THE DEVELOPMENT OF A PROGRAMME OF USER EDUCATION AT CHALMERS UNIVERSITY OF TECHNOLOGY LIBRARY

Thesis submitted for the Degree of Doctor of Philosophy of the University of Surrey.

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THE DEVELOPMENT OF A PROGRAMME OF USER EDUCATION
AT CHALMERS UNIVERSITY OF TECHNOLOGY LIBRARY

Abstract

This thesis describes the case history of the development of a programme of user education at Chalmers University of Technology Library, Gothenburg, Sweden.

It was shown, by means of user studies, that there was a need for instruction in the use of the library and its resources. The needs of student library users, as seen by students, academic staff, administrative staff, engineers and library staff, were studied. These views were used in the formulation of goals and objectives for the programme of user education.

A three stage programme was drawn up:

1. Orientation for new users.
2. An introductory course in information retrieval for undergraduates.
3. An advanced course in information retrieval for postgraduates.

Teaching methods and media were chosen for the various parts of the programme. Priority was given to the development of the introductory course in information retrieval for undergraduates and to library orientation,
as these would reach the largest group of potential library users.

The undergraduate course was evaluated in a number of ways, as part of the formative process development, and in order to provide information on the product of the instruction. Modifications were made in the course, and these have resulted in a model which now functions very well.

It has been shown that, by taking account of student needs, a successful course of library instruction, integrated into the general pattern of university studies, can be developed. This course is now attended by practically all the undergraduate students at the university.

One of the most important points arising from this work is that library user education is not an isolated function at the library. It needs to be integrated both into the general pattern of university studies and into the other functions and activities at the library.
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AT CHALMERS UNIVERSITY OF TECHNOLOGY LIBRARY

1 Introduction

In 1971, representatives from the School of Engineering Physics at Chalmers University of Technology asked the University Library to provide instruction for engineering undergraduates (see 6.4.2). During the same year, the Library was asked to take part in a postgraduate course on research techniques, by providing instruction on methods of information retrieval. At about the same time, it also became apparent that the traditional means of individual library instruction - by the reference librarian working at the readers' advisory desk - was a heavily overburdened service. This was hardly surprising, since the number of undergraduates had risen from 2,350 in 1960 to 3,700 in 1970. During this period of ten years, the number of qualified librarians on the library staff had increased from 7 to 8. When it is remembered that there has been a rapid increase in published scientific and technological information during these years, it can be readily understood that there were inadequate resources for individual instruction.

1.2 Purpose of the study

Against this background, it was decided to plan and develop a systematic programme of user instruction at Chalmers University of Technology Library. The
following thesis may be regarded as a "case study" in the development of this user education.

This "case study" has been related to the wider context of user education in Swedish university libraries. These have a traditional closed-stack pattern, with the greater part of the collections housed in a closed book store. Closed-stack libraries were primarily designed to preserve the book collection and their use is appropriate where the library has a clearly marked archival function. Three of the Swedish general university libraries, Gothenburg, Lund and Uppsala, share the national archive role with the Royal Library in Stockholm. Specialized university libraries, such as Chalmers University of Technology Library do not have this archive function, but have, however, retained the traditional closed-access system. Recent planning for Swedish University Libraries is in the direction of open-access. Thus the new university libraries of Umeå and Linköping have large parts of their collections on open-access shelves.

1.3 Outline of the programme of development

1.3.1 User studies

Within the general background of the Swedish University Library system, it was necessary to find out about the existing patterns of use and the needs for user education. Very few user surveys had been carried out, within recent years, in Swedish academic libraries.
For this reason a user survey was carried out at Chalmers Library (Chapter 2). This gave a certain amount of information on the use of one particular, specialized university library. For purposes of comparison, a similar survey was carried out at the Biomedical Section of Gothenburg University Library (Chapter 3). This is also a specialized university library, but differs from Chalmers Library in that a considerable portion of the collection is available on open shelves. It was hoped that these two surveys, which were based on similar structured interviews, would give information on the pattern of use and on user needs - information of great importance for the development of a programme of library user education.

1.3.2 Existing programmes of library user education

In designing a new programme of education for a specific institution, such as Chalmers University Library, it is useful to study courses of instruction at similar institutions in order to benefit from experience already obtained. Therefore a study was made of existing courses of library orientation and instruction at Scandinavian and British university libraries (Chapters 4 & 5). Even though the findings concerning the libraries of one country cannot necessarily be applied directly to those of another country, as there may be many differing factors in the two situations, such as for example library design or pattern of use, it was hoped that this survey would provide information about
teaching methods, course design, timing and contents, which would be useful in the planning of the programme of library user education at Chalmers University of Technology Library.

1.3.3 The planning of the programme of user education
An attempt was made to integrate the views of students, academic staff and library staff, in the formulation of goals and objectives for the proposed programme of user education at Chalmers University of Technology Library (Chapter 6). Courses were then planned, and methods of instruction chosen, in an attempt to realize the goals and objectives expressed (Chapter 7).

1.3.4 Evaluation of the user education programme
An important aspect of the work was the evaluation of the programme. This was carried out for two purposes - to assist in the design and development of the courses and to enable decisions to be made as to whether to continue with the courses or not. The latter part of the thesis deals with the evaluation of the programme so far carried out, in particular the evaluation of an introductory course in information retrieval for undergraduate engineering students. (Chapters 8 - 16).

1.4 The place for the study
1.4.1 Chalmers University of Technology
Chalmers University of Technology is situated in Gothenburg, Sweden. It is a state university
supervised by the Office of the Chancellor of the Swedish Universities (Universitetskanslersämbetet).

Chalmers University of Technology is one of the two universities in Gothenburg. The other is Gothenburg University, which has approximately 20,000 students, in the faculties of liberal arts, medicine and dentistry, natural sciences, economics and social sciences.

The educational programme at Chalmers University of Technology comprises undergraduate and postgraduate courses in various fields of engineering and in architecture. The undergraduate courses are of four years duration and lead to a degree equivalent to an M.Sc. The postgraduate courses lead to the degree of Doctor of Engineering, equivalent to a Ph.D. The research activities are of both basic and applied nature and are often supported by Government or industrial grants.

Chalmers University of Technology has about 3,500 undergraduates and 500 postgraduates. The university has 2,000 full-time employees - teachers, assistants, technicians and administrators. The budget of Chalmers, which is almost entirely based upon different government grants, was approximately £14.000.000 for the academic year 1974/75.

The University is primarily divided into six Schools of Engineering (sektioner):
School of Engineering Physics
School of Mechanical Engineering
School of Electrical Engineering
School of Civil Engineering
School of Chemical Engineering
School of Architecture

Each School of Engineering is led by a Dean (dekanus). Within each school there are several institutions (institutioner), each led by a Chairman (prefekt). The Deans and Chairmen are elected from the permanent members of the academic staff.

Academic year
The academic year, at Chalmers, starts at the beginning of September and ends at the beginning of June. This year is divided into two terms. No lectures are held during the summer vacations.

Undergraduate courses
Students, who enter Chalmers as undergraduates, have completed a 12-year education within the Swedish general school system (Primary, Secondary and High School levels), starting at the age of 7. During the last three years at school, some specialization in the natural sciences - mathematics, physics and chemistry has taken place within the broad general education programme, which includes languages and social subjects. The undergraduate programme takes about four years and leads to the degree of "civilingenjör" - equivalent to M.Sc. or M.Eng. Students in the School of Architecture are
awarded the degree of "arkitekt". The undergraduate programme includes a special research project of experimental or theoretical nature. Further details of courses within the different Schools can be obtained from the 1974 edition of "Some facts about Chalmers University of Technology" published by the university authorities. (Some facts about ... 1975).

Postgraduate courses
Postgraduate students must have obtained their "civilingenjör" or "arkitekt" degree. The duration of the postgraduate course is normally 4 years of full-time study. However, since most postgraduate students combine their studies with appointments as assistant teachers this period often becomes extended to 5 years. On an average 1/3 of the total effort is devoted to studies of advanced texts and research papers (followed by examinations) in the special field of each course. The remaining 2/3 are devoted to original research leading to a doctor's thesis, often comprising a number of internationally published research papers.

1.4.2 Chalmers University of Technology Library
Chalmers University is served by a main library plus a number of smaller section/departmental libraries. The main library includes a special chemistry section. The main library serves as central library for all Schools of Engineering at Chalmers University and also for certain departments of the University of Gothenburg -
Astronomy, Chemistry, Mathematics and Physics. The Library aims to provide information and documentation services to meet all levels of university requirements. In addition, the Library serves as a central library of technology for technical and industrial research institutions throughout Sweden, and in particular the West Coast region. The present library building, which is part of the university campus, was completed in 1961. The Library contains a 7 storey book-tower, a main reading room, with 56 study tables, a periodical reading room with 50 study tables, individual and group study rooms, a catalogue hall and staff working areas - see Figs. 1 and 2. The basement floor contains the technical facilities of the Library - book bindery, photographic and reproduction unit, and postal despatch area (Hemlin, 1961).
Lending activities/Library holdings

The extent of the library's lending activities is considerable - approximately 70,000 per year - with regard to interlibrary loans, lending is one of the highest for Swedish research libraries. At the end of the fiscal year 1973/74 the collections amounted to 260,000 volumes. The number of currently received periodicals was 4,700. Most of the collection is placed in a closed book magazine or "book-tower" to which borrowers do not have direct access. Material to be borrowed must be ordered on special order forms, which contain information on the unit to be borrowed and on the borrower. The material requested, if available, is then taken out of the store and brought
to the borrowing desk, where the user signs a receipt and the loan is registered. This process takes an average of about 5 minutes. The most recent numbers of some periodicals are available in the periodical reading room, and in addition the last 5 years of volumes of some periodicals are available for direct access in the reading room. See Fig. 1. There is a small collection of reference books - handbooks, encyclopedias, dictionaries etc. available in the main reading room. Bibliographic tools are placed on shelves round the catalogue hall, which contains "author catalogue", "subject catalogue" and "UDC abstract catalogue" - See Fig. 2. The bibliographic tools available are of general type, such as Science Citation Index, Engineering Index, British Technology Index, and subject orientated material, such as Electrical and Electronic Abstracts, Computer and Control Abstracts, etc. There are also small collections of project catalogues, institution addresses etc.

Hours of opening

The hours of opening for the main library are:

During term time

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday - Friday</td>
<td>9.00 - 16.15</td>
<td>(Full service)</td>
</tr>
<tr>
<td></td>
<td>16.15 - 20.00</td>
<td>(Partial service)</td>
</tr>
<tr>
<td>Saturday</td>
<td>9.00 - 12.00</td>
<td>(Partial service)</td>
</tr>
</tbody>
</table>

During the vacation

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday - Friday</td>
<td>9.00 - 16.00</td>
<td>(Full service)</td>
</tr>
<tr>
<td>In addition Wednesday</td>
<td>16.00 - 18.30</td>
<td>(Partial service)</td>
</tr>
</tbody>
</table>
Partial service means that the reading rooms are open and consequently the limited collections on open access. Borrowing from the material store can only take place under periods of full service.

1.4.3 Gothenburg University Library

Gothenburg University is served by the Gothenburg University Library, which, as has been pointed out in 1.2, is one of the Swedish depositary libraries. The University Library consists of the Main Library, which primarily serves the liberal arts and social science faculties, the Biomedical Section Library (see Chapter 3), and the Botany Library which serve the medical and dental faculties and part of the natural science faculties - (zoology and botany), and the Economics Library for students of economics. As has been mentioned in 1.4.2, Chalmers University Library serves as university library for students from certain departments from the natural science faculty of Gothenburg University - Astronomy, Chemistry and Physics. There is considerable cooperation between the two university libraries. Gothenburg University Main Library occupies a building completed in 1954, a description of the library building has been given by Boberg. (Boberg, 1954).
Chapter 2

A STUDY OF USER BEHAVIOUR AND NEEDS AT CHALMERS UNIVERSITY OF TECHNOLOGY LIBRARY

2.1 Introduction

User studies have been carried out by many libraries and library organisations, in attempts to find out the needs and attitudes of the library users, and adapt the services provided to meet these needs. Some important surveys are described in Maurice Line's excellent book "Library surveys" (Line, 1967) and bibliographies of user studies have been published by Davis and Bailey in 1964 (Davis & Bailey, 1964), Fishenden 1965 (Fishenden, 1965), De Weese 1967 (De Weese, 1967) and Wood in 1971 (Wood, 1971). A critical review of the surveys of scientists' use of libraries was written by Barber in 1966 (Barber, 1966) and a recent review entitled "Research in user behaviour in University Libraries" has been published by Ford in 1973 (Ford, 1973).

A number of user studies have been carried out in Scandinavia: for example, within research libraries, by Birkelund 1963 (Birkelund, 1963), and Sanner 1965 (Sanner, 1965), and Sanner and Turesson 1973 (Sanner & Turesson, 1973); for specific categories of users, such as scientists and engineers, by Törnudd 1968 (Törnudd, 1958); and for engineers working in industrial concerns, Törnudd 1967 (Törnudd, 1967), with reports from Denmark, Finland, Norway and Sweden.
(Meeodom, 1967; Scandinavian study of communication of information in industry, 1967; Collin & Löken, 1967; Selander & Nyström, 1967; Informasjonsundersøkelsen, 1971). Broad sociological studies have been carried out in the field of public libraries and these are described in "En bok om biblioteksforskning" (A book on library research) 1969, edited by Furuland and Brundin (Furuland & Brundin, 1969).

During the planning of a programme of library orientation/instruction at Chalmers University of Technology Library, it was decided to carry out an investigation on the use of the library and the needs of the users. The main aim of the investigation was to obtain information that could be used in the planning and development of the proposed courses of instruction for undergraduate and postgraduate students. As there were few studies on the use of Swedish university libraries, Sanner 1965 (Sanner, 1965), it was necessary to examine the pattern of library use in some detail. Thus information could be collected with regard to the various service functions of the library, such as opening hours, availability of material, adequacy of study facilities, etc. The service functions of the library are closely connected with information/instruction for users, in that users should be made aware of what services are available to them. At the same time, the user's general attitude to the library, is closely dependent on how he, or she,
experiences satisfaction with the services provided.

It was important to see if the pattern of use of the Swedish university library differed from the use of similar libraries in other countries. Methods used in one country, for example Britain or U.S.A., are often applied to apparently similar institutions in another country, without making allowance for any differences that might exist. Information on the general background pattern of university studies and library use was of importance for the planning of library instruction, in that any course in user instruction must form part of the integrated teaching programme of the university. Use could be made of existing experience, both within Sweden and from other countries, if the similarities and differences in the various situations had been examined.

2.2 Method

It was decided to make use of a series of interviews based on a carefully structured questionnaire - see Ch.2, Appendices 1 and 2. This method was chosen in view of its reliability, due to the high response rate as compared with the mailed questionnaire (Line, 1967, p.62; Wood, 1969). These interviews were carried out by a group of trained interviewers.

A very high proportion of Swedish students have their
own telephone. This enabled a method of telephone interview to be developed, which was time-saving and therefore less costly than the personal interview. The interviewer phoned the student in question and a suitable time was arranged for the interview, which followed the structured pattern, and took an average of 35 minutes. The telephone interview method eliminated the possibility of visual influence by the interviewer, thus removing one of the disadvantages of the personal interview. At the same time, it was possible to gauge whether the person answering was being flippant and to avoid misunderstandings as to the questions and the purpose of the survey. The time-saving factor was important, not only from the point of view of costs, but also in the speed at which the investigation could be carried out. The interview took place during a six week period in the spring term of 1973. Both undergraduate and postgraduate students were very cooperative (only 1 refusal out of 184 interviews). Many of the students commented that they were delighted (and surprised) that the library was now taking an interest in their views.

Engineering students at Chalmers University of Technology belong to one of six schools of engineering: Engineering, Physics, Mechanical Engineering, Electrical Engineering, Chemical Engineering and Architecture. It was important to try to measure needs, attitudes and library usage patterns in the
total student population, rather than in the more limited group of actual library users, in order to obtain a representative picture of usage patterns and user needs. As it would obviously have been far too expensive to interview the total population, it was necessary to employ some means of random sampling. This was done by making use of random lists (alphabetical lists of names) for undergraduates in each of the six schools of engineering, and for postgraduate students. The first individual was chosen at random and every nth person, thereafter in the list was interviewed where n = 30. A total of 142 undergraduates was interviewed - a random sample within a stratified population - and a total of 41 postgraduates were also questioned.

The material collected in this way was transferred to punched cards and analysed by means of an IBM 360/65 computer, using the OSIRIS programme system for statistical methods developed at the Institute for Social Research, University of Michigan, 1971 (OSIRIS, Users Manual 1971).

2.3 Results
The responses to the interviews have been divided into five main groups:

2.3.1 Pattern of university studies.
2.3.2 Family and housing situation.
2.3.3 Pattern of library use.
2.3.1 Pattern of university studies

The first part of the interview questionnaire was designed to investigate the general pattern of university studies for students at Chalmers University of Technology and to reveal similarities and differences in the undergraduate/postgraduate study situation.

Median values for the number of terms of study at Chalmers, for the students in the sample, were:

Undergraduates: 6 terms
Postgraduates: 14 terms

The Swedish academic year is divided into 2 terms, so these median values represent an undergraduate median of 3 years study (total course length is 4 to 5 years) and a postgraduate median of 7 years of study (doctoral studies, which follow the 4 - 5 year undergraduate period, may be spread over a relatively long period due to part-time work).

Distribution of the study population according to age is shown in Table I.
There was a strong bias of male students in the sample from Chalmers:

Undergraduates: 134 (94%) male, 8 (6%) female
Postgraduates 39 (95%) male, 2 (5%) female

These figures are in accordance with the traditional male bias towards engineering and applied science.

Whereas 93% of the undergraduates in the sample study full-time, only 19% of the postgraduates study full-time. This is due to the fact that many Swedish postgraduate students are employed as assistant lecturers with a teaching/demonstration etc. quota of 1,000 hours per year. The remainder of their working time is spent on research work/doctoral studies.

The number of hours spent on time-tabled studies is shown in Table II.
### Table II. Hours of time-tabled study per week.

As may be expected undergraduates have a high proportion of time-tabled studies — lectures, demonstrations and laboratory studies — 86% had more than 20 hours per week. Postgraduates, on the other hand, have far less scheduled teaching in their individual study programmes.

Table III shows where the students carry out their non-time-tabled optional studies:

### Table III. Places in which optional studies are carried out.

A high proportion of both undergraduate (91%) and postgraduate students (76%) study at home. Post
graduates study at their departments or institutions (93%) in contrast to the undergraduates (9%)—most of the postgraduates at Chalmers have their own rooms or places for study in their departments. Postgraduates make greater use of Chalmers University Library (17%) than undergraduates (6%), and considerably more use of their departmental libraries (44%) as compared with undergraduates (9%). In Swedish universities, the development of departmental libraries has followed, to some extent, the German "Seminar Library" pattern. (Fischer 1950–60; Thompson, 1942; Grönberg, 1970). The departmental libraries vary considerably with respect to availability of material, due to differences in opening hours, limited space, persons to which access is granted etc. Most postgraduate students are granted free access to their departmental libraries, whereas undergraduates have, as a rule, very limited access to these collections. Undergraduates from Chalmers make relatively little use of the public library, which may be due to the large amount of time-tabled study in the undergraduate courses and the fact that Chalmers University campus lies some 3 km. from the main public library in Gothenburg.

2.3.2 The family and accommodation situation
The family and accommodation situation of the students was studied in order to see if these influenced the pattern of library use in any way.
10% of the undergraduates and 30% of the postgraduates, in the sample, had children, and of these students, 12 (85%) of the undergraduates and 7 (58%) of the postgraduates said that they had someone to look after the children.

A comparison of the place of study for students with/without children was made, the results of which can be seen in Table IV:

<table>
<thead>
<tr>
<th>Place of study</th>
<th>U With children</th>
<th>U Without children</th>
<th>P With children</th>
<th>P Without children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home</td>
<td>77%</td>
<td>93%</td>
<td>67%</td>
<td>79%</td>
</tr>
<tr>
<td>University dept.</td>
<td>8%</td>
<td>9%</td>
<td>92%</td>
<td>93%</td>
</tr>
<tr>
<td>Univ. library</td>
<td>15%</td>
<td>5%</td>
<td>25%</td>
<td>14%</td>
</tr>
<tr>
<td>Dept. library</td>
<td>15%</td>
<td>9%</td>
<td>50%</td>
<td>39%</td>
</tr>
<tr>
<td>Public library</td>
<td>8%</td>
<td>2%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table IV. Effect of children on place of study.

It would seem that both undergraduates and postgraduates, who have children, study at home less than those without children. The group with children make proportionately more use of the various types of library as a place for study than do the groups without children. Further analysis of the differences between those who had someone to look after their children and those who had not, revealed that those undergraduates who had no one to look after their children studied at home more, and made less use
of various libraries than did undergraduates who had someone to look after their children. Similar tendencies were not observable in the corresponding postgraduate groups. It must be pointed out that these results represent only small groups of users, so that the tendencies observed would have to be confirmed by further studies before any general conclusions could be drawn from them.

Type of accommodation for the students can be seen in Table V:

<table>
<thead>
<tr>
<th>Type of accommodation</th>
<th>U %</th>
<th>P %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student hostel/flat</td>
<td>29</td>
<td>12</td>
</tr>
<tr>
<td>Parents' home</td>
<td>45</td>
<td>0</td>
</tr>
<tr>
<td>Own flat/house</td>
<td>60</td>
<td>29</td>
</tr>
<tr>
<td>Digs</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Some other place</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

Table V. Type of accommodation of students at Chalmers.

It can be seen that a relatively high proportion of Chalmers students (42% of the undergraduates and 71% of the postgraduates) live in their own flats or houses.

In a large city such as Gothenburg (population 400,000) many families live at some distance from the city centre. Chalmers University which is situated fairly close to the centre of the city
(about 5 km) has a compact campus in which the Library occupies a fairly central position. The distribution of students according to the distance between their home and the university is shown in Table VI:

<table>
<thead>
<tr>
<th>Distance from Chalmers</th>
<th>U</th>
<th>%</th>
<th>P</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 km.</td>
<td>33</td>
<td>23</td>
<td>9</td>
<td>22</td>
</tr>
<tr>
<td>1 - 2 km</td>
<td>34</td>
<td>24</td>
<td>11</td>
<td>27</td>
</tr>
<tr>
<td>3 - 5 km</td>
<td>23</td>
<td>16</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>6 - 10 km</td>
<td>32</td>
<td>23</td>
<td>8</td>
<td>20</td>
</tr>
<tr>
<td>over 10 km</td>
<td>20</td>
<td>14</td>
<td>10</td>
<td>24</td>
</tr>
</tbody>
</table>

Table VI. Distribution according to distance of home from Chalmers

2.3.3. Pattern of library use

The existing pattern of library use at Chalmers University of Technology was of particular interest and a number of questions were designed to collect information about this.

Set course literature represents a sizeable output in many student budgets and it was of interest to know, roughly, how much of the literature was bought by the students. This can be seen in Table VII:
<table>
<thead>
<tr>
<th>Amount of literature bought</th>
<th>U %</th>
<th>P %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practically all</td>
<td>131</td>
<td>9</td>
</tr>
<tr>
<td>About half</td>
<td>8</td>
<td>19</td>
</tr>
<tr>
<td>Practically none</td>
<td>3</td>
<td>13</td>
</tr>
</tbody>
</table>

Table VII. Amount of literature bought by students.

A very high proportion of undergraduates bought most of their literature (92%), whereas only 22% of the postgraduates bought so much.

A certain proportion of literature is borrowed by all students, and they were asked to indicate which of various libraries were used for this purpose. This can be seen in Table VIII:

<table>
<thead>
<tr>
<th>Library</th>
<th>U %</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chalmers main library</td>
<td>53</td>
<td>75</td>
</tr>
<tr>
<td>Departmental library</td>
<td>26</td>
<td>100</td>
</tr>
<tr>
<td>Chemistry library</td>
<td>6</td>
<td>27</td>
</tr>
<tr>
<td>Gothenburg University central library</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Gothenburg University biomedical library</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Public library</td>
<td>27</td>
<td>7</td>
</tr>
<tr>
<td>&quot;Other&quot; library</td>
<td>5</td>
<td>22</td>
</tr>
</tbody>
</table>

Table VIII. Libraries from which literature for studies is borrowed.
Undergraduates borrowed first and foremost from Chalmers main library, their departmental libraries and the Gothenburg public library. Postgraduates borrowed from the departmental library and Chalmers main library. At the Gothenburg public library, student literature is purchased if this is thought to fill a general demand. This results in a somewhat uneven representation of the different subjects and a concentration on undergraduate level literature, as opposed to the more specialized material. "Other" libraries include libraries situated near the students' vacation address, other research libraries, etc.

Amount of use and frequency of use of the various libraries were then investigated. These two factors are not necessarily correlated, for example a student may visit his departmental library for a few minutes each day thus showing high use frequency for a short amount of time. Questions with regard to the "average" amount of time spent on a given function during a term are notoriously unreliable; therefore no attempt has been made to correlate frequency/amount of use with other factors. The values shown in Tables IX - XII are therefore used to give rough indications of the pattern of use of the various libraries:
<table>
<thead>
<tr>
<th>Hours/week</th>
<th>Chalmers University</th>
<th>Gothenburg University</th>
<th>Public library</th>
<th>&quot;Other&quot; library</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Main library</td>
<td>Dept. library</td>
<td>Chemistry library</td>
<td>Central Library</td>
</tr>
<tr>
<td>% of sample</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>11 - 20</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>6 - 10</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>5 or less</td>
<td>54</td>
<td>54</td>
<td>54</td>
<td>54</td>
</tr>
</tbody>
</table>

Table IX: Amount of use of various libraries by undergraduates

<table>
<thead>
<tr>
<th>Hours/week</th>
<th>Chalmers University</th>
<th>Gothenburg University</th>
<th>Public library</th>
<th>&quot;Other&quot; library</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Main library</td>
<td>Dept. library</td>
<td>Chemistry library</td>
<td>Central Library</td>
</tr>
<tr>
<td>% of sample</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>11 - 20</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>6 - 10</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>5 or less</td>
<td>83</td>
<td>83</td>
<td>83</td>
<td>83</td>
</tr>
</tbody>
</table>

Table X. Amount of use of various libraries by postgraduates

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Chalmers University</th>
<th>Gothenburg University</th>
<th>Public library</th>
<th>&quot;Other&quot; library</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of sample</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>6 days/week</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4-5 days/week</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>1 day/week</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>once a fortnight</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>once a month</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>less than once a month</td>
<td>17</td>
<td>17</td>
<td>17</td>
<td>17</td>
</tr>
</tbody>
</table>

Table XI. Frequency of use of various libraries by undergraduates

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Chalmers University</th>
<th>Gothenburg University</th>
<th>Public library</th>
<th>&quot;Other&quot; library</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of sample</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>6 days/week</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4-5 days/week</td>
<td>63</td>
<td>63</td>
<td>63</td>
<td>63</td>
</tr>
<tr>
<td>1 day/week</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>once a fortnight</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>once a month</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>less than once a month</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>

Table XII. Frequency of use of various libraries by postgraduates
From Table IX to X, it can be seen that postgraduates make greater use of their departmental libraries than do undergraduates. The latter, in contrast, make greater use of the public library which is open until 22.00 each night. With regard to frequency of use (Table XI and XII), postgraduates and undergraduates show a marked difference in frequency of use of both their departmental libraries and Chalmers main library. This may well be related to the fact that postgraduates borrow a greater amount of literature for studies than the undergraduates.

Both undergraduates and postgraduates were asked to state for what purposes they used Chalmers main library, and these are shown in Table XIII:

<table>
<thead>
<tr>
<th>Use of Chalmers main library</th>
<th>U</th>
<th>%</th>
<th>P</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>To borrow books/journal articles</td>
<td>40</td>
<td>28</td>
<td>37</td>
<td>90</td>
</tr>
<tr>
<td>A place for study - own material</td>
<td>41</td>
<td>29</td>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>A place for study - reserve book coll.</td>
<td>15</td>
<td>11</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Essay writing</td>
<td>7</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>To carry out lit. searches &amp; use reference coll.</td>
<td>50</td>
<td>35</td>
<td>22</td>
<td>54</td>
</tr>
<tr>
<td>Social reasons</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table XIII. Purposes for which students use Chalmers main library.
It can be seen from Table XIII that undergraduates use the main library for three main purposes: to carry out literature searches and make use of the reference collection, for studying their own material and for borrowing books and journal articles. Postgraduates mainly use the library for borrowing purposes, for literature searches and to a less extent for study purposes. Further, more detailed, studies of the use of the main library have been carried out, the results of which will be published in a separate paper.

Adequacy of services provided by Chalmers University Library

A series of questions designed to reveal the adequacy of some of the services provided by Chalmers Main Library was asked. The hours of opening for the main library are:

During term time:

Monday - Friday  9.00 - 16.15  (Full service)
                  16.15 - 20.00  (Reduced service)
Saturday          9.00 - 12.00  (Reduced service)

During the vacation:

Monday - Friday  9.00 - 16.00  (Full service)

In addition
Wednesday        16.00 - 18.30  (Reduced service)

Students were asked whether these hours of opening were sufficient for their needs. 129 (91%) of the
undergraduates and 31 (76%) of the postgraduates said that the hours of opening were adequate, and 9 (6%) of the undergraduates and 9 (22%) of the postgraduates were dissatisfied with the hours of opening. Postgraduates commented that the library maintained only a reduced service during the evenings and on Saturdays - times at which they would have liked to make use of the library's facilities.

Students were then asked if there was always a study place available when they wanted to work at Chalmers main library. Their responses are shown in Table XIX:

<table>
<thead>
<tr>
<th>Availability of study place</th>
<th>U %</th>
<th>P %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always</td>
<td>25</td>
<td>63</td>
</tr>
<tr>
<td>Nearly always</td>
<td>12</td>
<td>30</td>
</tr>
<tr>
<td>Sometimes</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Never</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>(Do not work there)</td>
<td>102</td>
<td>29</td>
</tr>
</tbody>
</table>

(= % of those who wished to work there)

Table XIV. Availability of study place

In order to obtain some information on the adequacy of holdings of the books and periodicals at the main library, students were asked how often they had not been able to immediately obtain recommended course literature the past year. Results can be seen in Table XV:
Table XV. Availability of set material

These figures show that most of the student users of Chalmers main library can borrow set literature without too long a delay. A similar study of the availability of non-course literature was carried out. See Table XVI. In this case postgraduates, with their greater need for wider reading, stated that they very often (2%) or often (24%) had to wait for material, whereas the corresponding figures for undergraduates were much lower.

Table XVI. Availability of non-set material
Students were asked whether or not there are people at Chalmers library who could help to find the material they needed. Nearly all students (88%) of the undergraduates and (93%) of the postgraduates stated that there were people who could help them. Very few, (2%) of the undergraduates found it difficult to ask for help, but 10% of the postgraduates had thought they would have some difficulty—perhaps due to the more specialized information that they required. 71% of the undergraduates and 90% of the postgraduates had asked for help at some time.

The students were also questioned as to the general helpfulness of the library staff, as can be seen in Table XVII:

<table>
<thead>
<tr>
<th>The library staff are</th>
<th>U %</th>
<th></th>
<th>P %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always very helpful</td>
<td>92</td>
<td>65</td>
<td>22</td>
</tr>
<tr>
<td>Helpful but often busy</td>
<td>23</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Not particularly helpful</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Never helpful</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Do not know</td>
<td>27</td>
<td>19</td>
<td>2</td>
</tr>
</tbody>
</table>

Table XVII. Helpfulness of library staff

2.3.5 User instruction

As a programme of user instruction was planned, it was of particular interest to obtain information on the present types of library instruction available and on the needs for such courses. University students have, as a rule, experience of other types of library
before starting to use the University Library. It was of interest to try to find out about this pre-university use of libraries, which gives the background of knowledge on which subsequent instruction can be based.

Students were asked whether, or not, they had received instruction in how to use a library, while at school. 93 (65%) of the undergraduates had received some training in library use, whilst none of the postgraduates could remember this. Regular training in the use of libraries had been introduced rather recently in the Swedish school curriculum, which may afford some explanation of these figures. Similarly, nearly all the undergraduates stated that they had had access to a school library (91%), whereas the corresponding figure for postgraduates was 66%. Use of the school library, where this existed, was for both study and recreational purposes, as can be seen in Table XVIII:

<table>
<thead>
<tr>
<th>Use of school library</th>
<th>U</th>
<th>%</th>
<th>P</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mostly for studies</td>
<td>28</td>
<td>22</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Mostly for recreation</td>
<td>45</td>
<td>35</td>
<td>7</td>
<td>26</td>
</tr>
<tr>
<td>Both study and recreation</td>
<td>33</td>
<td>26</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Did not use</td>
<td>23</td>
<td>18</td>
<td>17</td>
<td>63</td>
</tr>
</tbody>
</table>

(\% = \% of those who had school library)

Table XVIII. Use of school library
The other type of library which students could be expected to have experience of, before entering university, was the public library. Practically all students, 93% of the undergraduates and 98% of the postgraduates, had used the public library before starting their university studies. Again the purpose of use was sought, see Table XIX:

<table>
<thead>
<tr>
<th>Use of public library</th>
<th>U % of sample</th>
<th>P %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mostly for studies</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>Mostly for recreation</td>
<td>96</td>
<td>68</td>
</tr>
<tr>
<td>Both study and recreation</td>
<td>26</td>
<td>18</td>
</tr>
</tbody>
</table>

Table XIX. Use of public library

The way in which a public library was used might possibly affect, by training, the later use of, for example, a subject catalogue at the university library.

Students were also asked whether, or not, they had received any form of written or verbal instruction in how to use Chalmers University Library. 47 undergraduates (33%) and 22 (54%) of the postgraduates had, at some time, received some form of instruction in the use of the Chalmers Library. Of these groups, instruction had been received at different times, see Table XX:
The number of students who had received some form of instruction was necessarily small, as there was little organized instruction in library use at Chalmers University. (See Chapter 1). Obviously the students questioned could have received instruction at several different times, and in several ways. In such cases there was no practical way of separating what was learnt at each particular time. It so happened, however, that the undergraduates interviewed said that they received instruction at one particular time, whereas a number of the postgraduates, as might be expected with students who had studied for a longer period of time, had received instruction on two or more different occasions. The form of the instruction can be seen in Table XXI:

<table>
<thead>
<tr>
<th>Time for library instruction</th>
<th>U</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>First 2 weeks of first term</td>
<td>19</td>
<td>.40</td>
</tr>
<tr>
<td>Later during first term</td>
<td>11</td>
<td>23</td>
</tr>
<tr>
<td>During second term</td>
<td>9</td>
<td>19</td>
</tr>
<tr>
<td>Later</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Didn't remember</td>
<td>4</td>
<td>9</td>
</tr>
</tbody>
</table>

Table XX. Time at which library instruction was received.
<table>
<thead>
<tr>
<th>Form of training</th>
<th>U %</th>
<th>P %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written instruction</td>
<td>7  15</td>
<td>0  0</td>
</tr>
<tr>
<td>Verbal instruction by academic staff</td>
<td>5  11</td>
<td>1  5</td>
</tr>
<tr>
<td>Verbal instruction by library staff</td>
<td>18 38</td>
<td>11 50</td>
</tr>
<tr>
<td>Written instruction + verbal - academic staff</td>
<td>9  19</td>
<td>2  9</td>
</tr>
<tr>
<td>Written instruction + verbal - library staff</td>
<td>4  9</td>
<td>3  14</td>
</tr>
<tr>
<td>Verbal instruction academic + library staff</td>
<td>1  2</td>
<td>2  9</td>
</tr>
<tr>
<td>Written + verbal - academic staff + library staff</td>
<td>0  0</td>
<td>2  9</td>
</tr>
<tr>
<td>Other</td>
<td>2  4</td>
<td>1  5</td>
</tr>
<tr>
<td>Forgotten</td>
<td>1  2</td>
<td>0  0</td>
</tr>
</tbody>
</table>

Table XXI. Form of instruction received (percentages of those who have received instruction).

83% of the undergraduates and 61% of the postgraduates who had received instruction, stated that this had been useful.

Students were asked a series of questions designed to explore their knowledge of the basic tools for carrying out an information search.

In a closed-access library collection, such as that at Chalmers main library, the importance of the use of the catalogue is obvious. The catalogue provides the link between the user and the material that he/
she wishes to borrow. When carrying out a subject orientated literature search, the subject catalogue ought to provide one of the most important means of access, particularly for the undergraduate students, who require general introductory works which should be listed in the catalogue.

Against this background, students were asked whether or not the main library had a subject catalogue. 29% of the undergraduates and 12% of the postgraduates did not know whether there was a subject catalogue or not.

Of those who knew that there was a subject catalogue at Chalmers University Library, 29% of the undergraduates and 19% of the postgraduates said that they did not use it. See Table XXII:

<table>
<thead>
<tr>
<th>Difficulties in using the subject catalogue</th>
<th>U</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>of those who</td>
<td>aware of</td>
</tr>
<tr>
<td></td>
<td>are</td>
<td>catalogue</td>
</tr>
<tr>
<td>Have difficulty</td>
<td>12</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>44</td>
</tr>
<tr>
<td>No difficulty</td>
<td>60</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>59</td>
<td>30</td>
</tr>
<tr>
<td>Do not use it</td>
<td>29</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>29</td>
<td>19</td>
</tr>
</tbody>
</table>

Table XXII. Difficulties in use of the subject catalogue.

Thus less than half of the student population was aware of the existence of the subject catalogue and had managed to use it with some degree of success.
Students were then asked about their awareness of the existence of abstract publications, index publications and other bibliographic aids. Results can be seen in Table XXIII:

<table>
<thead>
<tr>
<th>Has Chalmers University Library?</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Don't know</td>
</tr>
<tr>
<td>% of sample</td>
<td>U</td>
<td>P</td>
<td>U</td>
</tr>
<tr>
<td>Abstracts</td>
<td>25</td>
<td>71</td>
<td>2</td>
</tr>
<tr>
<td>Indexes</td>
<td>32</td>
<td>66</td>
<td>1</td>
</tr>
<tr>
<td>Other bibliographic aids</td>
<td>46</td>
<td>66</td>
<td>1</td>
</tr>
</tbody>
</table>

Table XXIII. Awareness of existence of aids for information retrieval

A large proportion of the undergraduates, 53 - 73% admitted that they did not know that the library possessed essential aids for information retrieval, and about a third of the postgraduates did not know if these tools were available at their main university library.

7% of the undergraduates and 41% of the postgraduates said that they had experienced difficulties in using these tools - figures which reflect on the general level of use within the two groups.

Students were asked what methods they would use to obtain information on a new subject topic within a new field of studies. It was pointed out that the methods were not mutually exclusive, i.e. one could make use of several methods. Results are shown in Table XXIV:
Table XXIV. Method used to obtain information on a new subject topic.

<table>
<thead>
<tr>
<th>Method used</th>
<th>U (%)</th>
<th>P (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject catalogue</td>
<td>66</td>
<td>27</td>
</tr>
<tr>
<td>Author catalogue</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Subject bibliography</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Ask member of academic staff</td>
<td>25</td>
<td>21</td>
</tr>
<tr>
<td>Ask member of library staff</td>
<td>86</td>
<td>14</td>
</tr>
<tr>
<td>Friend/colleague</td>
<td>8</td>
<td>18</td>
</tr>
</tbody>
</table>

It is somewhat surprising to see that 6% of the undergraduates and 20% of the postgraduates would make use of the author catalogue to find out about a new subject topic.

Students were asked whether they had ever heard of interlibrary loans. 51 (36%) of the undergraduates and 33 (80%) of the postgraduates had heard of these. 45 (32%) of the undergraduates and 30 (73) of the postgraduates could state what they were. Only 14% of the undergraduates had made use of the interlibrary loan service whereas 73% of the postgraduates had used this service. These figures may be explained by the different literature needs of the two groups - undergraduates have a high proportion of set course material, whereas postgraduate students need to use a wider range of material, much of which may lie outside the collection of their own university library.
I decided to see whether there were measurable differences between those undergraduates who had received library instruction whilst at Chalmers University and those who had not, with regard to knowledge of the existence of the subject catalogue, abstracts, indexes, other bibliographic aids and interlibrary loan services. The results can be seen in Table XXV:

<table>
<thead>
<tr>
<th>Knowledge of existence</th>
<th>Received instruction (47)</th>
<th>No instruction (95)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Subject catalogue</td>
<td>81</td>
<td>67</td>
</tr>
<tr>
<td>Abstracts</td>
<td>43</td>
<td>17</td>
</tr>
<tr>
<td>Indexes</td>
<td>55</td>
<td>20</td>
</tr>
<tr>
<td>Bibliographic aids</td>
<td>57</td>
<td>41</td>
</tr>
<tr>
<td>Interlibrary loans</td>
<td>43</td>
<td>32</td>
</tr>
</tbody>
</table>

Table XXV. Effect of instruction on awareness of tools for information retrieval.

As so few students at Chalmers University had received instruction in the use of the library and its resources, it would have required a much larger sample of students to obtain detailed information about the effect of the instruction on awareness of tools for information retrieval. This would have been outside the scope (and resources) of this background study. However in view of the fact that the user study was intended to provide preliminary information which would be useful for the development of a programme of user
education, an examination of the effects of time and methods of instruction on awareness of tools for information retrieval was made.

As was stated earlier, the 47 undergraduates who had received instruction in library use, said that this had occurred at one of the times given in Table XX. This enabled a comparison to be made between time of instruction and awareness of tools for information retrieval. As there were so few students concerned, they have been divided into two groups - those who received instruction during the first term (30) and those who received instruction during the second term or later (13). See Table XXVI:

<table>
<thead>
<tr>
<th>Knowledge of existence</th>
<th>1st term instruction %</th>
<th>Later instruction %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject catalogue</td>
<td>23  77</td>
<td>12  92</td>
</tr>
<tr>
<td>Abstracts</td>
<td>10  39</td>
<td>10  77</td>
</tr>
<tr>
<td>Indexes</td>
<td>13  43</td>
<td>10  77</td>
</tr>
<tr>
<td>Bibliographic aids</td>
<td>16  53</td>
<td>9   69</td>
</tr>
<tr>
<td>Interlibrary loans</td>
<td>13  43</td>
<td>7   54</td>
</tr>
</tbody>
</table>

Table XXVI. Effect of point of time of instruction on awareness of tools for information retrieval.

As has been seen from Table XXI, undergraduates had in several cases been exposed to more than one method of instruction (in spite of the fact that only one particular time for this instruction was given). A comparison was made between those who stated that
they had received one type of instruction and those who had received more than one type of instruction, with respect to awareness of tools for information retrieval. See Table XXVII:

<table>
<thead>
<tr>
<th>Knowledge of existence</th>
<th>Single method</th>
<th>More than 1 method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30 students</td>
<td>14 students</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Subject catalogue</td>
<td>24 80</td>
<td>11 79</td>
</tr>
<tr>
<td>Abstracts</td>
<td>10 33</td>
<td>10 71</td>
</tr>
<tr>
<td>Indexes</td>
<td>15 50</td>
<td>11 79</td>
</tr>
<tr>
<td>Bibliographic aids</td>
<td>16 53</td>
<td>12 86</td>
</tr>
<tr>
<td>Interlibrary loans</td>
<td>14 47</td>
<td>7 50</td>
</tr>
</tbody>
</table>

Table XXVII. Effect of more than one method on awareness of tools for information retrieval.

At the end of the interview, students were given the opportunity of making suggestions for improvement, or commenting on anything they thought to be of particular value. There were a number of comments expressing rather vague general satisfaction - "The library staff are always nice and helpful". There were not many complaints or suggestions for improvement, and those made fell into a few main groups. 6 postgraduates specifically stated that they wished for more instruction in methods of information retrieval. 3 postgraduates and 6 undergraduates suggested that the library should have longer opening hours. 6 undergraduates wished to have rooms for individual study and one undergraduate complained of the length of waiting time for ordered material.
2.4 Discussion
2.4.1 Patterns of library use

It is interesting to compare the patterns of library use at Chalmers with patterns of library use at other institutions of higher education. A comprehensive survey of the undergraduate use of the university library was the "UGC Survey on the undergraduate use of libraries" carried out at 23 British Universities by Marplan Ltd., for the U.G.C. in 1966 (University Grants Committee, 1967). Another undergraduate survey was carried out by Line at Southampton in 1962. "Student attitudes to the University Library" (Line, 1963) and this was repeated by Line and Tidmarsh in 1965 (Line & Tidmarsh, 1966). Surveys have been carried out at Leeds University Library in 1957 and 1960 (Tucker, 1959; Tucker, 1961). A comparison of use of libraries in two countries is interesting; differences observed may well be due to a complex pattern of cultural factors. For example, in one study, it was found that physicists in Britain relied on formal channels of communication to a great extent, whereas physicists in USA made greater use of informal channels, Slater and Keenen, 1967 (Slater & Keenen, 1967). In spite of the difficulties, some attempts at comparison have been made.

Students at Chalmers made use of a number of different libraries for borrowing material for study. However very little material was borrowed totally. Use of
of the main university library and departmental libraries for borrowing of study material is seen in Table XXVIII:

<table>
<thead>
<tr>
<th>Purpose of use</th>
<th>Borrowing material</th>
<th>Main library %</th>
<th>Dept. library %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chalmers</td>
<td></td>
<td>53</td>
<td>26</td>
</tr>
<tr>
<td>UGC Survey</td>
<td></td>
<td>83</td>
<td>71</td>
</tr>
<tr>
<td>Southampton 1962</td>
<td></td>
<td>51</td>
<td>52</td>
</tr>
</tbody>
</table>

Table XXVIII. Undergraduate borrowing at university libraries.

Note: The U.G.C. survey figures represent undergraduates from the faculties of social science, arts, pure science and applied science. Values for science undergraduates have been taken from the Southampton survey. The report on the U.G.C. survey states that "Arts students are more likely to use the main library, than those in the science disciplines." As can be seen from Table XXIV, students from different places use their main university library to a rather similar extent for borrowing purposes. With regard to purposes of general study, however, a different state of affairs seems to exist between students at Chalmers University and their British counterparts. Thus 6% of the students at Chalmers said that they used the main library for optional studies, and 9% made use of departmental libraries for the same purpose. Line's Southampton survey of 1962 showed that 77% of the
science undergraduates used the main library for working with their own books and 34% used departmental libraries for these purposes. The U.G.C. survey states that the proportion of users using the main library for general study was 72%, with 66% using the departmental library. However, the U.G.C. survey also compared places where reading and writing for study projects could be done. 21% of the total student sample claimed to do most of such reading at the main university library, with a further 13% who used one of the other university libraries. Highest percentages were to be found among students from the social science faculties, and lowest for students of the applied science. In addition, there were marked differences between universities - thus 44% used the main library for reading at Sussex and only 6% at Durham. It is suggested that the difference reflected to some extent the pattern of living structure in the universities. The residential college system at Durham where most of the reading would be done in nearby student halls of residence, as opposed to conditions at Sussex where many students live some distance from the campus. There was an inverse relationship between the conditions for work at home and use of the university library for reading and writing. Those students who lived in colleges or halls of residence with study facilities did most of their studying there. Science students, in particular
emphasized that they preferred to study at the place where they kept their own books and notes. The pattern of use for writing study projects was very close to that for reading for study projects. These reasons may account for the relatively small use made of Chalmers main library, by the undergraduates as a place of regular study. As can be seen in Table VI, 63% of the students live within 5 km of the library. It must also be remembered that many students at Chalmers have a car or motor cycle etc., and can easily return home for any free time. From the study of type of accommodation, it could be seen that many students had their own flat or lived in student hostels or at home, and have adequate study facilities. This illustrates some of the difficulties of making comparisons in patterns of library use from the results of different surveys; strict comparison is only possible if similar questions, with no possibility of misinterpretation, are asked.

Frequency of use had been investigated in similar ways in this survey of user patterns at Chalmers and in Sanner & Turesson's 1973 survey of use at the Library at the Caroline Institute of Medicine, Stockholm, and in the U.G.C. survey and the results obtained are shown in Table XXIX:
Frequency of use and quantity of use are not necessarily correlated. The average British university undergraduate was found to visit the library two or three times a week, but to work there for less than 5 hours per week. Bearing in mind the difficulties of comparison, it seems that undergraduates at Chalmers and the Caroline Institute make less use of their university libraries than do their British counterparts. A tentative explanation might be that differences in frequency of use of university libraries in the two countries might be partly due to social conditions and partly due to availability of material. British University Libraries have large proportions of their collections available on open access shelves. The two Swedish libraries described here - Chalmers and the Caroline Institute - both have mainly closed access collections, with, at the times of the surveys, limited hours of opening.
with a fully staffed library service (during term

time Chalmers has fully staffed main library for

$7^{1/4}$ hours during weekdays, the corresponding

figures for the Caroline Institute Library were

8 hours on weekdays, 5 hours on Fridays, and 3 hours

on Saturdays).

As a consequence of the findings at the Caroline

Institute Library, full library service has now

been made available between 10.00 and 20.00 on week­

days and between 10.00 and 13.00 on Saturdays. This

increased opening is in the nature of an experiment.

It may be that increased hours of fully staffed

service will result in an increased use of material,

but such changes will probably be very gradual as

they would depend on changes in established borrowing

patterns. Increases in opening hours were suggested

by the postgraduate users at Chalmers (22%).

The influence of the family situation on the pattern

of library use was studied. Both undergraduates and

postgraduates with children made more use of various

libraries and studied less often at home. Under­

graduates who had no one to look after their children

studied at home and made less use of libraries.

These findings were obtained from a very small group

of users, but are regarded as being of such interest

that further studies will be carried out to see if a

general pattern exists in which studies are dependent
on the child-care situation. This is of importance with regard to the provision of nursery places for the children of students.

2.4.2 Adequacy of services provided

Users of Chalmers University Library seem to be satisfied with many of the services provided. A place for study was always/nearly always available if and when required. Library staff were considered to be very helpful/helpful by the vast majority of students, who were aware that there were library staff who could help them. Only 2% of the undergraduates found it difficult to ask for help. This may be contrasted with the 21% of undergraduates in the U.G.C. survey and the 40% of the science undergraduates in Line's 1962 survey who said that they were reluctant to put questions to the library staff.

Set books were mostly available when required. This was in contrast to the situation at the Caroline Institute Library, where 44% of the undergraduates and 27% of the postgraduates stated that set course literature had very often/often been unavailable. Opening hours were considered adequate by nearly all the undergraduates, but not by 22% of the postgraduates who would have preferred longer opening hours with full library service. This expression of satisfaction need not necessarily mean that the services provided are adequate, but that people accept the conditions imposed upon them, such as closed-access libraries.
with restricted hours of opening, and that if they have no wider frame of reference or experience of alternative solutions; such conditions may be regarded as satisfactory. It is interesting to note that user criticism at Chalmers came from the postgraduate students - the more qualified and experienced group of users in the survey.

One may conclude, however, from the survey, that the average user/potential user of Chalmers University Library has a positive attitude to the library, and that this positive attitude can be of great help in courses of user instruction.

2.4.3 User instruction

In view of the planning of a programme for user instruction, it was of great interest to obtain information on the existing state of knowledge about some of the basic tools of information retrieval. In addition, it was also of interest to find out what proportions of students had received training in library use and if this affected their knowledge of methods of information retrieval. The proportion of undergraduates, at Chalmers, who claimed to know of the existence of bibliographic tools, were as follows:

<table>
<thead>
<tr>
<th>Tool</th>
<th>U</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>25</td>
<td>71</td>
</tr>
<tr>
<td>Indexes</td>
<td>32</td>
<td>66</td>
</tr>
<tr>
<td>&quot;Others&quot;</td>
<td>46</td>
<td>66</td>
</tr>
</tbody>
</table>
These may be compared with undergraduates in the U.G.C. survey of British University Libraries: abstracts 37%, indexes 33%, "others" 22%. Postgraduates, at Chalmers, were much more aware of the existence of these tools: abstracts 71%, indexes 66%, "others" 66%.

At Chalmers University Library, with its closed-access collection, students are particularly dependent on the catalogues as instruments for ordering literature, and therefore one could expect a relatively large proportion of the students to be aware of the existence of a subject catalogue. This expectation was borne out by the responses: 71% of the undergraduates and 88% of the postgraduates were aware of the existence of a subject catalogue, whereas only 28% of the undergraduates in U.G.C. survey knew that these existed at their university libraries. Nevertheless, only 51% of the undergraduates, and 71% of the postgraduates, at Chalmers said that they made use of this, and 44% of the postgraduates said that they had experienced difficulties, in its use. When students were asked which method they would use to find out about information on a new subject topic, 6% of the undergraduates and 20% of the postgraduates said that they would make use of the author catalogue. This was rather surprising and indicated that the students were unclear as to the differences between the two basic library
functional procedures - identification of a known object and searching for material on a given topic. They knew that catalogues existed, but were in many cases, uncertain in their use of these tools. 64% of the undergraduates and 20% of the postgraduates had never heard of the interlibrary loan service (compared with 41% of the undergraduates in the U.G.C. survey). Level of use was close to the values for awareness of existence.

The values obtained concerning the use of these basic library tools, points clearly to the need for instruction.

Some students had already received instruction in library use. They could have received instruction in the use of libraries, whilst still at school, or learnt how to make use of the collections at a public library, or they may have received some form of library instruction at Chalmers University. 91% of the undergraduates and 66% of the postgraduates said that there was a library at their secondary school and 65% of the undergraduates claimed to have had some training in library use. Those students who had received instruction in the use of the library, during their studies at Chalmers University, showed a greater knowledge of the existence of the subject catalogue, abstracts, indexes, bibliographic aids, interlibrary services, (See Table XXV).
With regard to this library instruction given at Chalmers University, few students had received any form of instruction. Therefore conclusions based on this material are of a tentative nature and should be regarded as providing indications which can be of use in the design of a programme of library education.

When considering the point of time for an introductory course in information retrieval, the results shown in Table XXVI suggest that this should preferably be given later than during the first term at university. This would be reasonable in view of the fact that the tools for information retrieval are usually used in connection with actual information problems arising in connection with university studies, and that, with the present curriculum at Chalmers, these tend to occur after the first year.

With regard to methods of instruction, students who claimed to have been taught about the use of the library by more than one method appeared to have a greater awareness of the tools for information retrieval, than those who had been taught by one method. The choice of methods for various parts of a programme of user education will be considered in Chapter 7 (7.3 & 7.4).

2.5 Conclusions
The results showed that many students, particularly
undergraduates, made relatively little use of the library, as a place for study, or for borrowing material for study purposes. Students, who buy much of their study material and have adequate working facilities at home, have not the motivation to use the library for borrowing or work. Students, who do not visit the library, have little chance to discover the information resources available there. One most important conclusion was that ways must be found of attracting students into the library.

Studies of knowledge of tools of information retrieval revealed that $\frac{2}{3}$ of the undergraduates and $\frac{1}{3}$ of the postgraduates were unaware of the existence of these aids, and consequently of their use. With regard to the subject catalogue, far more students were aware of its existence, but a large number of these did not use it, or experienced difficulty in its use, as was later confirmed by confusion as to which catalogue to use when searching for information on a new subject topic. These results clearly pointed to the need for instruction in library techniques for students at Chalmers University.

The point of time, for such courses, and the teaching methods to be used were of interest. It can be concluded that courses in information retrieval for undergraduates should not be placed too near the beginning of university studies.
The material examined is of small size, therefore conclusions drawn must, as pointed out in 2.4.3 be tentative. Students who had been exposed to more than one method of instruction, had greater awareness of the tools for information retrieval than those who had been taught in one way. This would suggest that several methods should be utilized in user instruction, and an examination of the various teaching methods and their suitability will be made (See Chapter 7 - 7.3 & 7.4).

The students appear to have a positive attitude to the Library and services provided for them, but the pattern of library use showed that much more could be obtained from the existing resources. The cost of acquiring and maintaining the information held in a large research library is considerable. If this material, due to the closed-access pattern of storage, is only available for a limited amount of time each day, only part of its potential value is being realized. One can conclude that increased value could be obtained from the information resources stored at the university library, by increasing its availability, and by training the users in how to make use of it.
A STUDY OF USER BEHAVIOUR AND NEEDS AT THE BIOMEDICAL SECTION OF GOTHENBURG UNIVERSITY LIBRARY

3.1 Introduction

3.1.1 A survey of user behaviour and needs was carried out at Chalmers University of Technology Library in 1973 (see Chapter 2). This survey gave a considerable amount of information on the behaviour of engineering students within a closed-access type of library. The literature of science and technology shows many similarities with that of medicine - one of the most important being a rapid increase in the quantity of published information. For this reason, it was considered to be of interest to compare patterns of library use and information needs for the two groups of students.

The Biomedical Section of Gothenburg University Library is a specialized medical library serving the medical and dental faculties of Gothenburg University. In contrast to Chalmers Library, larger parts of the collections are available on open access shelves and there have been regular programmes of user instruction for postgraduate research workers from 1971, and also irregular introductory guided tours for undergraduates.

The corresponding medical library at Stockholm University is the Caroline Institute Library, in which the main parts of the collections are kept in closed-access book stores. A recent survey on user behaviour has been
carried out, in 1973, by Sanner & Turesson at the Caroline Institute Library. (Sanner & Turesson, 1973).

It was decided to carry out a survey of user behaviour at the Biomedical Section of Gothenburg University Library in 1974, in order to allow comparisons to be made between the two student groups - engineering students at Chalmers and medical and dental students at Gothenburg University.

### 3.1.2 The Biomedical Library

The Biomedical Section of Gothenburg University Library serves the medical and dental faculties of Gothenburg University. During 1973/74 there were 1,020 medical undergraduates, 521 dental undergraduates, 461 medical and 67 dental postgraduate students. The size of the regular teaching staff was: medical 231, dental 78. In addition, there were a number of assistant teachers and demonstrators. The Biomedical Library also functions as the central medical library for western Sweden. The present library building, which was completed in 1959, is conveniently situated near the medical and dental teaching centres and the Sahlgrenska hospital at which many medical students receive their clinical training.

The library building consists of a rectangular block of five storeys, three of which are stack floors. The top floor contains the reference department, the main
reading room, a reading room for periodicals and offices for the library administration, See Fig.1.

1. Elevators
2. Lending & reference department
3. Waiting room
4. Periodicals room
5. Main reading room
6. Abstracts & bibliographies
7. Catalogue
8. Open shelves
9. Reading room for advanced students
10. Stairs leading to room for advanced scholars
11. Offices & workrooms
12. Cloak rooms

Fig. I. Plan of main floor of Biomedical Library.
The ground floor contains the technical departments of the library: bindery, photographic laboratory, stencilling and apparatus rooms. In addition, the documentation department, for computer-based information retrieval systems, is situated on the ground floor. The main reading room, periodical reading room and reference department are characterized by open planning. There is a total of 130 study places - 69 in the main reading room, 28 in the periodical reading room, 26 in the reference department and a further 7 places in the south eastern part of the ground floor. Further details about the building can be found in an article "New library at the University of Gothenburg School of Medicine" by Ström, (Ström, 1959).

The extent of the library's lending activities is approximately 61,000 per year, of which 20,000 are inter-library loans. At the end of the fiscal year 1973/74 the collection amounted to 4,793 shelf metres, and the number of currently held periodicals was 2,200.

Opening hours were as follows:

September - May
Weekdays 8.30 - 20.00
Saturdays 9.00 - 15.00

June - August
Weekdays 9.00 - 17.00
Saturdays 9.00 - 15.00

Full service was maintained during these hours.
The most recent numbers of some periodicals are available for consultation in the periodical reading room. In addition, the last five years' volumes of the most frequently used periodicals are available on open shelves in the main reading room. Borrowing frequency for the material most often loaned has been found to be fairly constant (Irgens, 1969, unpublished material). Thus, a relatively large proportion of the most frequently borrowed material is available for direct consultation, as are the reference collection—handbooks, dictionaries and bibliographic aids.

3.2 Method

The method used was similar to that used in the Chalmers Library user survey. A series of telephone interviews, following a structured questionnaire, was given to a random sample of 114 undergraduate medical and dental students during the spring of 1974. With regard to the postgraduates, it was felt to be desirable to have a representative sample from the point of view—clinical—preclinical students, so a random sample of postgraduates from each department was used. This resulted in a sample of 49, in which the different disciplines were equally represented. As in the Chalmers survey, response was very good—2 refusals—one due to lack of time—in the total group.

The questionnaire was identical to that used for the Chalmers survey, with the exception that "Biomedical library" was substituted for "Chalmers main library" in the questions.
Responses were transferred to punched cards and analysis was carried out by means of an IBM 360/65 & 370/145 system, using the OSIRIS programme system for statistical methods developed at the University of Michigan, 1971. (Osiris, 1971; Osiris, 1973).

3.3 Results
The responses to the interviews have been divided into five main groups:

3.3.1 Pattern of university studies.
3.3.2 Family and accommodation situation.
3.3.3 Pattern of library use.
3.3.4 Adequacy of services at the Biomedical Section of Gothenburg University Library.
3.3.5 User instruction.

3.3.1 Pattern of university studies
The first part of the questionnaire was designed to obtain information on the general pattern of university studies and differences in the undergraduate/postgraduate study situation.

Distribution of the student population according to age is seen in Table I.
<table>
<thead>
<tr>
<th>Age</th>
<th>Undergraduates</th>
<th>Postgraduates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
</tr>
<tr>
<td>Under 20 years</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>20 - 25 years</td>
<td>53</td>
<td>46</td>
</tr>
<tr>
<td>26 - 30 years</td>
<td>45</td>
<td>40</td>
</tr>
<tr>
<td>31 - 35 years</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Over 35 years</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Table I. Distribution of student population according to age.

There was a bias towards male students in both the undergraduate and postgraduate sample:

Undergraduates: 64% male, 36% female
Postgraduates: 67% male, 33% female

This male bias was, however, much less than in the sample of engineering students from Chalmers University of Technology.

Median values for the number of terms of study were:

Undergraduates 6.5
Postgraduates 21

The present Swedish medical course consists of five years' training, followed by a year's hospital intern training. This represents 10 + 2 terms of study, as the Swedish academic year is divided into two terms. The present training replaced, in 1970, the somewhat longer previous training of 6 years, leading to the degree of Licenciate of Medicine. Postgraduate research studies are taken up at different points
after the Licenciate of Medicine degree. Studies lead to the degree of Doctor of Medicine, and the length of time taken varies widely, according to the amount of time available to be spent on research. Thus the values for the total length of study were sometimes difficult to estimate for the postgraduate students. 94% of the undergraduates studied full time, but only 22% of the postgraduates studied full time. Many postgraduate medical students carry on research at the same time as they have a regular medical appointment.

Corresponding figures for engineering students for full time study were: undergraduates (93%), postgraduates (19%)

The number of hours spent on time-tabled research is shown in Table II.

<table>
<thead>
<tr>
<th>Time-tabled hours of study per week</th>
<th>U %</th>
<th>P %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 10</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>10 - 15 hours</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>16 - 20 hours</td>
<td>14</td>
<td>12</td>
</tr>
<tr>
<td>More than 20</td>
<td>88</td>
<td>77</td>
</tr>
</tbody>
</table>

Table II. Hours of time-tabled study per week.

The medical undergraduates had a high proportion of time-tabled studies per week - 77% had more than 20 hours of compulsory studies. As might be expected, the postgraduate students had few time-tabled studies in their
research programme. Students were asked where they carried out their non-time-tabled optional studies and the replies can be seen in Table III.

<table>
<thead>
<tr>
<th>Place</th>
<th>U</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home</td>
<td>102</td>
<td>22</td>
</tr>
<tr>
<td>University dept.</td>
<td>18</td>
<td>34</td>
</tr>
<tr>
<td>University library</td>
<td>24</td>
<td>12</td>
</tr>
<tr>
<td>Dept. library</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Public library</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>&quot;Other&quot; place</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

Table III. Places chosen for optional studies.

Undergraduates worked mostly at home (89%), the university library (21%) and the department (16%). Postgraduates used their departments far more, for optional studies (69%). They also studied to a large extent at home (45%) and the university library (24%). "Other" places of study were the Sahlgrenska Hospital Library and various hospital departments.

3.3.2 The family and accommodation situation

The family and accommodation situation of the students was studied in order to see if these affected the pattern of library use in any way.

23 of the undergraduates (20%) and 34 of the postgraduates (69%) in the sample, had children, and of these, 18 (78%) of the undergraduates and 29 (85%) of the postgraduates said that they had some person to look after their children.
A comparison of the place of study for students with/without children was made and the results can be seen in Table IV:

<table>
<thead>
<tr>
<th>Place of study</th>
<th>With children</th>
<th>Without children</th>
<th>With children</th>
<th>Without children</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>U</td>
<td>U</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>Home</td>
<td>78</td>
<td>92</td>
<td>44</td>
<td>47</td>
</tr>
<tr>
<td>University dept.</td>
<td>35</td>
<td>11</td>
<td>65</td>
<td>60</td>
</tr>
<tr>
<td>University library</td>
<td>26</td>
<td>23</td>
<td>18</td>
<td>40</td>
</tr>
<tr>
<td>Inst. library</td>
<td>9</td>
<td>4</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>Public library</td>
<td>9</td>
<td>9</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>&quot;Other&quot; place</td>
<td>13</td>
<td>10</td>
<td>32</td>
<td>6</td>
</tr>
</tbody>
</table>

Table IV. Effect of children on place of study.

It would seem that undergraduates with children study less at home than those without children. At the same time they make more use of libraries. Further analysis of the differences between those undergraduates who had someone to look after their children and those who did not, showed that those without someone to look after their children tended to study at home more than those who had someone to take care of the children. However, these tendencies are observed on a very small group of individuals, and further study would be necessary before any definite conclusion could be drawn.

All the postgraduate medical students interviewed lived in their own flat or house, as did 72% of the undergraduates in the sample. Of the remainder of the
undergraduates - 16% lived in their parents' home, 9% in a student hostel, and 1% in digs.

The Biomedical Library is situated centrally with regard to many of the medical and dental teaching centres and the Sahlgrenska teaching hospital. Students were asked the distance between where they lived and the Biomedical Library. The distribution of students according to this distance can be seen in Table V.

<table>
<thead>
<tr>
<th>Distance from Biomedical Library</th>
<th>U</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 km</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>1 - 2 km</td>
<td>35</td>
<td>31</td>
</tr>
<tr>
<td>3 - 5 km</td>
<td>40</td>
<td>35</td>
</tr>
<tr>
<td>6 - 10 km</td>
<td>16</td>
<td>14</td>
</tr>
<tr>
<td>more than 10 km</td>
<td>15</td>
<td>13</td>
</tr>
</tbody>
</table>

Table V. Distance of home from Biomedical Library.

With reservations, due to the small size of the material, it does seem as if there is a greater tendency to use the library as a place for optional studies if the students live at a greater distance from it.

3.3.3 Pattern of library use

The existing pattern of library use at the Biomedical Library was of great interest and a number of questions were asked to find out about this.
Recommended course literature is expensive, therefore it was of importance to know, roughly how much of this was bought by the students. This can be seen in Table VI.

<table>
<thead>
<tr>
<th>Amount of literature bought</th>
<th>U %</th>
<th>P %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practically all</td>
<td>85</td>
<td>3</td>
</tr>
<tr>
<td>About half</td>
<td>18</td>
<td>13</td>
</tr>
<tr>
<td>Practically none</td>
<td>8</td>
<td>32</td>
</tr>
<tr>
<td>No opinion</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

Table VI. Amount of literature bought by students.

These rough figures for the quantity of literature bought by medical and dental students show similar trends to those of engineering students. A high proportion of undergraduates - 75% of the medical and dental students, and 92% of the engineering students bought most of the recommended course literature, in spite of the cost. Far fewer postgraduate students bought most of their literature (6% and 22%). Course literature for postgraduates may well include many periodical articles which can be borrowed and photocopied. The amount of literature bought affects the amount of literature borrowed from the libraries, and is of importance in determining the place of study - literature available at home must influence the place chosen for study.

Students were asked to state from which libraries they borrowed the literature required for their studies.
This is shown in Table VII.

<table>
<thead>
<tr>
<th>Library</th>
<th>U</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chalmers University Library</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Departmental Library</td>
<td>7</td>
<td>35</td>
</tr>
<tr>
<td>Chalmers Chemistry Library</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Gothenburg University Central Library</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Gothenburg University Biomedical Library</td>
<td>61</td>
<td>100</td>
</tr>
<tr>
<td>Public Library</td>
<td>18</td>
<td>2</td>
</tr>
<tr>
<td>&quot;Other&quot; Library</td>
<td>4</td>
<td>8</td>
</tr>
</tbody>
</table>

Table VII. Libraries from which literature for studies is borrowed.

Table VII shows that both undergraduate and postgraduate medical and dental students make good use of the Biomedical Library for borrowing study material. The corresponding groups of engineering students used Chalmers Library U - 53%, P - 75%. The postgraduates at Chalmers all borrowed from their departmental libraries, in contrast to the medical and dental students (35%). The public library was used to a certain extent by both undergraduate groups, for borrowing - 18% for the medical and dental students, 27% for the engineering students. Postgraduates, not surprisingly, did not borrow much of their very specialized study material from the public library. The "other" library group included the Sahlgrenska hospital medical library.
Amount of use and frequency of use of the various libraries was investigated; the two factors are not necessarily correlated. The tables obtained depend on "average" assessments of time spent/frequency of use of the libraries. Such assessments are subjective and notoriously unreliable; therefore, no attempt has been made to correlate the values obtained, with other factors. The figures give, however, a rough indication of the pattern of use of the libraries concerned. Tables VIII and IX show the amount of use of the various libraries. Tables X and XI show the frequency of use of the same libraries.

<table>
<thead>
<tr>
<th>Hours/week</th>
<th>Chalmers main library</th>
<th>Departmental library</th>
<th>Chalmers chemistry library</th>
<th>Gothenburg Univ. Library</th>
<th>&quot;Other&quot; library</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% of sample</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>over 40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31 - 40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21 - 30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>11 - 20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>6 - 10</td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>5 or less</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>79</td>
</tr>
</tbody>
</table>

Table VIII. Amount of use of various libraries by undergraduates

From Tables VIII to XI, it can be seen that undergraduates and postgraduates, particularly the latter, make frequent use of the Biomedical Library. From comparisons of frequency with amount of use, it would
<table>
<thead>
<tr>
<th>Hours/week</th>
<th>Chalmers main library</th>
<th>Departmental library</th>
<th>Chalmers chemistry library</th>
<th>Gothenburg Univ. Library</th>
<th>&quot;Other&quot; library</th>
</tr>
</thead>
<tbody>
<tr>
<td>over 40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31 - 40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21 - 30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 - 20</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 - 10</td>
<td>10</td>
<td>8</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 or less</td>
<td>2</td>
<td>24</td>
<td>4</td>
<td>90</td>
<td>6</td>
</tr>
</tbody>
</table>

Table IX. Amount of use of various libraries by postgraduates.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Chalmers main library</th>
<th>Departmental library</th>
<th>Chalmers chemistry library</th>
<th>Gothenburg Univ. Library</th>
<th>Bio-medical library</th>
<th>Public library</th>
<th>&quot;Other&quot; library</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% of sample</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 days/week</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-5 days/week</td>
<td>1</td>
<td>11</td>
<td>4</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 day/week</td>
<td></td>
<td>22</td>
<td>7</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>once a fortnight</td>
<td></td>
<td>4</td>
<td>11</td>
<td>3</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>once a month</td>
<td></td>
<td>1</td>
<td>11</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>less than once a month</td>
<td></td>
<td>1</td>
<td>43</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table X. Frequency of use of various libraries by undergraduates.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Chalmers main library</th>
<th>Departmental library</th>
<th>Chalmers chemistry library</th>
<th>Gothenburg Univ. Library</th>
<th>Bio-medical library</th>
<th>Public library</th>
<th>&quot;Other&quot; library</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% of sample</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 days/week</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-5 days/week</td>
<td></td>
<td>20</td>
<td>10</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 day/week</td>
<td></td>
<td>8</td>
<td>35</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>once a fortnight</td>
<td></td>
<td>10</td>
<td>22</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>once a month</td>
<td></td>
<td>10</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>less than once a month</td>
<td></td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Table XI. Frequency of use of various libraries by postgraduates.
seem that there are rather frequent visits of short duration. Undergraduates make considerable use of the public library, but very little use of departmental libraries. Use of the public library may depend on the fact that the main branch, in the centre of Gothenburg, is open until 22.00 on weekdays and is also open on Sundays. Postgraduates, on the other hand, make little use of the public library, but considerable use of their departmental libraries, and the Sahlgrenska hospital library.

Students were asked to state for what purposes they used the Biomedical Library. Their answers are shown in Table XII:

<table>
<thead>
<tr>
<th>Use of the Biomedical Library</th>
<th>U %</th>
<th>P %</th>
</tr>
</thead>
<tbody>
<tr>
<td>To borrow books/journal articles</td>
<td>42</td>
<td>37</td>
</tr>
<tr>
<td>A place for study - own material</td>
<td>59</td>
<td>52</td>
</tr>
<tr>
<td>A place for study - reserve book coll.</td>
<td>17</td>
<td>15</td>
</tr>
<tr>
<td>Essay writing</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>To carry out lit. searches and use the reference coll.</td>
<td>47</td>
<td>41</td>
</tr>
<tr>
<td>Social reasons</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Table XII. Purposes for which students use the Biomedical Library
It can be seen from Table XII, that undergraduates use the Biomedical Library for three main purposes: as a place for study of their own material, for carrying out literature searches and using the reference collection, and for borrowing material.

Postgraduate research students use the library for carrying out literature searches (96%) and for borrowing books and journal articles (80%).

3.3.4 Adequacy of services provided at the Biomedical Library

A series of questions was asked in order to reveal the adequacy of some of the services provided at the Biomedical Section of Gothenburg University Library. Thus, students were asked if the hours of opening were sufficient for their needs. 90% of the undergraduates and 82% of the postgraduates were satisfied with the present opening hours. A number of postgraduates expressed the wish to have longer hours in the evenings, at the weekends and during the summertime, when they were free to visit the library.

Students were asked if there was always a study place available when they wanted to work at the Biomedical Library. Of those who wished to work there, 96% of the undergraduates and 93% of the postgraduates said that they could always find a study place, the others said that a place was nearly always available.
In order to obtain some information on the adequacy of the book and periodical collection at the Biomedical Library, undergraduates were asked how often they had not been able to obtain recommended course literature during the past year. Results can be seen in Table XIII. This question was not applicable to postgraduates.

<table>
<thead>
<tr>
<th>Set course material not available</th>
<th>Undergraduates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
</tr>
<tr>
<td>Very often</td>
<td>6</td>
</tr>
<tr>
<td>Often</td>
<td>6</td>
</tr>
<tr>
<td>Seldom</td>
<td>2</td>
</tr>
<tr>
<td>Never</td>
<td>41</td>
</tr>
<tr>
<td>Do not know</td>
<td>7</td>
</tr>
<tr>
<td>Not applicable</td>
<td>52</td>
</tr>
</tbody>
</table>

Table XIII. Availability of recommended course literature

These figures show that student users at the Biomedical Library could obtain their set course material without too long a delay. A similar study of the availability of non-course literature was carried out for both undergraduates and postgraduates. See Table XIV.
Table XIV. Availability of non-set material.
(\% = \% of those who had borrowed)

This shows that the postgraduates, with their needs for material from a wider range, had to wait for material more often than the undergraduates, but that two-thirds of the postgraduates had not experienced much difficulty in this respect.

Students were asked whether there were people at the library who could help them to find the material that they needed. 95\% of the undergraduates and 100\% of the postgraduates replied in the affirmative. Very few (3\%) of the undergraduates found it difficult to ask for help, whereas 10\% of the postgraduates thought that they would have some difficulty in this - perhaps due to the more specialized nature of the material that they required. 85\% of the undergraduates and 96\% of the postgraduates had asked for help at one time or another.

Students were also asked about the helpfulness of the library staff, and their responses can be seen in Table XV.
The library staff are:

<table>
<thead>
<tr>
<th></th>
<th>U</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always very helpful</td>
<td>78</td>
<td>44</td>
</tr>
<tr>
<td>Helpful but often busy</td>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td>Not particularly helpful</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Never helpful</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Do not know</td>
<td>16</td>
<td>1</td>
</tr>
</tbody>
</table>

Table XV. Helpfulness of the library staff.

3.3.5 User instruction

Regular courses in information retrieval for postgraduate students have been held at the Biomedical Section of Gothenburg University Library since 1971. These courses form part of the postgraduate research training programme organized by the medical and dental faculty. The present course consists of 14 hours' teaching, where emphasis is placed on manual and computer-based information retrieval in connection with the individual students' programme of study. Each course is limited to 15 participants. There has been a steadily increasing demand for these courses since their introduction; for example, in the autumn of 1974 there were 60 applicants for 15 places. This led to an extra grant from the faculty to allow duplication to take place. Since the autumn term of 1974, undergraduate medical and dental students pay a compulsory visit to the Biomedical Library as part of their introductory
programme. Previously non-comulsory guided tours were available for undergraduates, at irregular intervals. Attendance was very varied.

Against this background, it was particularly interesting to study student attitudes and needs for user instruction. University students usually have experience of other types of library before starting to use the University Library. Studies of the pre-university use of libraries, which provides the background for further training, were carried out.

Students were asked whether or not they had received any instruction in how to use a library, whilst still at secondary school. 51% of the undergraduates and only 18% of the postgraduates said that they had had some instruction in library use, whilst still at school. There has been a marked increase in library instruction, during recent years, in the Swedish secondary schools (IFLA Annual Report 1973) and this would provide an explanation of the differences. Similarly, nearly all (89%) of the undergraduates said that there had been a library at their secondary school, whereas the corresponding figure for the postgraduates was 76%. Use of the school library, where this existed, was for both study and recreational purposes.

The other type of library, which students could be expected to have some experience of before entering university, was the public library. 84% of the undergraduates and 92% of the postgraduates said that they
had used their public library before starting university studies.

Students were also asked whether or not they had received any form of written or verbal instruction in how to use the Biomedical Library, and at what point in time of their studies this had taken place. 26 (23%) of the undergraduates and 21 (43%) of the postgraduates said that they had received library training. The point of time for this instruction can be seen in Table XVI.

<table>
<thead>
<tr>
<th>Time for library instruction</th>
<th>U</th>
<th></th>
<th>P</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>First two weeks of 1st term</td>
<td>5</td>
<td>19</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Later during 1st term</td>
<td>9</td>
<td>35</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>During 2nd term</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Later</td>
<td>10</td>
<td>38</td>
<td>20</td>
<td>95</td>
</tr>
<tr>
<td>Forgotten time for instr.</td>
<td>2</td>
<td>8</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table XVI. Time at which user instruction was received.

The number of students who had received instruction was small, particularly in the case of the undergraduates. This is hardly surprising, as there had been only a few non-compulsory courses given to undergraduates. 43% of the postgraduates interviewed had received some form of instruction (11 of those interviewed had taken part in one of the postgraduate courses). The students questioned could have received
instruction at different times and in different ways. However all the students who had received instruction stated that this had occurred at one time only. With regard to the method of instruction - undergraduates appeared to have (with one exception) experienced only one method of instruction whereas postgraduates had mostly been taught in two different ways - see Table XVII.

<table>
<thead>
<tr>
<th>Form of instruction</th>
<th>U</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbal instruction by library staff</td>
<td>13</td>
<td>4</td>
</tr>
<tr>
<td>Verbal instruction by academic staff</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>&quot;Other&quot; method</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Written instruction + verbal instruction by library staff</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>Verbal instruction by library + academic staff</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Written instruction + verbal instruction by library + academic staff</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Forgotten</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Table XVII. Form of instruction received.

The "other" form of instruction was described in three cases as "help from an older student" (during the first weeks of term older students act as tutors for new students).
77% of the undergraduates and 95% of the postgraduates who had received instruction said that this had been useful to them.

95% of the postgraduates who had received instruction, had obtained this late during their studies - most of them had followed the postgraduate information retrieval course. Only one of this group had not found the instruction useful - he had received 20 minutes verbal instruction and found this insufficient. Many of those who had followed the postgraduate information retrieval course commented spontaneously, during the interviews, that this had been useful.

Students were asked a series of questions designed to explore their knowledge of the basic tools for carrying out an information search. In a library which has part of its collection in a closed-access book store, use of the catalogue is important. When carrying out a subject orientated literature search, the subject catalogue ought to provide one of the most important means of access, particularly for undergraduates, who often require general introductory works. With this in mind, students were asked whether the Biomedical Library had a subject catalogue. 36% of the undergraduates and 16% of the postgraduates did not know whether there was a subject catalogue, or not. Of those who did know that this existed, 35% of the undergraduates and 20% of the postgraduates said that they did not use it. 12% of the undergraduates and
6% of the postgraduates who knew of the existence of the subject catalogue had experienced difficulties in its use.

Students were then asked about their awareness of the existence of abstract publications, index publications, and other bibliographic aids. Results can be seen in Table XVIII.

<table>
<thead>
<tr>
<th>Has the Biomedical Library</th>
<th>Yes</th>
<th>No</th>
<th>Don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>U %</td>
<td>U %</td>
<td>U %</td>
</tr>
<tr>
<td>Abstracts</td>
<td>51</td>
<td>92</td>
<td>0</td>
</tr>
<tr>
<td>Indexes</td>
<td>57</td>
<td>98</td>
<td>0</td>
</tr>
<tr>
<td>Other bibliographic aids</td>
<td>36</td>
<td>78</td>
<td>0</td>
</tr>
</tbody>
</table>

Table XVIII. Awareness of existence of bibliographic aids.

A large proportion of the undergraduates (43% - 63%) were unaware of the existence of essential tools for information retrieval at their university library. Postgraduate students, in contrast, were, to a large extent, aware of abstract and index publications (92% and 98%) and 78% were aware of the existence of other bibliographic aids. 23% of the undergraduates and 72% of the postgraduates said that they had experienced difficulties in using these bibliographic tools.

Students were asked what methods they would use to obtain information on a new subject topic within their field of studies. It was pointed out that the methods were not mutually exclusive, that is, that one could make use of several methods. Results are shown in Table XIX.
Table XIX. Method used to obtain information on a new subject topic.

<table>
<thead>
<tr>
<th>Method used</th>
<th>U %</th>
<th>P %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject catalogue</td>
<td>45</td>
<td>19</td>
</tr>
<tr>
<td>Author catalogue</td>
<td>15</td>
<td>18</td>
</tr>
<tr>
<td>Subject bibliography</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>Ask member of academic staff</td>
<td>45</td>
<td>19</td>
</tr>
<tr>
<td>Ask member of library staff</td>
<td>64</td>
<td>15</td>
</tr>
<tr>
<td>Ask friend or colleague</td>
<td>29</td>
<td>12</td>
</tr>
</tbody>
</table>

It was rather surprising to see that 13% of the undergraduates and 37% of the postgraduates would make use of the author catalogue to find out about a new subject topic. It was interesting to see that 56% of the undergraduates would ask the library staff for help, more than those who would ask a member of the academic staff (40%), postgraduates on the other hand would be more likely to ask a member of the academic staff, rather than the library staff, for help. Students were asked whether they had heard of the inter-library loan service. 47 (41%) of the undergraduates and 32 (65%) of the postgraduates had heard of this. 37 (33%) of the undergraduates and 28 (57%) of the postgraduates knew what the inter-library loan service was. 30% of the undergraduates and 55% of the postgraduates had made use of this service. Postgraduates need to use a wide range of material for research purposes, and it is not
surprising that they might have to borrow from collections outside that of their own university library.

It was decided to try to see whether or not there were measurable differences between those undergraduates who had received various forms of user instruction, whilst at university, and those who had not, with respect to knowledge of the existence of the subject catalogue, abstracts, indexes, other bibliographic aids. The results can be seen in Table XX.

<table>
<thead>
<tr>
<th>Knowledge of existence</th>
<th>Received instruction</th>
<th>No instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject catalogue</td>
<td>73%</td>
<td>58%</td>
</tr>
<tr>
<td>Abstracts</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Indexes</td>
<td>62</td>
<td>55</td>
</tr>
<tr>
<td>Bibliographic aids</td>
<td>39</td>
<td>36</td>
</tr>
<tr>
<td>Inter-library loan service</td>
<td>39</td>
<td>37</td>
</tr>
</tbody>
</table>

Table XX. Effect of instruction on awareness of library tools - Undergraduates

This means that, for example, 73% of those who had received library instruction at the Biomedical library were aware of the existence of the subject catalogue, while 58% of those who had not received instruction knew of its existence.

Differences between those postgraduates who had received training in information retrieval and those
who had not were studied. Results can be seen in Table XXI.

<table>
<thead>
<tr>
<th>Knowledge of existence</th>
<th>Received instruction (21)</th>
<th>No instruction (28)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Subject catalogue</td>
<td>100</td>
<td>71</td>
</tr>
<tr>
<td>Abstracts</td>
<td>95</td>
<td>89</td>
</tr>
<tr>
<td>Indexes</td>
<td>95</td>
<td>95</td>
</tr>
<tr>
<td>Bibliographic aids</td>
<td>95</td>
<td>68</td>
</tr>
<tr>
<td>Inter-library loan</td>
<td>71</td>
<td>61</td>
</tr>
</tbody>
</table>

Table XXI. Effect of instruction on knowledge of library tools. - Postgraduates

From Table XXI, it can be seen that, those postgraduates who had received instruction were more aware of the various tools which can be used for information retrieval, than their counterparts who had not received instruction.

The relationship between point of time of this university instruction and awareness of the existence of tools for information retrieval was studied for the medical and dental undergraduate students as shown in Table XXII. As the numbers of undergraduates are so few, students have been grouped into those who received instruction during the first term (14) and those who received it later (10). 2 had forgotten the time of instruction.
Table XXII. Effect of point of time for instruction on awareness of tools for information retrieval. - Undergraduates.

The students who had received instruction during the first term showed less awareness of the tools for information retrieval than, both the average medical student who had received no instruction, and those students who had received instruction at a later time. There was, however, one exception to this finding - students who had received instruction during the first term showed a greater awareness of the subject catalogue than the students who had not received instruction. As has been pointed out in 2.4.3, the most reasonable time to learn about the more specialized tools for information retrieval such as abstracts, and indexes, is at a stage when these are of use in connection with studies. This is not the case during the first term.

With regard to the form of instruction for undergraduates - in the Chalmers study, described in Chapter 2, there were indications that students who had been taught by more than one method had a greater awareness of the
tools for information retrieval than those who had been taught by a single method. At the Biomedical Library nearly all the students had received instruction in one way. The groups of 5 and 6 students are so small that quantitative comparisons cannot be made. However, it appeared that those students who had been taught by library staff had a greater awareness of the tools of information retrieval than the other students. In the case of the postgraduates, 15 out of 21 had been taught by written instruction plus verbal instruction given by the library staff. This form of instruction appeared to be effective but the group available for comparison is too small to allow definite conclusions as to the value of the different methods.

The majority of postgraduate students who have taken part in the information retrieval courses for research workers, have stated that they had not previously received any formal training in the use of the library and its resources.

At the end of the interview, students were given the opportunity of commenting on anything they thought to be particularly good or bad, and of making suggestions for improvements. The postgraduates, in particular, took advantage of this. Many of the comments fell into well defined groups. 11 undergraduates and 9 postgraduates commented that the opening hours were insufficient for their needs. 30 undergraduates and 9 postgraduates...
said that they felt that there should be more courses in library instruction. It can be noted that some of these postgraduates had applied unsuccessfully for the course in information retrieval. Most postgraduates wanted to have such a course at the beginning of their research studies - a point at which it would be most useful. 15 undergraduates stated that they wished that there were individual study carrels. 2 undergraduates and 2 postgraduates said that they wished that it was possible to get a cup of coffee at the library (there is no café there). 7 undergraduates and 1 postgraduate complained of the time delay in obtaining requested material. 5 undergraduates said that they had difficulty in finding the material that they wished to borrow. 3 postgraduates complained of the expense of photocopies. Very many of the users expressed satisfaction with the library and the general helpfulness and pleasantness of the library staff. The service which attracted most individual positive comments was the MEDLINE/MEDLARS computer-based information retrieval system. 10 of the postgraduates commented specifically about this.

3.4 Discussion
It is of interest to compare the patterns of library use between the engineering students at Chalmers University of Technology and the medical and dental students at Gothenburg University. Both groups are characterized by undergraduate courses in which there
is a high proportion of compulsory instruction. Most of the undergraduates study full-time (Chalmers - 93%, Gothenburg University medical and dental students - 94%). Postgraduates, on the other hand, often carry out their research on a part-time basis (81% and 78%), and have few hours of scheduled instruction. Science, technology and medicine are all characterized by a rapid increase in information and subsequent increase in the quantity of published material, which increases the difficulty of information retrieval on individual topics.

The main difference between Chalmers University Library and the Biomedical Section of Gothenburg University Library is that the latter has a much greater quantity of material, particularly the most frequently borrowed periodical material, on open-access shelves.

In addition, the hours of opening at the Biomedical Library are somewhat more generous than at Chalmers Library. There has been a regular programme of user instruction for postgraduate research students at the Biomedical Library since 1971.

The two surveys carried out at Chalmers Library and the Biomedical Library made use of the same structured interview questionnaire. Response rate was 99% in both cases. The telephone interview method used was identical in both cases, and the two surveys were carried out within a year of each other, so the results
can be regarded as completely comparable.

Another user investigation - on the use of the medical library at the Caroline Institute in Stockholm - was carried out in 1973 by Sanner and Turesson. (Sanner & Turesson, 1973). In this case a postal questionnaire method was used and the response was 71%. Some of the questions asked had been taken directly from the structured questionnaire used in the Chalmers survey and this makes comparison of the results somewhat easier. Comparison was not possible, however, in all cases, as similar questions were not always asked.

The collection at the Caroline Institute Library is mainly closed-access. At the time of Sanner & Turesson's survey, the hours of opening, with full library service, were 8 hours on weekdays, 6 hours on Fridays and 3 hours on Saturdays. The amount of time that the library was open was therefore less than that at the Biomedical Library in Gothenburg. There were only 16 reading places at the Caroline Institute Library, compared with 130 at the Gothenburg Biomedical Library. Undergraduate and postgraduate student user groups at the two libraries can be regarded as having identical study needs.

Libraries are used for a variety of purposes, one of which is as a place where optional studies can be carried out. Students were asked to state where they carried out optional studies, and a comparison of the
results from Chalmers Library (Ch) and the Biomedical Library (B) follows:

<table>
<thead>
<tr>
<th>Place</th>
<th>U% of sample Ch</th>
<th>B</th>
<th>P% of sample Ch</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home</td>
<td>91</td>
<td>89</td>
<td>76</td>
<td>45</td>
</tr>
<tr>
<td>University dept.</td>
<td>9</td>
<td>16</td>
<td>93</td>
<td>69</td>
</tr>
<tr>
<td>University library</td>
<td>6</td>
<td>21</td>
<td>17</td>
<td>24</td>
</tr>
<tr>
<td>Dept. library</td>
<td>9</td>
<td>5</td>
<td>44</td>
<td>8</td>
</tr>
<tr>
<td>Public library</td>
<td>2</td>
<td>9</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table XXIII. Places used for optional studies.

Undergraduates of both groups, who have many hours compulsory instruction per week, study to a great extent at home. Medical students make more use of the main library and less use of the departmental libraries, whereas the reverse is true of the Chalmers undergraduates. Postgraduates at Chalmers also make greater use of their departmental libraries than do their medical and dental counterparts. With reservation, due to the small size of the material, students with children study at home less than their counterparts without children. Those with children seem to favour alternative places of study, such as the university department, or various libraries.

The library is also used for borrowing material for studies, and, in connection with this, it was of interest to know approximately how much of the material required for study purposes was bought by the students:
Table XXIV. Amount of literature bought by students.

<table>
<thead>
<tr>
<th>Amount of literature bought</th>
<th>U% of sample</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practically all</td>
<td>92 75</td>
<td>22 6</td>
</tr>
<tr>
<td>About half</td>
<td>6 16</td>
<td>46 27</td>
</tr>
<tr>
<td>Practically none</td>
<td>2 7</td>
<td>32 65</td>
</tr>
</tbody>
</table>

The undergraduate groups bought far more of the material required for studies than did the postgraduates. This means that the amount of set-course literature to be borrowed from the libraries is correspondingly small. Postgraduates who have less set material but often require to read widely round their fields of interest, rely on the university libraries for borrowing purposes. Thus postgraduates from Chalmers used the main library (75%) and their departmental libraries (100%), and medical and dental postgraduates used the Biomedical Library (100%) and their departmental libraries (35%). 61% of the medical and dental undergraduates borrowed material from their main library and 53% of the engineering undergraduates borrowed material from their main library. The main university libraries were the main source for borrowing for undergraduates. Undergraduates were asked how often they had not been able to obtain material directly. With regard to set-course literature the replies of the undergraduates were as follows, where Ch - Chalmers Library, B - Biomedical Library and K - Caroline Institute Library, Stockholm.
Table XXV. Availability of set-course material for undergraduates.

Undergraduates at Chalmers and the Biomedical Library, rather seldom have to wait for set-course material, due perhaps to the fact that most of them buy their own material and therefore do not need to borrow. This is in contrast to the situation of the Caroline Institute Library. With regard to postgraduates and study material (non-set course material) - availability was as follows:

Table XXVI. Availability of non-set material for postgraduates.

It can be seen that about a third of research students, at all three of the libraries where surveys have been carried out, have not always been able to obtain the material that they wanted directly. This can be due to several causes - material already out on loan,
material not available in the library collection, inadequate bibliographic identification, etc.

These causes for failure - temporary or permanent, are of considerable interest. A number of studies, in which the related problem of "shelf failure" is studied, have been carried out. (Urquhart and Schofield, 1971; Urquhart and Schofield, 1972; and Buckland et al, 1970.) It would be of interest to carry out an analysis of the reasons for "non" availability at Chalmers University Library and at the Gothenburg University Library Biomedical Section.

In the Chalmers and Biomedical Library surveys, both amount of use and frequency of use were studied. Frequency of use was studied in the Caroline Institute survey. It is thus possible to compare frequency of use of the three university libraries in the survey, by both their undergraduate and postgraduate groups.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Chalmers main library</th>
<th>Biomedical library</th>
<th>Caroline Institute library</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 days/week</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-5 days/week</td>
<td>5</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>1 day/week</td>
<td>15</td>
<td>22</td>
<td>12</td>
</tr>
<tr>
<td>once a fortnight</td>
<td>9</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>once a month</td>
<td>15</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>less than once a month</td>
<td>17</td>
<td>43</td>
<td>76</td>
</tr>
<tr>
<td>No answer</td>
<td>39</td>
<td>2</td>
<td>12</td>
</tr>
</tbody>
</table>

Table XXVII. Undergraduate frequency of use of main university library.
From Table XXVII and XXVIII, it can be seen that the Caroline Institute Library is used much less by its undergraduate student group than Chalmers Library and the Biomedical Library. As the needs of the undergraduate medical and dental users in Stockholm must be similar to those of their counterparts in Gothenburg, and as both medical libraries are conveniently situated with regard to the place of work/study of the student population, one must look for other factors to account for the differences. The most obvious difference is the very few study places available at the Caroline Institute Library - 16 as compared with 130. Both undergraduates and postgraduates from the medical and dental faculties visit the Biomedical Library more often than engineering students at Chalmers visit their main university library. The main difference between the Biomedical Library and Chalmers
is that the former has greater availability of material, due to the large part of the collection available on open access and the longer hours of opening with full service.

Purposes for which the Chalmers Library and the Biomedical Library were used can be seen in Table XXIX.

<table>
<thead>
<tr>
<th>Use of library</th>
<th>U% of sample</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>To borrow books/journal</td>
<td>Ch</td>
<td>B</td>
</tr>
<tr>
<td>A place for study - own material</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>A place for study - reserve book coll.</td>
<td>29</td>
<td>52</td>
</tr>
<tr>
<td>Essay writing</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>To carry out lit. searches and use ref.coll.</td>
<td>35</td>
<td>41</td>
</tr>
<tr>
<td>Social reasons</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

Table XXIX. Purposes for which the university libraries are used.

The purposes of use of the two university libraries - Chalmers and the Biomedical - are very similar, with the exception that considerably more of the medical/dental undergraduates make use of the library as a place to study their own material. This agrees with the findings in Table XXIII: Place for optional studies.
With regard to the hours of opening, 22% of the postgraduates and 6% of the undergraduates at Chalmers desired longer hours of opening, as compared with 18% of the postgraduates and 10% of the undergraduates at the Biomedical Library (10% of the postgraduates at the Caroline Institute Library were dissatisfied with the hours of opening). The more qualified the user, the greater the criticism. Differences between postgraduates at Chalmers and the Biomedical Library are in relation to the hours of opening at the two libraries. 93% and 100% of the undergraduates/postgraduates at Chalmers said that they could always/nearly always find a study place at the library if they wanted to work there. The corresponding figures for the Biomedical Library were 99%. Most surprisingly "almost all" the users of the Caroline Institute said that they could always, or nearly always, find a study place when they wanted to work at the library, however, frequency of use was lower, particularly amongst the undergraduate users.

The library staff were regarded as always helpful by 65% of the undergraduates at Chalmers and 71% of the undergraduates at the Biomedical Library. Corresponding figures for postgraduates were 54% and 90%. Library staff were described as "helpful", but often busy" by 16% of the undergraduates at Chalmers and 18% of the undergraduates at the Biomedical Library, corresponding figures for the postgraduates were 39% and 8%.
Most of the students in the samples had made use of their public library before starting university studies. Undergraduates at both Chalmers (91%) and the Biomedical Library (89%) had had access to a school library, whereas postgraduates had not had this to the same extent (66% and 76%).

Students were asked a series of questions designed to find out their awareness of various aids to literature searching. These results are summarized in Table XXX.

Has the library? | U % of sample | P % of sample
---|---|---
| Ch | B | Ch | B

- Subject catalogue: 71% Ch, 64% B, 82% Ch, 84% B
- Abstracts: 25% Ch, 51% B, 71% Ch, 92% B
- Indexes: 32% Ch, 57% B, 66% Ch, 98% B
- Other bibliographic aids: 46% Ch, 36% B, 52% Ch, 78% B
- Inter-library loan services: 36% Ch, 37% B, 81% Ch, 65% B

Table XXX. Awareness of tools for literature searching.

In a library which has part of its collection in a closed-access book store, the catalogue is the only contact between the user and the material that he/she wishes to borrow. A high proportion of the Swedish students were aware of the existence of the subject catalogue (comparative figures for British under-
graduates were 28%). Students at Chalmers, where most of the collection is in a closed-access store were slightly more aware of the subject catalogue than the group from the Biomedical Library. A large proportion of medical, dental and engineering undergraduates were unaware of the existence of such basic tools of information retrieval as abstracts and index publications. Medical/dental postgraduates on the other hand, were far more aware of these tools (and their spontaneous unrecorded comments showed that they had made use of them). This increase in awareness can be explained by the fact that there have been regular courses in information retrieval methods at the Biomedical Library for the postgraduate research students.

Students were asked what methods they would use to obtain information on a new subject topic. A choice of methods was offered and it was pointed out that these were not mutually exclusive. Results are shown in Table XXXI.

<table>
<thead>
<tr>
<th>Method used</th>
<th>U % of sample</th>
<th>P B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ch</td>
<td>B</td>
</tr>
<tr>
<td>Subject catalogue</td>
<td>46</td>
<td>40</td>
</tr>
<tr>
<td>Author catalogue</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>Subject bibliography</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>Ask teacher</td>
<td>18</td>
<td>40</td>
</tr>
<tr>
<td>Ask librarian</td>
<td>61</td>
<td>56</td>
</tr>
<tr>
<td>Ask friend/colleague</td>
<td>6</td>
<td>25</td>
</tr>
</tbody>
</table>

Table XXXI. Methods used to obtain information on a new subject topic.
It was surprising that so many of the sample would have used the *author* catalogue to search for new *subject* material. This is probably related to unclear concepts as to the function of the different types of catalogue, linked in turn to the two fundamental library functions - identification of a known object and the search for information on a given topic. Undergraduates in both groups showed a marked tendency to ask the library staff, as compared with the postgraduates. Sanner and Turesson noted a similar tendency and suggested that it might be related to unfamiliarity with information retrieval aids. It can be seen that those who had received most training, as a group, the medical postgraduates, would have asked the library staff for help least often.

The results obtained from the survey at the Caroline Institute Library led to the conclusion that "users make regrettably little use of the aids which have been acquired so time-consumingly and at such expense". (Sanner and Turesson,p. 23).

These findings indicate that there is a need to teach users how to use such library tools as card catalogues, abstracts, indexes, and other bibliographic aids. Where instruction has been available, the users have been made more aware of the resources possessed by their university libraries - often a first step to acquiring information.
Wood and Hamilton pointed out, as a result of a survey on the information requirements of mechanical engineers, that there is evidence that users actually desire such instruction (Wood & Hamilton, 1967). This was amply supported in the present survey, in which a third of the undergraduate sample spontaneously mentioned the need for instruction in use of the library. Similarly, those postgraduates who had not managed to attend a course in methods for information retrieval for research students, also stated that they felt the need for instruction. In the survey carried out at the Caroline Institute Library, students were asked whether they would be interested in following a course of library instruction; at least a third of the undergraduates said that they would be prepared to attend such a course.

Studies on the relationship between point of time of instruction and awareness of the existence of tools for information retrieval - for undergraduates, indicated that it was not most effective to give instruction on methods for information retrieval during the first term. This instruction appeared to be more effective at a later stage in the course of studies. This was in accordance with findings from a similar group of students at Chalmers University of Technology. With regard to the methods for instruction, it appeared that verbal instruction by the library staff and written information were effective, but the material
was too small to allow any definite conclusion on this point. Further consideration of the methods to be used for user education will be made in Chapter 7.

3.5 Conclusions

The amount of use made of the information stored in a library system depends on the accessibility of the material and knowledge as to how to make use of the information stored.

Availability of material depends on ease of use and the hours during which it can be used. There is a recent tendency in the Swedish research library planning to move away from the idea of the closed access book store towards open-access shelving for the parts of the collection most frequently used. The material is then freely available to the user who can thus decide directly, whether, or not, it is of use for his/her studies or research. The greater use made of the Biomedical Section of Gothenburg University Library, as compared with the Caroline Institute Library and Chalmers University of Technology Library, can be ascribed to the fact that a relatively large portion of the most frequently borrowed part of the collection is available for direct consultation. In addition, hours of opening with full library service were more extensive than at the other two libraries.
The need for instruction in how to make use of the material acquired and stored at the library is apparent from all three surveys described. Users need to be taught the basic pattern of scientific communication and the tools which simplify the process of information retrieval. The lack of knowledge of such basic tools as abstracts, indexes and other bibliographic aids, suggests that students need instruction in how to search for information. In those cases where instruction had been received there was a marked increase in awareness of library tools and techniques.

Studies have been made as to the most appropriate point of time for such studies and the methods to be used. It can be tentatively concluded that the most suitable point for an introduction to the basic techniques of information retrieval, for undergraduate students, is sometime after the third term of study, at a point when such instruction begins to appear meaningful. With regard to the method of instruction, it was seen that written instruction plus verbal instruction by interested and knowledgeable members of the library staff resulted in postgraduates who were aware of the tools for information retrieval. An examination of teaching methods for library instruction will be described in Chapter 7.

There is a great deal of expense involved in the building up and storing of the collection of material
in a large research library. It is, therefore, important to see that users are taught to make the best possible use of these resources, and that these are maximally available to potential users. In order to achieve this, it is necessary to provide financial means for student instruction in techniques of information retrieval.
Chapter 4

A COMPARISON OF USER INSTRUCTION IN SCANDINAVIAN AND
BRITISH ACADEMIC LIBRARIES

4.1 Introduction
As has been described in Chapter 1, plans had been made for the development of a multi-faceted programme for library orientation/instruction at Chalmers University of Technology. At an early stage in the development of the programme, it was decided to obtain information about existing library orientation/instruction programmes. It was hoped that this would provide valuable background material for the design of the programme of library education at Chalmers University.

4.1.2 Existing courses of instruction
There has been a growing interest in library user instruction during the last few years, and this interest appears to be internationally widespread: courses for microbiology students in East Germany have been described by Germann-Röbel (Germann-Röbel, 1972), courses for law students in Holland by Gokkel and Makken (Gokkel and Makken, 1971), courses for medical students in Strasbourg by Schlumberger, Ménégez and Héran (Schlumberger, Ménégez and Héran, 1970), and courses for physics students in London by Will (Will, 1970). Library instruction in Australia has been described by Scrivener (Scrivener, 1972), Aucamp has written about the situation in South Africa (Aucamp,
1972), Mesterhazi-Nagy about Hungary (Mesterhazi-Nagy, 1971), Dimitrov about East Germany (Dimitrov, 1972) and Bock about West Germany (Bock, 1971). At the F.I.D. Congress on Documentation at Buenos Aires in September 1970, papers were read on the training of information users, by Wood - United Kingdom (Wood, 1970), Mikhailov USSR (Mikhailov, 1970), and Heaps and Pavars - Canada (Heaps and Pavars, 1970).

Interest in user instruction has been especially marked in the U.S.A. and a bibliography on "Academic library instruction" from 1960-1970 has been compiled by Mirwis (Mirwis, 1971). A recent survey describing library orientation and instruction programmes in the U.S.A. has been carried out by Melum in 1971 (Melum, 1971 a). Courses in user instruction and the methods used vary greatly - ranging from the traditional guided (or "herded") tour to the use of modern audio-visual techniques, such as closed circuit television, film, tape/slides and programmed user instruction (McComb, 1958), (Howison, 1971), (Henning and Stillman, 1971), (Knapp 1966), (Model Library Project Point-of-use instruction, M.I.T., 1971). Visits were paid, by the author, to a number of academic libraries in the U.S.A. and user instruction programmes/media were observed at first hand. Amongst the libraries visited were: the Barker Engineering Library at Massachusetts Institute of Technology, Cambridge, Mass., the National Library of Medicine, Bethesda, Maryland, University of California Libraries at Berkeley and Stanford,
Visits were also paid to a number of British academic libraries, because it was realized that considerable attention had been paid, in recent years, to this aspect of librarianship, in Britain. A review of the development of library instruction in the United Kingdom has been written by Tidmarsh (Tidmarsh, 1968), and surveys on library instruction have been carried out by Havard-Williams (Havard-Williams, 1964), Carey in 1964-66 (Carey, 1968) and Fjällbrant in 1973 (Fjällbrant, 1974 a).

In order to obtain information about the user-instruction situation in Sweden, a survey, similar to the British one of 1973, was carried out in Swedish academic libraries, by Fjällbrant and Westberg (Fjällbrant and Westberg, 1974a). This survey provided information about courses of instruction available in Sweden, and about the teaching methods in use.

4.1.3 Planned user education survey

It was felt that a broader comparison between library instruction in the four Scandinavian countries - Denmark, Finland, Norway and Sweden - and library instruction in Britain would be more valuable than a direct comparison between instruction in one
Scandinavian country with that in Britain. This would make it possible to see if there were similar trends in Denmark, Finland, Norway and Sweden and to compare these with the existing British situation.

In 1973, the total population in Britain was 55,711,000, which may be compared with the combined population of the Scandinavian countries of 21,601,000 (Denmark 4,921,000, Finland 4,695,000, Norway 3,893,000, Sweden 8,092,000). The possibility therefore arises that cooperative solutions for library instruction, found suitable for Britain, might be applicable to the combined Scandinavian countries.

4.2 Method
A postal questionnaire on library orientation/instruction was sent out to the five countries. In the case of Britain, as described in "Library instruction for students in universities in Britain" (Fjällbrant 1974a) the questionnaire was sent out to the 54 university libraries listed in the Commonwealth Universities Yearbook. Advice was sought from Det Kongelige Bibliotek in Denmark, Helsinki University Library, Finland, and Riksbibliotektjenesten Norway in the selection of academic libraries from their respective countries. The postal questionnaire was then sent to all the main university libraries and the larger specialized academic libraries in each respective country. In order to allow comparisons to be made, the questionnaire used for the British library instruction survey was translated into
Swedish, and a Swedish version was sent out to the Scandinavian countries. (See Ch.4, Appendices 1 & 2).

In the design of the original British questionnaire, pilot tests were carried out at the National Lending Library, on a group of librarians attending a seminar on user instruction in science and technology. As in all postal questionnaires, it was necessary to obtain a balance between comprehensiveness and length. A postal questionnaire designed to obtain comprehensive information on a particular subject is usually both detailed and long - which often results in a poor reply response - giving comprehensive material from a limited and unrepresentative sample. The aim of this particular questionnaire was to obtain a limited amount of information on user instruction, which would serve as background material for the design of a series of courses in user instruction. The informatic collected could then be complemented by other means, such as interviews and visits to libraries.

The questionnaire was designed to provide information on the number of university libraries which held courses in library orientation/instruction, and on the types of course provided. Information was sought about the library position of the people responsible for the organization of the courses. In addition, it was asked whether the courses held were optional or compulsory, and whether, or not, attempts had been made to evaluate the results of the instruction
given. Methods used for teaching both groups of students and individual users were examined.

It was fully realized that it would be extremely difficult, in a questionnaire of this length, to obtain exact information on such subjects as the number of man-hours spent on user instruction and information work and details of individual library evaluation projects. Nevertheless, an attempt was made to collect exploratory information on these topics, in order to provide practical help in the design of courses and to serve as a starting point for more detailed investigations, which, though of great interest, lay outside the scope of this particular survey.

Initial response to the postal questionnaire was very good. Reminders were sent out by letter, and in certain cases by telex, and a final attempt to obtain information from the remaining libraries was made by telephone calls. These measures resulted in the following:

<table>
<thead>
<tr>
<th>Country</th>
<th>No. of Libraries questioned</th>
<th>Number of replies</th>
<th>Response in percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Britain</td>
<td>54</td>
<td>53</td>
<td>98</td>
</tr>
<tr>
<td>Denmark</td>
<td>24</td>
<td>23</td>
<td>96</td>
</tr>
<tr>
<td>Finland</td>
<td>24</td>
<td>22</td>
<td>92</td>
</tr>
<tr>
<td>Norway</td>
<td>13</td>
<td>13</td>
<td>100</td>
</tr>
<tr>
<td>Sweden</td>
<td>24</td>
<td>24</td>
<td>100</td>
</tr>
</tbody>
</table>

Table I. Response to postal questionnaire
In addition, visits were paid to several of the libraries concerned in the surveys and both personal and telephone interviews, with the librarians in charge of teaching activities, were made in a number of cases. This was in order to carry out a control of the information supplied by the questionnaire, and to obtain further information on the types of courses held, and their extent. Many of the libraries sent additional information on their programmes on instruction. This additional information which in some cases was very detailed, was extremely helpful and gave a good picture of user instruction in various individual libraries.

4.3 Results

4.3.1 Types of courses

A preliminary glance at the number of academic libraries that have courses in library orientation/instruction shows a high percentage (from 83%–90%) of the academic libraries in all five countries had some type of course. See Table II.

<table>
<thead>
<tr>
<th>Country</th>
<th>No. of libraries with courses of instruction</th>
<th>Percent of libraries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Britain</td>
<td>50</td>
<td>94</td>
</tr>
<tr>
<td>Denmark</td>
<td>22</td>
<td>96</td>
</tr>
<tr>
<td>Finland</td>
<td>21</td>
<td>95</td>
</tr>
<tr>
<td>Norway</td>
<td>12</td>
<td>92</td>
</tr>
<tr>
<td>Sweden</td>
<td>20</td>
<td>83</td>
</tr>
</tbody>
</table>

Table II. Academic libraries with courses of library orientation/instruction
A more detailed analysis of the types of course available shows, however, that there is a considerable variation between the different countries with regard to the types of courses provided. See Table III.

<table>
<thead>
<tr>
<th>Type of course</th>
<th>Academic libraries</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Britain</td>
</tr>
<tr>
<td>Orientation</td>
<td>47 (89%)</td>
</tr>
<tr>
<td>Undergraduate introduction</td>
<td>31 (58%)</td>
</tr>
<tr>
<td>Postgraduate instruction</td>
<td>45 (85%)</td>
</tr>
<tr>
<td>Other types of course</td>
<td>9 (17%)</td>
</tr>
</tbody>
</table>

Table III. Types of course available in academic libraries.

Thus, while most libraries provided some form of initial orientation (from 71%-89%), the percentage providing introductory "bibliographic" courses for undergraduates is much less (from 54%-64%), and in the case of postgraduate instruction, there is a very considerable variation - from 85% in Britain to 9% in both Denmark and Finland.

It may be argued that there are differences in higher education between the individual Scandinavian countries and Britain. Differences do exist - particularly perhaps between Denmark - which has a special undergraduate education divided into two parts - and the other countries. (Higher education... 1972, Att studera i Norden, 1972.)
Scandinavian high school students have a broader general curriculum than their British counterparts who specialize in a fewer number of subjects. Scandinavian first degrees tend to take somewhat longer than the corresponding British degree, partly due to the above mentioned differences in school curricula. However, similarities between first degree courses outweigh the differences. Postgraduate degrees involve, to a greater or lesser extent, research activities, and a larger degree of self-reliance and independence. Bearing in mind the strictly limited aim of this survey, it was decided to use four broad course descriptions: "Orientation", "Undergraduate introduction", "Postgraduate instruction" and "Other". Courses classed as "Other" were subsequently described in detail.

Many academic libraries organized other types of instructional courses, often directed toward specific user groups - for example, for academic teaching staff or industrial employees. These courses included seminars on computer-based information retrieval, an "introduction to the library" for newly-appointed members of staff, courses on record keeping and thesis presentation for postgraduates, literature search methods for industrial employees, seminars for medical specialists, introduction to literature searching for foreign research workers, courses in scientific bibliographic instruction for library
school students and introduction to medical literature for nursing students.

The majority of courses were optional, but this varied from country to country. See Table IV. It may be noted that, in many British universities all attendance at lectures is optional, so the figures in Table IV may reflect the general pattern of higher education in the countries concerned.

<table>
<thead>
<tr>
<th>Country</th>
<th>Optional courses</th>
<th>Compulsory courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Britain</td>
<td>42 (79%)</td>
<td>14 (26%)</td>
</tr>
<tr>
<td>Denmark</td>
<td>18 (78%)</td>
<td>10 (43%)</td>
</tr>
<tr>
<td>Finland</td>
<td>15 (68%)</td>
<td>10 (45%)</td>
</tr>
<tr>
<td>Norway</td>
<td>9 (69%)</td>
<td>4 (31%)</td>
</tr>
<tr>
<td>Sweden</td>
<td>17 (71%)</td>
<td>8 (33%)</td>
</tr>
</tbody>
</table>

Table IV. Percentage of academic libraries offering optional and compulsory courses

4.3.2 Evaluation

Many of the libraries involved in the surveys had made some attempt to assess the value of the courses of library orientation/instruction, as can be seen in Table V. Information supplied from the questionnaire and from visits or interviews showed that these "evaluations" varied from informal discussions on "how useful do you think the course has been?" to more formalized evaluation measurements.
Table V. Libraries which had carried out evaluations of the user-instruction courses given

<table>
<thead>
<tr>
<th>Country</th>
<th>No. of libraries</th>
<th>Percent of libraries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Britain</td>
<td>11</td>
<td>21</td>
</tr>
<tr>
<td>Denmark</td>
<td>7</td>
<td>30</td>
</tr>
<tr>
<td>Finland</td>
<td>9</td>
<td>41</td>
</tr>
<tr>
<td>Norway</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>Sweden</td>
<td>4</td>
<td>17</td>
</tr>
</tbody>
</table>

4.3.3 People responsible for user instruction

It was found that in Denmark, Finland and Norway, as in Sweden and Britain, the courses in user instruction were organized and taught by people holding very different types of library position: Librarian, Deputy Librarian, Reference Librarian, Information Officer, Subject Specialist, Assistant Librarian and Senior Library Assistant. It had been seen (Fjällbrant 1974a) that in those British libraries that had special information officer positions such as City University, London, and the Universities of Loughborough, Newcastle Reading and Surrey, and the six libraries that took part in the OSTI Scientific Information Officer project - (University College - Cardiff, Imperial College - London, and the Universities of Birmingham, Salford, Strathclyde and Sussex), educational programmes were in the hands of the information officers. Similarly in Sweden, at the Royal Institute of Technology Library, Stockholm, where there were 8 documentalist/information officers working on a
computer-based information retrieval and dissemination project (Gluchowicz, 1971), these information officers were responsible for courses of user instruction. This is also the case at a number of Finnish academic libraries: Oulu University Library, the University Library of Kuopio, the Central Medical Library, Helsinki, Tampere University of Technology Library and the Helsinki University of Technology Library at Otaniemi, where there are a number of information officers responsible for organizing user instruction.

In many cases, the people responsible for the organization of user instruction are described as being "documentalists" - as at Jyväskylä University Library, Finland, the Bio-Medical Section of Gothenburg University Library, Sweden, the Library of Technology, Aalborg, Denmark, the Library of Agriculture, Helsinki, Finland and the University of Technology Library at Trondheim, Norway. The distinction between "information officer" and "documentalist" is not always clear-cut. In many of the Scandinavian academic libraries people with these different titles carry out the same functions within the library. In many academic libraries "subject specialists" are now employed, and these specialists are usually responsible for courses of user instruction within their particular discipline. Examples of this can be seen in the British University Libraries of Aberystwyth, East Anglia and Lancaster, and at the National Technological Library of Denmark,
Lyngby, Copenhagen, the Danish Institute of Education Library, Copenhagen, the University Library, Trondheim, Norway, and in some of the courses at the University Library of Oslo, Norway.

An attempt was made to assess the numbers of library staff directly concerned with "information for library users". The libraries were asked to indicate how many people were employed on this, and, if possible, to give an indication of the proportion of time spent on this activity. It was realized that, in many cases, it would be difficult to give precise information - and this was confirmed by the replies received. Nevertheless, differences between academic libraries in Britain and those in Scandinavia could be observed, and Table VI may be used to illustrate this.

<table>
<thead>
<tr>
<th>Country</th>
<th>Libraries with more than 3 people working with information for library users</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Britain</td>
<td>34</td>
<td>64</td>
</tr>
<tr>
<td>Denmark</td>
<td>8</td>
<td>35</td>
</tr>
<tr>
<td>Finland</td>
<td>5</td>
<td>23</td>
</tr>
<tr>
<td>Norway</td>
<td>3</td>
<td>23</td>
</tr>
<tr>
<td>Sweden</td>
<td>6</td>
<td>25</td>
</tr>
</tbody>
</table>

Table VI. Number of people engaged in information work

It can be seen that, whereas 64% of the academic libraries in Britain had "more than 3" people actively engaged in information work, the figures
for Scandinavian libraries were much lower - from 23% to 35%. There was of course considerable variation from library to library, but the general picture which emerged from the questionnaire replies, together with the control interviews and visits, was that a relatively higher proportion of library staff was involved in information work and user instruction in the academic libraries in Britain than in those in Denmark, Finland, Norway and Sweden.

4.3.4 User instruction programmes at individual academic libraries

Examples of user instruction programmes at individual academic libraries in Britain have been given in Fjällbrant’s survey of library instruction in British University Libraries (Fjällbrant, 1974 a) where programmes of instruction at Southampton, Lancaster and Loughborough University Libraries have been described in some detail. In addition, references describing user instruction at Bradford (Crossley, 1968) City University (Corney, 1969) (Will, 1970) and Reading (Mews, 1972) have been given. Reader instruction in universities has been described by Mackenzie, 1969, who gave considerable detail about methods used at Lancaster (Mackenzie, 1969). Similarly, individual programmes at various Swedish academic libraries - Gothenburg University Library, the Institute of Agriculture Library, Ultuna, and
the Royal Institute of Technology Library, Stockholm -

have been described in Fjällbrant and Westberg's

survey of 1974 on user instruction in academic

libraries in Sweden. (Fjällbrant and Westberg, 1974 a).

(a) Denmark

The need for close cooperation between individual

academic departments and their university libraries

was stressed in many of the Danish questionnaire

replies and there seemed to be a tendency to

departmental organization of user instruction courses.

An example of a course of this type is that organized

at the Institute of History at Copenhagen University.

(Vejledning af studerende...; Kolding Nielsen, 1974).

A comprehensive course of some 75 hours (3 hours per

week for 25 weeks) in "the use of handbooks" is

provided for history students during their first two

terms. The course, which is attended by approximately

180-210 students per year, divided into 6 groups of

30-35 students, is concluded by means of examination.

Teaching is based on a combined text and handbook

"Introduktion til Historie. Bibliografi over fagets

hjælpmidler med en vejledning i litteratursøgning,"

(Introduction to History Bibliography of the aids to

the subject and guide to literature searching.)


Each course consists of a general part lasting 7

weeks, dealing with the use of the library at the

Institute of History (25.000 vols.) and two other
large research libraries, and with the use of the basic aids within the discipline, chronologies, histories, bibliographies, dictionaries, etc. This general instruction is followed by 6 three-week periods of specialized instruction centered on six chronological periods. The use of special bibliographic aids for each period are taught, together with suitable search techniques and programmes relevant to the period in question. Teaching is carried out by 6 teams consisting of 1 academic teacher plus 2 instructors (more advanced students). There is considerable emphasis, throughout the course, on practical exercises and association with the large research libraries is considered to be an important feature of the training.

The National Technological Library of Denmark, which is part of the University of Technology, at Lyngby outside Copenhagen, is engaged in considerable teaching projects of both external and internal character. (Nielsen (Ed.), 1971, Jørgensen, F, 1967).

New students at the University of Technology (about 600 per year) receive a short orientation during their introductory week. In addition, introductory bibliographic courses are held for the undergraduate students of the four main engineering sections: Civil engineering, chemical engineering, electrical engineering, and mechanical engineering. These courses vary in length
between 2 and 12 hours. The length and character of the course depend on the interest and demands of the teaching departments concerned. The longest of these courses is for civil engineering students, who are offered a non-compulsory course of 12 hours, including lecture on information and documentary systems, the use of alphabetic and systematic catalogues, general and technical bibliographies, subject based bibliographic training and the writing of abstracts and reports. Courses are also given for students from the Danish Engineering Academy, Lyngby, Copenhagen.

The Library provides internal instruction for library personnel - both for staff with and without engineering backgrounds (it may be noted that many of the staff have degrees in engineering and work as subject specialists within their own field). In addition, external courses are given for members of the Danish Society for Technical Literature. In 1974 the first course for practising engineers was held, and this was attended by 17 participants.

Another example of a course organized by a Danish library is an introduction to botanical literature organized by the Central Library of Botany, Copenhagen. This 6-hour course provides an introduction to botanical literature for undergraduate students, and is compulsory for those students having botany as a main subject. The course is based on a guide
"Bibliographic aids for students of botany" by M. Skytte Christiansen (Christiansen, 1971). Students must carry out a number of practical bibliographic exercises.

(b) Finland

In 1967, TINFO - the Finnish Council for Scientific and Technical Information - appointed a committee to study the organization of user instruction for the effective use of information sources and services. This committee, amongst other things, sent out, in 1969, a questionnaire on user instruction to 24 academic libraries. They found that of these, 4 had courses of between 6 to 20 hours on the use of information sources, whilst 7 libraries held shorter courses at irregular intervals (Kommittébetänkande Helsinki 1970).

The committee put forward the recommendations that all students should receive training in the use of information sources, and that this instruction should take place in the academic libraries, under the guidance of librarians/information officers. Instruction should include "the use of the university library" and "use of information sources and information services". Students, research workers and academic staff should be taught the use of computer-based information retrieval. The committee recommended the provision of special funds for these purposes, but in actual practice, user instruction within the academic libraries in Finland has been financed by funds from their respective universities.
These recommendations have provided a stimulus for the development of user instruction within the academic libraries. A good example of a well developed programme of instruction is to be seen at the Helsinki University of Technology Library, Otaniemi. A 2-hour library orientation is provided, for about 850 new students, annually. This course is compulsory. In addition, there are optional 13-hour courses for third/fourth year students, within their specific fields of study. About 300 students per year have taken these courses and attendance has risen annually. In 1973, it was decided to make use of closed-circuit TV for teaching these courses in library instruction - examples of these video-programmes are: "How to use the library", "Indexing and classification", "Secondary information sources within science and technology", "Computer-based information retrieval", and "The use of patents". The TV programmes vary in length between 10 and 25 minutes. They are used in combination with lectures and discussions. Each session is followed by practical exercises. Experience with these TV programmes has been described as being "promising" and it will be interesting to observe their future development (Kivelä 1974). In addition to these courses for undergraduate students, there are courses of 2 hours for postgraduates, and courses in computer-based information retrieval. Special courses are also arranged to meet the needs of specific user groups, such as engineers employed in industry.
(c) Norway

Answers to the questionnaire, together with interviews, revealed that, whilst many of the libraries had some courses for students, they had far fewer courses than they would like to have had. However, many libraries were planning to increase their user instruction, for example the University Library, Bergen and the Liberal Arts Section of the University Library, Trondheim. There is a well developed programme of user instruction at the University of Technology Library, Trondheim. This consists of a 2-hour library orientation for 600 new students, every year, followed by bibliographic introduction courses for undergraduate students. These vary in length between 3 hours and 10 hours. In addition, special courses, such as "computer-based information retrieval" and "the use of patents", are given. These courses have been described in a report by Randi Gjersvik (Gjersvik 1972).

4.3.5 Teaching methods

Teaching methods used for library orientation and instruction were examined. This investigation was divided into two parts - teaching methods used for group instruction and methods and media used for individual user instruction.

(a) For groups of students

A comparison of the methods used for group instruction can be seen in Table VII.
Table VII. Methods used for group instruction

<table>
<thead>
<tr>
<th>Teaching method</th>
<th>No. of Libraries</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Britain</td>
</tr>
<tr>
<td>Conducted tour</td>
<td>44 (83%)</td>
</tr>
<tr>
<td>Lecture</td>
<td>40 (75%)</td>
</tr>
<tr>
<td>Tape/slides</td>
<td>26 (49%)</td>
</tr>
<tr>
<td>Audio-cassette</td>
<td>3 (6%)</td>
</tr>
<tr>
<td>Closed-circuit TV (incl. video-cassette)</td>
<td>5 (9%)</td>
</tr>
<tr>
<td>Film-strips</td>
<td>4 (8%)</td>
</tr>
<tr>
<td>Films</td>
<td>9 (17%)</td>
</tr>
<tr>
<td>Practical tests</td>
<td>22 (42%)</td>
</tr>
</tbody>
</table>

It can be seen from Table VII and Fig. 1 that the most common methods of instruction are the conducted tour (from 77%-87%), the lecture (from 59%-78%) and practical tests (from 42%-83%). A high proportion of libraries in all five countries make use of conventional methods of instruction, such as the conducted tour and the lecture, and the use of practical tests is fairly widespread - particularly in Denmark, but the use of modern audio-visual methods is far from common. The use of tape/slide material in the British academic libraries - see Fig. 2 d), is an exception to this. Few of the libraries concerned in the surveys made use of audio-cassettes, internal TV or films for group instruction.
METHODS USED FOR LIBRARY INSTRUCTION

Fig. 1. - GROUPS OF STUDENTS
(b) Individual students

When the media used for teaching individual students were examined - see Table VIII and Fig. 2, variations could be seen in the extent to which these are used in the libraries in Britain and in libraries in the Scandinavian countries. Thus, with regard to individual tape/slide instruction, 43% of the academic libraries in Britain made use of this method, which was hardly used at all in the Scandinavian libraries (Fig. 2a). Similarly, with regard to subject bibliographies used as guides for the individual student, 68% of the British academic libraries made use of these, whereas the average figure for the Scandinavian countries was 25% (Fig. 2b). Even with regard to the traditional "library guide", there was a marked difference - thus 74% of the British university libraries had such a guide, while the corresponding figures for the Scandinavian academic libraries was 50% (Fig. 2c).

<table>
<thead>
<tr>
<th>Teaching media</th>
<th>No. of Libraries</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Britain</td>
</tr>
<tr>
<td>Tape/slide</td>
<td>23 (43%)</td>
</tr>
<tr>
<td>Audio cassettes</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Film-strips</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Subject bibliographies</td>
<td>31 (58%)</td>
</tr>
<tr>
<td>Library guides</td>
<td>39 (74%)</td>
</tr>
</tbody>
</table>

Table VIII.
Teaching media used for individual user instruction
METHODS USED FOR LIBRARY INSTRUCTION

Fig. 2. INDIVIDUAL STUDENTS
4.4 Discussion

4.4.1 Factors affecting the increase in user education

Interest in the education of library users is by no means new - this had been discussed in the U.S.A. as long ago as in 1880 - (Brough, 1953).

However, in recent years, there has been a very marked increase in the attention paid to user instruction and the educational role of the academic library. This increased interest in due to a number of factors, some of which are closely related:

(a) The information explosion

The volume of information, and consequently of published material, is increasing at an ever more rapid rate (see Fig.3.). This increase is particularly marked in the natural sciences, technology and medicine. Growth in primary literature - patents, reports, conference proceedings, journal articles etc., has resulted in a corresponding increase in secondary literature such as bibliographies, indexing and abstracting services, and in computer-based information retrieval systems.

(b) Increase in the number of users

At the same time as this increase in published material, there has been a marked increase in student numbers, in many countries, during the last two decades. Thus, for example, it has been estimated that the number of undergraduates, research students and academic staff
Fig. 3.

TOTAL NUMBER OF SCIENTIFIC JOURNALS AND ABSTRACT JOURNALS FOUNDED, AS A FUNCTION OF DATE

(Modified from Derek J. de Solla Price; Science Since Babylon, New Haven, Yale University Press, 1961)
in Britain has increased by a factor of 4 from 1945 to 1970. (Line, 1970).

This increase in numbers using the academic libraries, together with the rapid growth of published material, has resulted in an increased need for user instruction, in order to teach users how to obtain the information they require and how to make the best possible use of the library resources available to them.

(c) The transdisciplinary nature of research work
A third factor affecting the need for user instruction is the transdisciplinary nature of many present-day research projects. Thus an engineer and a medical specialist may well find themselves working within the same field of research - within an area where the literature is no longer familiar to them. The need for instruction on how to obtain information within other disciplines is of great importance to present-day students, who have to meet requirements of flexibility and adaptation to rapidly changing situations.

(d) Economic aspects
Economic factors also affect the need for increased library instruction. The exponential rate of growth, in volume, of published material has already been pointed out. Most university libraries have not received a corresponding exponential increase in their budgets. This means that their relative purchasing power decreases from year to year, and
they buy an ever diminishing quantity of the total literature available. This results, not only in a need to teach individual library users how to make the best possible use of their own immediate libraries, but also in how to obtain information and material from other libraries.

4.4.2 How is the need for user instruction being met in academic libraries in Britain and Scandinavia?

It would appear, from the results obtained in these surveys, that the need for user instruction is being more actively met in British academic libraries than in their Scandinavian counterparts, where the development of library instruction is, in some cases, being hampered by lack of adequate economic resources. Thus the proportion of library staff engaged on information and user instruction work appears to be higher in Britain than in Scandinavian libraries. Many of the Scandinavian librarians, interviewed in connection with these surveys, expressed the need for greater resources in order to develop programmes for user instruction.

4.4.3 The need for Scandinavian cooperation

In view of the limited resources available for user instruction at many Scandinavian libraries, it seems particularly important to pool these resources so as to use them as effectively as possible. The importance of cooperation can be seen by the influence that the SCONUL (Standing Conference of National and
University Libraries) Working Group on Tape/slide guides to Library Services has had on the use of this audio-visual medium in British academic libraries. The SCONUL Tape/slide Project started in 1970 for the production of a series of tape/slide guides on services and information sources available in libraries. The guides were to be produced on a cooperative basis by a group of three libraries - one library acting as producer and the other two as consultants - "Tape/slides presentations. Recommended procedures." Ed. by F. Earnshaw. (Earnshaw, 1973). Copies of the finished material are deposited with the British Library Lending Division, and prospective purchasers may loan a copy from the B.L.L. before deciding whether to buy a given tape/slide guide. Copies may then be bought directly from the producing library.

The effect of this cooperation project, on both group and individual instruction, can clearly be seen from the results of these British and Scandinavian surveys, with regard to methods used. Thus, while 49% of the academic libraries in Britain made use of tape/slides for group instruction, hardly any of the Scandinavian academic libraries made regular use of this material (Denmark 4%, Finland 5%, Norway 0%, and Sweden 13%). With regard to individual instruction, differences were even more marked, - 43% of the academic libraries in Britain made use of tape/slide guides, whereas, in 1973, these were not being used for individual instruction in the Scandinavian
academic libraries. However, many of the Scandinavian libraries are very interested in this medium, and plan to use tape/slides in their regular instruction programmes in the near future. At the 1974 Scandinavian Conference on User Instruction, Oslo, sponsored by NORDDOK (The Nordic Committee for Information and Documentation), the use of this medium was discussed, together with the possibility of using English tape/slide material for Scandinavian user instruction. Recent preliminary evaluations by Fjällbrant (Fjällbrant, 1973 and Chapter 9) on the use of certain English tape/slide material for library school students at the Swedish College of Librarianship, Borås, have shown that, in spite of possible language difficulties, there is a marked positive learning effect. In addition, user reactions to this type of media were very positive. (See Chapter 9.)

The effects of adequate resources, coupled to a policy of cooperation, can be seen in the use of subject bibliographies in British academic libraries. Thus 58% of the British university libraries in the survey made use of subject bibliographies, whereas the corresponding figures for the Scandinavian libraries were: Denmark 35%, Finland 32%, Norway 15%, and Sweden 17%. The production of this type of material requires trained library staff, with adequate time at their disposal. It is obviously desirable to avoid
duplication of this qualified work, and in an effort to do this and to increase cooperation between the various libraries, the British Library Lending Division now holds a comprehensive collection of this type of material (Myatt 1972).

4.4.4 Evaluation

It is of the greatest importance to try to evaluate user instruction courses and teaching media. The need for precise evaluation, in a given teaching situation, is now generally realized. An example of this can be seen in the research group set up at the Institute for Educational Technology at the University of Surrey to carry out an OSTI (Office for Scientific and Technical Information) project, during 1973 and 1974, on the methods of production and evaluation of Tape/slide guides to library service (Chesshyre and Hills, 1970; Hills, 1970; "The production of tape/slide guides to library services." - Leverhulme research project 1971-72.) In Scandinavia, a similar research project - the Library USER (User-Staff-Education-Research) Project - has been started at the Chalmers University of Technology Library, Gothenburg, Sweden, to try and find effective methods and media for user instruction. This project, sponsored by the Office of the Chancellor of the Swedish Universities and the Chalmers University Authorities, is being undertaken in collaboration with the Institute for Educational Technology, at the University of Surrey (Fjällbrant and Westberg, 1974 b).
The evaluation work carried out in connection with the user education programme at Chalmers Library is described in Chapter 8-15.

In Finland, the Helsinki University of Technology Library launched in 1973, a 2-year evaluation project financed by the Ministry of Education. Special emphasis is on the use of video-cassettes for both group and individual instruction.

Conclusions

A considerable amount of information about the organization of courses of user education, and methods and media used for instruction, at libraries in many countries has now been collected. This has provided information and ideas which have been of value in the planning and organization of the programme of user education at Chalmers Library (See Chapter 7). In particular, the use of tape/slide material for library instruction was observed in British University Libraries, and this led to experimental use and evaluation of this material for the teaching of Swedish library users (See Chapter 9). The importance of evaluation of user education programmes has been pointed out. Many of the libraries concerned in the survey had carried out informal discussions, but few had carried out systematic evaluation studies of the library instruction. I decided that it was necessary to carry out detailed evaluation of the library
education programme at Chalmers University Library. These evaluation studies are described in Chapter 8-15.
Chapter 5

USER INSTRUCTION IN SCANDINAVIAN UNIVERSITY OF TECHNOLOGY LIBRARIES

5.1 Introduction

When the survey of user instruction in Scandinavian university libraries, described in Chapter 4, was carried out, it was noticed that there appeared to be differences between instruction given in university of technology libraries and other university libraries. It was decided to examine the extent of these differences and to see if any reason could be found to account for them.

5.2 Method

9 university of technology libraries were selected from the total Scandinavian university library material. These libraries were selected on the grounds that they were "pure" university of technology libraries. Universities which included a faculty of technology or engineering, in a general university grouping, such as Linköping and Lund, were thus excluded. The following libraries were selected as representing university of technology libraries:

Denmark: Aalborgs Tekniske Bibliotek
        Odense Tekniske Bibliotek
        Danmarks Tekniske Bibliotek, Lyngby,

Finland: Helsinki University of Technology Library, Otaniemi
Lappeenranta University of Technology Library
Tampere University of Technology Library

Norway: The Norwegian University of Technology, Trondheim

Sweden: Chalmers University of Technology Library, Gothenburg
The Royal Institute of Technology Library, Stockholm.

The special libraries of technology were then regarded as one group, and compared with the total Scandinavian university library material — minus these specialized libraries, with respect to courses in user instruction and teaching methods used. Even though all the specialized technological libraries have been included, the size of the material is small, therefore results should be regarded as indications of general trends.

5.3 Results

5.3.1 Types of courses available

All 9 specialized technology libraries had some courses for user orientation and instruction. This did not differ significantly from the "general" group of Scandinavian university libraries, most of which had courses in user education. A closer examination of the types of courses offered showed that there was a higher percentage of university of technology libraries offering, in particular, courses in "bibliographic introduction" for engineering undergraduates, and "other" types of user instruction.

See Table I.
Table 1. Types of course available in University of Technology Libraries as compared with general university libraries in Scandinavia

<table>
<thead>
<tr>
<th>Types of course</th>
<th>Univ. of Techn. Library</th>
<th>General univ. Library</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation</td>
<td>89%</td>
<td>81%</td>
</tr>
<tr>
<td>Bibliographic</td>
<td>89%</td>
<td>56%</td>
</tr>
<tr>
<td>introduction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Postgraduate</td>
<td>33%</td>
<td>25%</td>
</tr>
<tr>
<td>instruction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;Other&quot; course</td>
<td>44%</td>
<td>19%</td>
</tr>
</tbody>
</table>

The courses listed as "other" were often directed towards a special group of library users—for example industrial research workers. Thus the Helsinki University of Technology Library at Otaniemi, Finland, organized courses for groups of visitors from industrial organizations and for various institutions. (Kivilä 1974). Courses were given for practising engineers and for students from the Department of Library Science, at the University of Tammerfors. The Norwegian University of Technology Library, at Trondheim, organized three-day seminars in information retrieval, including computer-based literature searches, for engineers and people working with information and documentation problems in industry and research. (Gjersvik 1972.) They also gave an 8-hour course on patents, and lectures in connection with short courses on information retrieval in various places such as Bergen, Stavanger and Tromsø. Courses were also given for librarians and documentalists. Similarly, at the Royal Institute of Technology Library, Stockholm, a series of courses and seminars
on manual and computer-based information retrieval have been organized by the documentation department. They have also given one and two-day seminars in different parts of Sweden. These seminars have been attended by production engineers, research workers and information and documentation personnel. The participants were given an introduction to manual information retrieval methods and then taught the principles of the Royal Institute Library's computer-based Selective Dissemination of Information system. Teaching consisted of a series of lectures and practical exercises in profile construction (Gluchowicz 1971). Similar courses were also held at Chalmers University of Technology Library, Gothenburg, Sweden.

5.3.2 Staff responsible for user instruction

In view of the greater number of courses available at University of Technology Libraries, it was of interest to see whether these libraries had greater numbers of staff engaged in giving "information for library users". The difficulties of collecting precise information on the total number of man-hours per year spent on this activity have been described, in chapter 4, in connection with the general survey of user instruction in Scandinavian and British university libraries. However, questionnaire replies gave a general picture that about twice as many people were engaged in this library function at the University of Technology libraries as at other types of academic library. More than
half of the University of Technology Libraries had more than 3 people engaged on this work, whereas less than a quarter of the remaining Scandinavian university libraries had this number of people working with information for library users.

In the Scandinavian university libraries in general, user instruction appears to be organized by people holding very different types of library position - from Librarian to Library Assistant (see Ch.4. - 4.3.3). In the University of Technology Libraries, on the other hand, it appeared that the people in charge of user instruction came from fewer categories: documentalists (The Royal Institute of Technology Library, Stockholm, Odense Library of Technology, Denmark, and the Norwegian University of Technology Library, Trondheim), Information Officers, (The Helsinki University of Technology Library, Otaniemi and the University of Technology Library, Tampere, Finland), Subject Specialists at the Danish University of Technology Library, Lyngby, and Assistant Librarians at the remaining libraries. (The titles documentalist and information officer are often used synonymously.)

5.3.3 Teaching methods
Teaching methods used for library orientation and instruction were examined. The methods used were considered in two parts - those used for teaching
groups of students and those used for teaching individuals.

(a) For groups of students

A comparison of the methods used for teaching groups of students in the University of Technology Libraries, as compared with those used in the other Scandinavian university libraries, can be seen in Table II:

<table>
<thead>
<tr>
<th>Teaching method</th>
<th>Univ. of Techn. Library</th>
<th>General Univ. Library</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conducted tour</td>
<td>89%</td>
<td>82%</td>
</tr>
<tr>
<td>Lecture</td>
<td>100%</td>
<td>66%</td>
</tr>
<tr>
<td>Tape/slides</td>
<td>11% (33%)</td>
<td>5%</td>
</tr>
<tr>
<td>Closed circuit T.V.</td>
<td>11% (22%)</td>
<td>3%</td>
</tr>
<tr>
<td>Film strips</td>
<td>11% (22%)</td>
<td>0%</td>
</tr>
<tr>
<td>Practical tests</td>
<td>89%</td>
<td>58%</td>
</tr>
</tbody>
</table>

Table II. Methods used for group instruction

The most popular methods of instruction are the lecture, conducted tour and practical tests. Audiovisual methods are not used to anything like the same extent. In a few cases, the University of Technology Libraries indicated on their questionnaire replies that they were planning to use a specific method in the near future, and this has been indicated in parenthesis in Table II. There appears to be a greater tendency to make use of most of the methods for group instruction, in the university of technology libraries, as compared with the general university libraries.
(b) Individual students
With regard to media used for individual instruction, none of the general university libraries made use of audio-visual material, but a few of the university of technology libraries, 4 out of 9, had started to try to use tape/slides of film strips, or were planning to use this in the near future. About a third of both groups used subject bibliographies and 7 out of 9 of the university of technology libraries made use of library guides, as compared with less than half of the general university libraries.

5.3.4 Evaluation
A comparison of the two groups of libraries with regard to attempts to evaluate the user instruction, showed that 4 out of 9 of the university of technology libraries had made some attempt to evaluate the usefulness of the courses given, whereas the corresponding situation for the general university libraries was that a quarter of the libraries had attempted some form of evaluation.

5.4 Discussion
It appears that the Scandinavian University of Technology Libraries are playing a more active role, with regard to user education, than the other Scandinavian academic libraries. This can be seen in the types of course offered and in the use of
different teaching methods and media.

It is interesting to see if this concern with user education is typical of university of technology libraries outside Scandinavia. Fjällbrant's recent survey of user instruction in British university libraries shows that this has often received considerable emphasis in university of technology libraries, as for example at Loughborough University of Technology, where there is a well developed programme of user instruction (Fjällbrant, 1974 a). Other universities with a strong emphasis on science and technology, such as Aston at Birmingham, Bradford, City University London, the Manchester Institute of Science and Technology, Salford and Strathclyde, can also be cited as being active in the field of user instruction. (Corney, 1969, Will, 1969, Crossley, 1968 and Crossley and Clews, 1974.) A similar example from the U.S.A. is Massachusetts Institute of Technology, where the Model Library Project has been completed, in 1973, at the Barker Engineering Library. This Model Library Project has included the development of a number of methods of individual instruction such as the "Pathfinders" (Canfield, 1972), and "point-of-use" audio-visual instruction (Gardner, 1972). A recent book describing the development of user services, including user education, in polytechnic libraries, is "Libraries in higher education" edited by Cowley (Cowley, 1975). From these and other
examples, it can be seen that there appears to be a marked interest in user education at many university of technology libraries.

One is led to speculate on the reasons for this interest in user education in university of technology libraries. Estimates have been made of the growth of information and published literature within the various disciplines, and it can be seen that the rate of growth of primary literature is considerably more rapid in science and technology than in the liberal arts (Meadows, 1974). This rapid growth in primary literature has resulted in a corresponding growth in secondary publications, such as abstracts and indexes, and in computerized information retrieval services, and this, in turn, brings about an increased need to enable science and technology students to be able to learn how to obtain the information they require from these primary and secondary sources. Thus it could be that the development of library user instruction is a direct function of the rate of growth of the literature. If this were so, we could expect a similar interest in user instruction in other disciplines where there has been a rapid growth in literature. Such a discipline is medicine. With this in mind, an examination of courses of instruction offered by the Scandinavian medical libraries was made. This showed that the "medical" libraries closely resembled the "general" libraries, with regard to the orientation
courses and courses for undergraduates, but that more courses were held at postgraduate level, and that "other" courses were frequent - courses for nursing staff, physiotherapists, etc. This emphasis on postgraduate library instruction is not surprising, in view of the medical curriculum with its high percentage of time-tabled compulsory studies during the early years. Research and the use of extra-curricular literature tends to start relatively late in many medical courses, when compared with other subjects. It is interesting to observe that the timing of courses in information retrieval reflects the pattern of study within a particular subject.

These findings tended to support the theory that courses in library instruction may be partially dependent on the rate of growth of the literature, as both medical libraries and university of technology libraries offered more courses of user instruction than the general university libraries.

It was decided that a study of the distribution of the courses offered by the university libraries which served faculties of technology and/or science as well as faculties of liberal arts, social sciences medicine etc. might reveal whether or not there was an emphasis on courses of user instruction in fields where the rate of increase of literature is particularly rapid. The pattern of these courses can
be seen in Table III. In this table the courses have been broadly grouped according to faculty. There does not appear to be any special emphasis on library instruction for disciplines in which there is a rapid increase in literature. However the grouping of the courses in Table III is very broad, and it may be argued that perhaps there are university libraries offering one course within the liberal arts faculty, but several within the corresponding science faculty. No tendency toward this could be observed. Many libraries had sent detailed accounts of the type and length of course offered, and bias, was, if anything, in the direction of the arts and social sciences. Courses at Umeå University Library, Sweden, may serve as an example:

Academic year 1972/73 - Courses in User Education

1. Library orientation courses for new students at the beginning of each term.

2. Courses in "bibliographic instruction" for undergraduates:

<table>
<thead>
<tr>
<th>Subject</th>
<th>Length of courses (hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of learning</td>
<td>15</td>
</tr>
<tr>
<td>Psychology</td>
<td>6</td>
</tr>
<tr>
<td>Education</td>
<td>4</td>
</tr>
<tr>
<td>English</td>
<td>2</td>
</tr>
<tr>
<td>Medical chemistry</td>
<td>2</td>
</tr>
<tr>
<td>Microbiology</td>
<td>2</td>
</tr>
<tr>
<td>Social studies</td>
<td>3</td>
</tr>
<tr>
<td>Dentistry</td>
<td>8</td>
</tr>
<tr>
<td>University</td>
<td>Faculty</td>
</tr>
<tr>
<td>--------------------</td>
<td>----------------------------------------------</td>
</tr>
<tr>
<td>Oslo Univ.</td>
<td>+</td>
</tr>
<tr>
<td>Bergen Univ.</td>
<td>⊤</td>
</tr>
<tr>
<td>Göteborgs Univ.</td>
<td>⊤</td>
</tr>
<tr>
<td>Linköpings Univ.</td>
<td>⊤</td>
</tr>
<tr>
<td>Umeå Univ.</td>
<td>⊤</td>
</tr>
<tr>
<td>Uppsala Univ.</td>
<td>⊤</td>
</tr>
<tr>
<td>Århus Univ.</td>
<td>⊤</td>
</tr>
<tr>
<td>Copenhagen Univ.</td>
<td>+</td>
</tr>
<tr>
<td>Odense Univ.</td>
<td>⊤</td>
</tr>
<tr>
<td>Åbo Univ.</td>
<td>⊤</td>
</tr>
<tr>
<td>Helsinki Univ.</td>
<td>⊤</td>
</tr>
<tr>
<td>Jyväskylä Univ.</td>
<td>⊤</td>
</tr>
<tr>
<td>Tampere Univ.</td>
<td>+</td>
</tr>
<tr>
<td>Turku Univ.</td>
<td></td>
</tr>
</tbody>
</table>

+ = faculty  
	× = course of library instruction within faculty

**Table III.** Distribution of courses of library instruction according to faculty
3. Postgraduate course in library instruction:
This course was completed by 39 students: Arts 11, Social Sciences 14, Economics 9, Biology 8, Mathematics and Statistics 7.

5.5 Conclusions
Scandinavian University of Technology Libraries appear to be playing an active role in the development of library user education, as can be seen from the number of courses offered and the use of different teaching methods and media.

The development of courses in user instruction may be in part dependent on the rate of growth of literature within a given discipline. This view is partially supported by the present examination of user instruction in Scandinavian academic libraries. Thus both university of technology libraries and university medical libraries have more courses in user instruction than other "general" university libraries. However, there was no evidence of "faculty dependent" development of courses at university libraries serving more than one faculty. It would be interesting to carry out more detailed studies on this point.

The type of courses offered appeared, to a certain extent, to be linked to the pattern of study within the discipline. Thus the university of technology libraries had a number of courses in information
retrieval at undergraduate level, whereas the medical libraries had courses at a later or post-graduate stage. In addition both these types of library had courses directed to special categories of users, such as nursing staff, physiotherapists, practising engineers and so on. This connection between the library education and the academic courses is of great importance and it would seem to be desirable to achieve as close an integration as possible between the two. This will be further studied in Chapter 6.
Chapter 6

GOALS AND OBJECTIVES FOR THE PROGRAMME OF USER EDUCATION AT CHALMERS UNIVERSITY OF TECHNOLOGY LIBRARY

6.1 Introduction

This chapter will describe the formulation of goals and objectives in relation to the development of an educational programme (6.2). This will be followed by a discussion on goals and objectives for library user education (6.3). Then comes an account of the needs for student library use and library instruction as perceived by students, academic staff, library staff, administrative staff and industrial engineers (6.4). Finally, an outline of goals and objectives will be given for the programme of user education at Chalmers University of Technology (6.5).

6.2 The formulation of goals and objectives

Education is often regarded as a process which changes the learners - a process "in which someone has to decide what changes are possible and desirable. Every teacher-student interaction is based on some implicit conviction on the part of both teacher and student about the possibility and desirability of certain changes." (Bloom et al, 1971.) A verbal formulation of the possible and desirable changes is called a statement of goals and objectives for a given educational programme. (The term "goal" will be used to express
broad, general statements of purpose, whereas the term "objective" will be used to express specific short-term aims, in agreement with the main goals.) The verbal formulation of goals and objectives does not, however, ensure that the goals expressed are the same as the implicit goals. It should also be realized that changes can occur which have not been foreseen; some of these may be desirable, others may be undesirable. In addition, students will not all change to the same extent, or even in the same way.

One use of evaluation is to try to relate the student-changes to the goals and objectives expressed for the courses. (See Chapter 8). The development of an educational programme, from the expression of objectives to the evaluation, is represented in Fig.1.

Goals and objectives should be based on the views of the people participating in the various educational processes. As Bloom says "There is no doubt that the student must be involved in the process of decision about educational goals and objectives... At the very least, it is to be desired that the learner accept the goals. At the other extreme, it is to be desired that he have some sense of participation in setting them. However, we would argue that the full responsibility for setting goals cannot be placed on the student, who in most cases will not be able to foresee the alternatives available and in many cases cannot fully appreciate the implications of particular
Fig 1. Development of a course of education.
6.3 The formulation of goals and objectives for library user education

6.3.1 Introduction

In considering the goals and objectives for library user education, one becomes aware that, if expressed at all, these tend to be very vague. Thus Lubans, in 1974, said that "several locally developed guidelines for instruction in library skills have been drawn up" but that "these guidelines are rarely based on specific objectives". (Lubans, 1974a). Similarly, Stevenson, made the statement that "few librarians have expressed either the aims or objectives for reader instruction" (Stevenson, 1973).

6.3.2 Goals and objectives for higher education in Sweden

The goals and objectives for programmes of library user education must be in agreement with the general aims of the university library; these aims must, in turn, be related to the goals and aims for university education. In Sweden, the goals and future development of education have been under review during recent years. A report on higher education was published in 1973- Higher Education. Report of the 1968 Committee on Education (Högskolan... 1973). This resulted in widespread discussion amongst the various organizations and groups concerned with higher education, and led to
a Government Education Bill - Reform of Higher Education - in 1975. (Regerings proposition 1975:9.) This Bill expresses the broad goals for Swedish higher education - the development of the facility for critical thought, and the provision of knowledge and skills for carrying out future work within some section of society. Emphasis is placed on breadth in education and the possibility of utilizing basic training within a wide series of different sectors, due to the rapid development of transdisciplinary research areas - such as in environmental control. In addition, great importance was attached to the extension of recurrent education - periods of theoretical study interspersed with periods of practical work.

These general goals imply that students should, after a period of higher education, be able to acquire information required for work or study. The emphasis on recurring periods of education, interspersed with practical work, will further result in the student having to acquire information from sources outside the immediate university or college enviroment. This implies that students should be taught, during their theoretical studies, how to make independent use of the information resources available, and this must now be regarded as one of the functions of the university library.
6.3.3 Goals for a specialized university library

The library system functions as a store for printed material (and non-print material such as audio tapes, films, slides, etc.) Individual libraries form part of complex national and international library systems networks. Within these networks, different types of library exist, to serve the needs of different user groups. Thus, taking Sweden as an example, there are the public libraries - with both educational and recreational functions; general university libraries, such as Gothenburg, Lund and Uppsala - with both depository and educational functions; specialized university libraries, such as Chalmers University of Technology Library - designed to serve the needs of a specialized user category of engineering students and engineers; and specialized libraries designed to serve the needs of user groups within a specific community - for example the specialized industrial libraries. These different types of library aim to acquire, register and store the information material which is of interest to the users being served.

In science and technology (the fields served at Chalmers Library), there has been a rapid growth of published material. Thus, in 1775, the total number of scientific journals was 10. (See Fig. 2.) Presumably the scientist of that day coped very well with obtaining information about topics in which he was interested. Even in 1800, when the number of scientific journals had risen to 100,
obtaining desired information must have been relatively easy. The situation has, however, changed with increasing speed, and it is now estimated that there are some 100,000 scientific journals being published at the present time. (Price, 1963). These represent only a part of the publication of new scientific and technical information - other sources are patents, reports, congress publications, theses, etc. More and more people, in an ever increasing number of countries, are engaged in scientific and
technological work, and this has led to the direct rise in the publication of information. Due to this "information explosion", it is particularly difficult for the individual student or engineer, to find information on topics of specific interest. This, in turn, has brought about a need for user instruction in scientific and technical libraries (See Chapter 5). Users need to be taught how to obtain specific information that they require, from the vast amount of total available information.

The acquisition and storage of information is not an end in itself, for the university library. If the material, often laboriously acquired, registered and stored, sometimes at considerable cost, is to be of use, then this material must be made available to those who could make use of it. Availability depends on ease of access - that is, partly on physical conditions such as type of shelving and the hours of opening, and partly on conceptual awareness of which resources are there to be made use of.

As has been pointed out in 6.3.2, the general aims for the university library must be related to the general aims for university education. Fjällbrant and Westberg have expressed the general goals for a specialized university library in the following way: (Fjällbrant and Westberg, 1975).
1. To contribute to the realization of the aims of the university, with regard to teaching, learning and research, by acquisition of printed and non-print material necessary to cover present day, and future, information needs.

2. To register and store the material acquired in such a way that, it not only permits, but even actively stimulates the use of this material.

3. To adapt these information resources and services to the changing needs of the university and society.

4. To contribute to the integration of both national and international information resources within the university.

One way of stimulating the active use of the information stored in the library, is by teaching the library user how to obtain information from the material available. Thus a general goal for a programme of user education, for any type of library, is likely to include an attempt to create an awareness of the resources available.

In special libraries, for such subjects as science, medicine or technology, where the rate of growth of literature is rapid, the need for user instruction is particularly marked.

6.3.4 The need for cooperation between library staff, academic staff and students, in the formulation of goals and objectives for library education

Library use is not part of a separate academic discipline
such as zoology, history or sociology; it consists of a series of skills which can be made use of in connection with different academic studies. This would suggest that education in library use should be closely integrated with the teaching programmes within the various academic disciplines. As the type of literature and the information sources vary widely between different areas of study, such as, for example, the natural sciences and the liberal arts, one would expect that the specific objectives for library instruction in these disciplines would show differences, whereas the main goals might well be similar.

Several investigators have pointed out the need for cooperation between library and academic staff. For example, Knapp stated, in 1965, that (competance in use of the library) "should be integrated into the total curriculum. But it cannot be so integrated until the faculty as a whole is ready to recognize the validity of its claim and to implement this recognition through regularly established procedures of curriculum development." (Knapp, 1965.) Similarly, MacKenzie pointed out, in 1969, that "The department's view of what is required will often conflict with the library's." He suggested that both sides should cooperate in the teaching and "gradually learn from each other." (MacKenzie, 1969.) Scrivener calls for greater efforts from librarians to work with academic staff. (Scrivener, 1972.) Lubans, in 1971, suggests the problem-solving approach - "As a solution for limiting non-use it is recommended that faculty involve
the use of literature in research or problem-solving assignments whenever possible". (Lubans, 1971.)

The need for cooperation between library-staff, academic staff and students, in order to decide on the main goals for library education, can be represented in Fig.3.

![Diagram of interactions between library staff, academic staff, and students.]

Fig.3. The relationship between library staff, academic staff and students, in user education.

Goals and objectives for educational programmes are often perceived differently by different groups of people concerned with the instruction. Thus, in university courses, the academic staff may be aiming to teach broad general concepts within a specific discipline, whereas the students taking part in the instruction may be aiming to pass a given examination as quickly as possible, in order to obtain a degree. With regard to university library education, there is, in addition to the two groups mentioned above - the academic staff and the students - a third group concerned with user education - the library staff. The goals and objectives perceived by these three groups may well differ. Even within each of the groups, it is possible to have a wide range of goals and objectives. For example, the library administrative
staff might be concerned with the efficient utilization of the library resources available, and consider this to be the main goal of library instruction. Other members of the library staff might have quite different conceptions of a programme of user instruction - that an important part is to reduce the number of "errors" made by students in requesting material, and thereby speeding up the supply of the material desired.

A pilot study of the needs of the library user, as seen by academic staff, library staff and students, has been carried out, as part of an OSTI research project, at the Institute for Educational Technology, University of Surrey, England, (Roy, 1974). In this descriptive study, Roy showed that the students viewed the library as a tool to be used in response to stimuli such as essays, projects and exams, whereas the ideal of "most of the academic staff and all library staff" was that the library should be "the centre for information, sources of constant references, and stimulus to the course."

In the following section, 6.4, a description will be given of the perceived needs, goals and objectives for user education at Chalmers Library, by the students, academic staff and library staff.
6.4 The need for user instruction at Chalmers Library, as perceived by different groups

6.4.1 In the early stages of the development of the programme of user instruction at Chalmers Library, the attitudes of various groups such as students, academic staff and library staff to user instruction were examined in a number of ways.

6.4.2 Student attitudes

The use of Chalmers Library by undergraduates and postgraduates has been described in Chapter 2. In that Chapter, it was shown that few (6% of the sample) of undergraduates used the library as a place for optional studies, and that many of the undergraduates (92%) estimated that they bought "most of the material required for courses", and therefore had little use for the library for borrowing purposes. Many of the undergraduates were unaware of essential tools for information retrieval (about 1/3 did not know of the existence of the subject catalogue, and about 2/3 were unaware of the abstracts and indexes). The corresponding situation for postgraduates was that 17% used the library for optional studies, and that fewer students (22%) bought practically all the literature required for their studies. Knowledge of tools for information retrieval was greater – only 12% of the postgraduates were unaware that the library had a subject catalogue, and about 1/3 were unaware of the abstracts and indexes available at the library.
These studies revealed that the undergraduates did not make great use of the library, nor were they aware of the information resources available there. Post-graduates used the library to a greater extent and were more aware of the tools for information retrieval.

Yet students commented, when being interviewed, that they were interested in finding out more about the library and how to use it. A further example of student interest in user instruction is that students from the School of Engineering Physics approached the library staff, in 1971, (before the period of these studies) and made a direct request for a course in library instruction. In response to this request, a 49 hour course was provided, as optional instruction. This course included library administration, principles of cataloguing and indexing, manual literature searching, computer-based information retrieval, and report writing. The course included a number of practical exercises, as well as an information search, which had to be presented in the form of a report. This non-compulsory course attracted however only about 15 undergraduates per year (out of a possible 600), and only about 8 to 10 students completed the course.

Summing up the student attitudes: Undergraduates vaguely regarded use of the library as a "good thing", but their actual use was in connection with definite projects such as literature seminars or the undergraduate research project. Students said that during the first
two years, they had many hours of time-tabled studies, often of theoretical kind such as mathematics, and that during this period they had little occasion to use the library in connection with their studies. Use of the library coincided with seminars and research projects in the third and fourth years of study. Thus, students were interested in using the library in connection with obtaining information of use for their academic studies. They had also shown that few students were interested in a theoretical course which included details of organization, cataloguing and classification.

6.4.3 Attitudes of academic staff

It was also of importance to try and find out if the academic staff were interested in library education and if they believed this to have any value in the total educational programme at the university. I decided to start by having a series of informal discussions with members of staff from the six Schools of Engineering, rather than by making use of a formal written questionnaire. I hoped that the discussion method would help to establish a friendly and cooperative relationship, which would be useful in the subsequent organization of library instruction. The discussion method allowed for an interaction of ideas from a number of members of the academic staff.

The academic staff pointed out that several of the University Departments had varying amounts of instruction in literature and information searching. Thus the School
of Chemical Engineering had 49 hours of instruction in library techniques and information retrieval, during the four-year undergraduate course. There was an introductory course during the first year (in Inorganic Chemistry), followed by a course organized by the Organic Chemistry Department and a final course during the third/fourth years as part of Engineering Chemistry. In the other Schools of Engineering there was far less instruction in the use of the library and in information retrieval and the amount of instruction given varied widely between different departments. Thus in the School of Electrical Engineering, the Department of Electron Physics gave instruction in information retrieval. Similarly, courses in information retrieval were provided by the Department of Structural Engineering (School of Civil Engineering), the Departments of Engineering Materials and Power Engineering (School of Mechanical Engineering). Teaching was carried out by members of the academic staff; course content and time allocated varied widely from subject to subject. Thus some members of the academic staff had clearly felt the need for instruction in information retrieval, and had, as a result, organized courses for their students.

Many of the other members of staff, when approached informally, expressed an interest in courses of library instruction, but said that they had no time within their present timetables for such teaching. The 49 hour course was criticised as being too long and aimed at the production of "little librarians" rather than
engineers who knew how to make use of a practical tool in their daily work. Some of the older members of staff said that they themselves had managed very well without the need for special library instruction, so why should students now need this? The discussion method allowed me to discuss the effect of the "information explosion" on problems of obtaining information. I could also point out that many members of staff could cope very well with their own information problems by means of the so-called invisible college, (Crane, 1969; Crane, 1972), with the exchange of preprints of articles and by transatlantic telephone calls etc. whereas engineering undergraduates did not have access to these methods. Similarly, established research workers are able to attend national and international conferences and receive quick verbal communication about research projects, with all the advantages of immediate feedback, whereas undergraduates and younger research workers have to rely on more formal, and much slower, printed channels of communication - material stored in the university library. It was pointed out that use of the library and its information resources was a tool for the engineer and research worker, rather like an adequate knowledge of mathematics. Having information resources available in the library and being unable to use them, was like having a computer and being unable to write programmes for its use.

Many of the postgraduates who were interviewed in the user study at Chalmers University of Technology, were
also junior members of staff. These postgraduate students expressed a positive interest in instruction in methods of information retrieval. They were themselves actively engaged in research, and had, in many cases, come into contact with problems of obtaining the information required, quickly. They realized the need for instruction, both for themselves, and for other students.

The academic staff were asked what they thought ought to be the main goal of courses in library instruction and if there were any specific objectives which they thought a student should be able to perform after such instruction. The answers given tended to be very vague, and it may be argued that this could have been avoided by the use of a specific list of questions to which degrees of importance could be indicated. What did emerge, however, was that knowledge of library resources and techniques varied very much amongst members of staff, and that had they been presented with a list of possible objectives many might have ticked a certain objective on the "good thing" principle, that is that the particular objective sounded as if it might be a good thing for students to know about. However it was possible to derive considerable information by the less formal discussion method.

Of the academic staff, a small number were very enthusiastic about instruction in information searching methods - these staff had often organized some form of
instruction within their own teaching programmes. The principal emphasis was on how to obtain recent information on research projects, rather than how to find out about relatively well-known basic facts within a given discipline - this was often provided in the set books or compendia.

Many of the academic staff, particularly the older staff, had not realized the difficulties that students might have to face in their attempts to obtain information. However, when the possible problems had been pointed out, there was a positive response - the members of the academic staff agreed that students should receive instruction in how to find information. They suggested that this instruction should be given relatively late during the university course. Very few of the academic staff thought that instruction in methods of information retrieval was a waste of time.

Members of the teaching staff from the School of Chemical Engineering appeared to be well aware of the need for information searching. This was reflected in the curriculum of the degree course, which included approximately 50 hours of instruction in methods of information retrieval. This teaching was concerned mainly with the use of subject specific tools, such as Chemical Abstracts. Students were given practical search problems, at different stages during their four-year degree course.
This is in contrast to the situation observed in some other universities, where it has been said that "the great majority of the academic staff are indifferent to library instruction" (Stevenson, 1973). The position, at Chalmers University, appeared, however, to be in agreement with Melum's observations that many teachers who would not ask for library instruction for their students, would take advantage of such instruction, if it were made available (Melum, 1971b).

The impression obtained, from the series of informal talks, was that there were widely differing levels of awareness, amongst academic staff, as to the resources available at the library. Academic staff regarded the teaching of methods of information retrieval as being the main goal for courses in library instruction. They were not very interested in library orientation. Academic staff did not think that students had much need for instruction in methods of information retrieval during their first year, during which time the students concentrated largely on gaining basic skills such as mathematics etc. There was agreement that, as students progress through their university studies, they should be taught, in some way, to think for themselves and solve their own problems, and that knowing how to find information on topics of interest in connection with other studies would be useful. During their engineering courses, students had to concentrate on mastering a large amount of factual information and learning many practical skills. Extra reading, round the regular course
content was rarely demanded, with one notable exception—the undergraduate research project, undertaken during the third or fourth year of study. Members of the academic staff suggested that the timing of the courses in information retrieval ought to be in apposition to the work for the undergraduate project, or to some seminar where literature studies are required, as for example in "Transport studies" or in "Ship Hydromechanics".

In summary, the academic staff suggested that the broad general goal of a programme of library instruction should be concerned with stimulating the students to find and obtain material of use to them in their field of study. Instruction should emphasize how to find out about recent developments, rather than how to find out about established basic knowledge, as the latter is normally taught in the regular courses.

6.4.4 Administrative staff

Not only were discussions held with the academic staff at Chalmers University of Technology, but also with several of the university administrators. They were, without exception, very interested in the development of a programme of library education. The goal for this project was seen as an attempt to enable students to fully utilize the resources available at the library—material acquired and stored at considerable cost to the university. A further goal was to enable students
and research workers to avoid the duplication of the previous work of other scientists and engineers.

6.4.5 Industrial engineers and librarians at industrial firms

Very many of the undergraduates who receive their training at Chalmers University, later work as engineers in industrial concerns. For this reason, it was important to obtain the views of practising engineers on the problems connected with information retrieval in industry. Discussions were held with a number of engineers, for example departmental heads in two major electronics concerns, consultant mechanical engineers, shipbuilding engineers, civil engineers etc. There is a tradition of close cooperation between the Swedish Universities of Technology and Swedish Industry. Many of the academic staff at Chalmers have spent a period of their working lives as industrial engineers. This makes them particularly aware of the conditions of work for an industrial engineer, so problems of information retrieval in industry were even discussed with members of the academic staff.

As part of this well-established tradition of cooperation between the university and industry, Chalmers University Library functions as a central library for Swedish industrial concerns, in particular for firms situated in western and central Sweden. Services to external users have always been regarded as a very important role of the library. There are many professional contacts between the library staff and industrial
librarians. The two groups often meet under the auspices of the "Technical Literature Society" (The Swedish equivalent of ASLIB). These contacts enabled various members of the library staff to be able to discuss the information needs of industrial engineers with the industrial librarians, and consider these needs in relation to the planning of the programme of user education.

What emerged from these various discussions, was the strong "project-link" that is often a dominating feature of the information needs of the industrial engineer. Information searching is often carried out as part of a definite work project. Therefore any programme of user education should enable the student to learn how to carry out a search for information on a specific topic. It was also pointed out that the industrial search for information, in connection with a specific project, was usually a situation in which the searcher had high motivation. Thus, in order to give engineering undergraduates a realistic training in industrial information searching, it would be necessary to simulate these conditions - specific search topic and high motivation.

6.4.6 Library staff
The goals and objectives of user instruction, as seen by the library staff, were also examined. The library staff are in a unique position, amongst the groups already considered, in that they are aware of the
information resources possessed by the library, and they have been able to observe, at first hand, some of the problems and difficulties encountered by users. The views of the library staff, at Chalmers University of Technology Library, on user education, were sought in a number of ways. Discussion, in particular with librarians who were engaged in information work, gave considerable insight into some of the "perceived needs" of the users. In addition, the library staff who were assembled for one of the regular staff discussion meetings, were asked to answer, spontaneously, the two following questions:

1. What do you consider to be the main goal or goals for library user education?

2. Can you name specific tasks (objectives) which you consider that students should be able to carry out, after completing a course in library instruction?

People were allowed about ten minutes to write down the answers to these questions. It was explained that the answers were to be completely anonymous, and that no-one was compelled to answer - the paper handed out could be left blank and folded up for collection purposes. The method used had the disadvantage that the library staff had not very much time to think about the questions and formulate their answers. On the other hand, a greater number of individual views were obtained, than if the papers had been distributed and answers collected at a later date. The views expressed had also the advantage of spontaneity - no-one knew, in advance, that the questions were to be asked, and it was hoped
that the opinions expressed would represent those most deeply felt. All the various categories of library staff were included in this attempt to register views on goals and objectives for user education.

70% of the personnel present at the meeting (a representative group) made an attempt to express main goals for instruction, and 56% wrote out suggestions for specific tasks or objectives, which they thought that students should be able to complete after participation in a course of user education.

There were considerable variations between the answers given, but it was possible to draw up a list of "generalized goals", from those suggested:

1. To teach the students how to utilize the resources available in the library. (44%).
2. To teach the students to find material in the library. (19%).
3. To teach the students how to use the card-catalogues. (15%).
4. To help the students with their studies, by means of helping them to find the literature that they require. (15%).
5. To teach the students how to carry out an information search. (4%).
6. To make the students less afraid to ask for help when required. (4%).

One member of staff thought that the ultimate goal was that all users should have free access to computerized
information banks, and that present day teaching of manual routines would soon be superceded.

(The figures given in brackets represent percentages of the answers received and can be merely regarded as giving some indication of the numbers in favour of a particular suggestion).

With regard to the specific objectives, the following were suggested:

After completing a course of user education, students should be able to:

1. Use the card catalogue. (7) - (Actual number)
2. Use abstracts/indexes. (7)
3. Fill in the loan requisition form correctly. (5)
4. Use handbooks and encyclopedias. (2)
5. Give a reference correctly. (2)
6. Find material in the Library. (2)
7. Find information required for studies. (2)
8. Carry out a literature search. (1)
9. Understand what a call-number or signum is. (1)
10. Put back borrowed abstracts/indexes in their correct places on the shelves. (1)
11. Give the source of a reference correctly. (1)
12. Know about the possibility of obtaining material by the interlibrary loan service. (1)
13. Have received insight into how work is carried out in the Library. (1)
14. Carry out on-line information retrieval searches. (1)
15. Have carried out practical exercises in information retrieval. (1)
It can be seen that, with regard to both main goals and specific objectives, emphasis was placed on making the user aware of what a useful institution the Library was, and how it should be used. Fewer of the expressed goals and objectives were orientated towards giving the student help in acquiring information, in response to needs arising in connection with studies or work. Emphasis was placed on acquiring skills such as the use of the card-catalogue, abstracts and indexes, and how to fill in requisition forms.

In addition to the questions asked above, library staff were also asked, at the discussion meeting, to indicate the degree of importance that they attached to the performance of various specific tasks, by students who had taken part in user instruction. These tasks were presented in the form of a list of specific objectives, and library staff were asked to indicate the degree of importance in the appropriate square. (See Table I.). A space was also left for suggestions for further objectives. The papers were then collected and answers were treated anonymously. The values obtained are shown in Table I, where the results are expressed as percentages of the library staff present at the meeting. (Usually most members of staff take part in these meetings - absentees are people on holiday or on sick-leave).

As can be seen from Table I., those specific objectives to which greatest importance was attached, were:
To be able to use the subject catalogue. (78%)
To be able to use the author catalogue. (63%)
To be able to correctly complete a loan requisition form. (63%)
To be able to use encyclopedias. (56%)
To be able to use indexes. (52%)
To be able to use abstracts. (52%)

Additional suggested objectives were:
To be able to carry out an on-line search.
To be able to construct a search profile for an off-line search.
To know the basic facts about computer-based methods of information retrieval.

During the discussions on student use of the library and the need for user instruction, library staff often commented on the lack of communication between the academic staff and the Library. Very often the various Departments "forgot" to send over copies of compendia, lists of set-course literature and/or reports to the Library. Many of the senior academic staff rarely visited the Library - they sent their secretaries to collect loans etc. The librarians working at the information desk felt that lack of communication created difficulties, such as "unnecessary lack of knowledge about what information students were likely to require."
Table I. Specific objectives for library instruction.

<table>
<thead>
<tr>
<th>Do you consider that knowledge of the following objectives is, for students after completion of a course:</th>
<th>Very important</th>
<th>Important</th>
<th>Not so important</th>
<th>Not important at all</th>
<th>No opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Search strategy for literature searches</td>
<td>48</td>
<td>26</td>
<td>11</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>2. To be able to express a search question in suitable terms</td>
<td>41</td>
<td>26</td>
<td>11</td>
<td></td>
<td>22</td>
</tr>
<tr>
<td>3. To be able to use the author catalogue</td>
<td>63</td>
<td>19</td>
<td>4</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>4. To be able to use the subject catalogue</td>
<td>78</td>
<td>7</td>
<td></td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>5. To be able to use the abstracts</td>
<td>52</td>
<td>26</td>
<td></td>
<td></td>
<td>22</td>
</tr>
<tr>
<td>6. To be able to use indexes</td>
<td>52</td>
<td>26</td>
<td></td>
<td></td>
<td>22</td>
</tr>
<tr>
<td>7. Correct procedure for completion of requisition form</td>
<td>63</td>
<td>19</td>
<td>4</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>8. Correct procedure for writing a reference</td>
<td>48</td>
<td>22</td>
<td>7</td>
<td></td>
<td>22</td>
</tr>
<tr>
<td>9. To be able to find a review article</td>
<td>30</td>
<td>22</td>
<td>15</td>
<td></td>
<td>33</td>
</tr>
<tr>
<td>10. To know how to carry out current awareness' surveys for a given subject</td>
<td>26</td>
<td>33</td>
<td>19</td>
<td></td>
<td>22</td>
</tr>
<tr>
<td>11. To be able to use the DK-abstract catalogue</td>
<td>26</td>
<td>37</td>
<td>11</td>
<td>4</td>
<td>22</td>
</tr>
<tr>
<td>12. To be able to use the Union list of periodicals for Swedish Technology libraries</td>
<td>33</td>
<td>30</td>
<td>19</td>
<td></td>
<td>19</td>
</tr>
</tbody>
</table>
Table I. (cont.)

<table>
<thead>
<tr>
<th></th>
<th>Very important</th>
<th>Important</th>
<th>Not so important</th>
<th>Not important at all</th>
<th>No opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>13. To be able to use the Union catalogue of foreign literature in Swedish research libraries</td>
<td>26</td>
<td>26</td>
<td>19</td>
<td>7</td>
<td>22</td>
</tr>
<tr>
<td>14. To know how to fill in an interlibrary loan request</td>
<td>37</td>
<td>22</td>
<td>19</td>
<td></td>
<td>22</td>
</tr>
<tr>
<td>15. To be able to find quickly periodicals which cover a given subject field</td>
<td>37</td>
<td>33</td>
<td>7</td>
<td></td>
<td>22</td>
</tr>
<tr>
<td>16. To be able to &quot;browse&quot; or look for information in a) periodicals</td>
<td>41</td>
<td>33</td>
<td>7</td>
<td></td>
<td>18</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. To be able to use encyclopedias</td>
<td>56</td>
<td>26</td>
<td></td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>18. To be able to use relevant handbooks</td>
<td>48</td>
<td>30</td>
<td>4</td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>19. To be able to search for information in trans-disciplinary areas</td>
<td>18</td>
<td>30</td>
<td>22</td>
<td>4</td>
<td>26</td>
</tr>
<tr>
<td>20. To be able to find relevant government publications</td>
<td>7</td>
<td>15</td>
<td>44</td>
<td>4</td>
<td>30</td>
</tr>
<tr>
<td>21. To be able to find information on a specific subject topic</td>
<td>37</td>
<td>37</td>
<td>4</td>
<td></td>
<td>22</td>
</tr>
<tr>
<td>22. To be able to identify a specific publication e.g. a given edition of a book and order it</td>
<td>26</td>
<td>11</td>
<td>26</td>
<td>7</td>
<td>30</td>
</tr>
</tbody>
</table>

Will you please add to the list other objects that you consider to be important. Thank you!
6.4.7 **Summary of the views of students, academic staff, administrative staff, library staff and industrial engineers, on student use of the library and the need for user education**

In the preceding sections - 6.4.1 to 6.4.6 - the views of various groups on student use of the library and the need for user education have been discussed in some detail, in an attempt to provide a basis for a formulation of goals and objectives for a programme of library user education. In this section, these perceived needs (or theoretical views of user needs) will be summarized and contrasted with what happens in practice. The findings will be presented in tabular form - Table II, and it is hoped that this will show clearly, areas of agreement and disagreement between the groups. The idea for this form of tabular presentation has been taken from an article by Roy on the needs of student library users. (Roy, 1974). In section 6.4.8, the possible effects of differences in attitudes, with regard to user needs, are discussed in relation to the formulation of goals and objectives for library user education.

6.4.8 **Differences of attitudes with regard to user needs**

What emerged from the user studies and the discussions, was that there were considerable differences between perceived needs for use of the library, and therefore the need for library instruction, between library staff, academic staff and students.
<table>
<thead>
<tr>
<th>GROUP</th>
<th>THEORY</th>
<th>PRACTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduates</td>
<td>Not much reason to use library in first two years.</td>
<td>Little use of library for optional studies or borrowing.</td>
</tr>
<tr>
<td></td>
<td>Library - useful as source of material for study projects - literature seminars &amp; undergrad. project.</td>
<td>Unaware of tools for information retrieval.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Library used in connection with study projects.</td>
</tr>
<tr>
<td>Postgraduates</td>
<td>Have experienced problems of information retrieval.</td>
<td>Make greater use of library than undergrads. More aware of tools for information retrieval.</td>
</tr>
<tr>
<td></td>
<td>Interested in learning how to carry out information searches.</td>
<td></td>
</tr>
<tr>
<td>Academic staff</td>
<td>Student use of library &quot;desirable&quot; as source of information.</td>
<td>Few teachers actively promote the use of the library in connection with studies. Lack of time for additional material.</td>
</tr>
<tr>
<td></td>
<td>Prepared to encourage library use (but not at expense of own courses).</td>
<td></td>
</tr>
<tr>
<td>Library staff</td>
<td>Library information resources should be of great value for the students. Student should learn how to use the tools at the library</td>
<td>Lack of contact with academic staff. Difficulties in knowing what courses are planned &amp; therefore what information students are likely to require.</td>
</tr>
<tr>
<td>Administrative staff</td>
<td>Library resources should be maximally utilized</td>
<td>No money provided for instruction in how to use. (This changed to - money provided for instruction)</td>
</tr>
<tr>
<td>Industrial engineers &amp; librarians in industrial concerns</td>
<td>Library and instruction in use should be project-linked.</td>
<td>(Use library in connection with industrial projects themselves).</td>
</tr>
</tbody>
</table>
Academic staff and students regarded the library as a source of information for students. The main goal for a programme of user education was regarded as being the enabling of students to find information on various topics in connection with their academic studies. Academic staff stressed students' need to obtain information as an aid to independent thinking and problem solving activities. Students wished to be able to find information in connection with actual study projects.

Librarians, on the other hand, were concerned with the utilization of the resources possessed by the Library, and the use of specific library tools such as card catalogues. As the examination of the list of specific objectives showed, emphasis was on the use of specific tools, rather than on the method of information retrieval in the context of the communication pattern or in connection with the academic courses.

If this is expressed in terms of Fig. 3, the situation at Chalmers Library seems to be:

![Diagram](image)

Fig. 4. Relationship between library staff, academic staff and students at Chalmers University
In these differences of goals and objectives, may well lie the explanation for the relative failure of many courses of library instruction. Such courses have often been received with lukewarm enthusiasm by students and staff:

As Lubans states, in 1974, "Most library instruction is based on what we librarians think library users need to know. It is this educated guesswork or perceived need on which many programmes (tour, orientation lectures, a multitude of multi-media presentations and formal courses in bibliography) have been based. Since we are prompted to action by what we observe to be lacking in the library users at the time of the user's need, our response is apt to be a type of bibliographic first aid". (Lubans, 1974 b).

The result of this "perceived need" approach is that a number of short term objectives, such as the use of specific tools, may be included in librarians' programmes of user instruction which neglect the main goals of the user - for example - how to find information as quickly as possible. Use of the material stored in the library is an important way in which scientists can acquire new knowledge. It is, however, only one of many ways. It is important to know when to use the library and
when not to use the library. Thus verbal communication, with the possibility of direct feedback, is much faster than printed communication, and many scientists and engineers are particularly interested in obtaining information as quickly as possible.

Possibly some of the problems of the existing courses of library instruction for scientists, medical workers, and engineers, has been the failure to identify with the needs of the user, and realize the importance of the time aspect of information retrieval. Many librarians have little training in scientific subjects and this may be one reason for this failure in identifying with the needs of the users. One can become so dominated by the library environment that one tends to forget that there are other ways of obtaining information, than by the use of bibliographies, abstracts and indexes!

Librarians have often assumed the role of designers of courses in user-instruction. Bloomfield, in a 1974 review on the methods of testing for library-use competence, says that "In the way we have constructed our tests on library use skills it appears that we librarians have shown a poor understanding of the value of the library to our students." He goes to say that "Librarians have exalted the card catalog as the major source for locating books. The card catalog is one of the most useful library tools we have,
but it is certainly not the only one. The emphasis placed on the use of the card catalog suggests that librarians are convinced that a thorough use of the card catalog is essential to the efficient use of a library." (Bloomfield, 1974). This statement referred to libraries in general, the remarks might have been even more appropriate for a specialized scientific library.

Students want to learn how to find out information on given topics. At many universities the students complete one or more research projects. If courses in user instruction are planned to spend a great deal of time teaching students how to fill in a requisition form, for example, the students will react negatively and say something like "This is a waste of time - or the library should have a better system for registration and storage of books so that these problems don't occur. They may well have a point worth making! The university library should make its material easily accessible for the potential users.

Similarly, if students find the classification system difficult to use, the argument may well be - is the classification scheme, as used by the library, suitable for the registration of the transdisciplinary material of present day technology?

Science students often feel little motivation to search for details of books not possessed by the library, in order to facilitate an interlibrary request. Their
reaction tends to be "the library should have the material I need for my studies - if it is not there then (a) the library's acquisitions policy should be improved, or (b) someone from the library should help me to locate which other library has the material.

As has been mentioned, much emphasis is often placed on teaching students the successful use of the card catalogue, including the details of alphabetical filing. For example, in an alphabetic author catalogue a student may look unsuccessfully for a book by Allen Mckenzie. He asks for help and is shown that all Mc authors are regarded as having their names spelt Mac... for the purpose of that catalogue. Students, however, have difficulty in remembering these rules. Librarians work regularly with this type of material and repetition makes the rules easier to remember. These details could be taught by means of programmed instruction, but there are difference between the practices used in different countries etc., and a scientist, engineer or research worker often moves from place to place, so it is perhaps not so important to teach this type of detail.

Many courses in library-use place great emphasis on teaching how to use the subject catalogue. This tool is useful, but its usefulness must be assessed in context to the information resources to which it
gives access. The material registered there is usually larger units—that is books, theses, textbooks etc. These contain, in the case of science and technology, information considerably removed in time from the actual research work. Thus the card catalogue can be useful for orientation or basic knowledge on a topic, but less useful for obtaining access to information on recent research work. The subject catalogue can be very useful if orientation on a given topic is required, as by undergraduates, or librarians, or by academic staff planning a new course. However, for undergraduates working on research projects and for postgraduates and academic staff engaged on research, there are other tools—such as abstracts and indexes which play a more important role. This would be true in scientific, engineering and medical projects, but not the case in the liberal arts. Many librarians, even if they work in a specialized scientific library, have a liberal arts background. As librarians, they themselves find the subject catalogue and encyclopedias of great help when faced with an information problem. This may account for some of the emphasis placed on the use of the card catalogue and on the use of encyclopedias by librarians in courses of user instruction. Academic staff and research workers, on the other hand, who are seldom in need of orientation within their own particular field of research, regard
such instruction as less important. Thus it can be seen that differences in goals and objectives may well lead to emphasis on certain aspects of a subject which one of the groups concerned regards as not very important. This in turn can cause problems of motivation and result in a course which is not particularly successful. It would be possible to set up a series of detailed objectives for a course in library instruction, to let the students participate in the course, and show, by pre- and post instruction tests that the students had learnt a great deal about the use of libraries. However, if there was poor agreement about the goals and main objectives of such instruction, one would expect to find low attendance of students and a lack of interest among the academic staff - a condition frequently described with regard to programmes of user instruction.

One of the first lists of objectives for university library instruction was that drawn up by Hutton at the 1942 ASLIB conference (Hutton, 1942):

1. To acquire facility to work easily and familiarly with books in large libraries.
2. To provide a basis for continuation of self-education.
3. To develop initiative and independence.
4. To learn how to find books on some special subject.
5. To prepare surveys from world wide periodicals of some subject on which no book is sufficiently up-to-date.
6. To secure access to information on some subject outside one's normal interests.
7. To be able to find data as a basis for planning.
8. To study alternative views.
9. To survey current affairs in daily, weekly, monthly or other periodical literature.
10. To develop ability to judge the comparative merits of books.
11. To acquire knowledge, skill in using it, and experience in where to find it, upon which power for leadership is based.
12. To enjoy some general acquaintance with books, their individuality, scope and location.

It is very interesting to observe that Hutton's list of objectives shows awareness of the importance of the time-factor in the retrieval of information - the need for training in writing a survey (5) and the need for current awareness in study (9). It is interesting to see that in the list of specific objectives presented to the library staff at Chalmers, Nr. 9 - To be able to find a review article - and Nr. 10 - To be able to carry out current awareness studies - were regarded as being of "great importance" by less than a third of the staff. Similarly, Hutton stresses, in 1942, the need to be able to obtain information outside one's normal area of study, (6), yet, in 1975 this was only regarded as being of great importance by 18% of the library staff at Chalmers, and this in spite
of the enormous increase in transdisciplinary research during recent years. This lack of regard for the importance of the time-pattern and the systematic organisation of information communication is to be seen in many of the programmes of library instruction that have been developed.

The goals or main objectives for a course of library instruction must be in accordance with the goals expressed by the students and academic staff. As Watkins pointed out in 1970, "It is now and always will be the classroom and its ideals which, by and large, determine the activity at our loan desk" (Watkins, 1970). The broad main goals can be broken into a number of specific objectives, and in the designing of a course it is of the greatest importance to see that these really do form part of the main goals and are not designed to meet the needs of another group for example the library staff.

6.5 Goals and objectives for user education at Chalmers University of Technology Library

6.5.1 Having considered some of the problems concerned with the definition of goals and objectives for library user education, I made an attempt to formulate goals for the user instruction programme at Chalmers University of Technology Library. I tried to integrate, as far as possible, the views expressed by the academic staff, students and library staff. In formulating the
main goals for the programme, I paid particular attention to the views of the students and academic staff, as the library instruction courses had to form part of the total education programme at Chalmers University. The specific objectives suggested by the library staff were useful in the detailed design of how to implement these goals.

6.5.2 Goals for the programme of user education

After completing the user education programme the student should have obtained:

1. The ability to apply the principles of scientific communication to problems of information retrieval.
2. The ability to use the various tools available in the university library (and other libraries) in order to obtain information useful in connection with studies and later work, as and when required.
3. A sense of enjoyment in information searching.

The first of these goals is concerned with enabling the student to realise why to use a particular information channel or particular tool, in a given situation. The second goal is concerned with how to use the various resources available - when requiring information in connection with studies or later work (A basis for the continuation of self-education). I hoped that if the students were enabled to understand the pattern of information transfer, they would be able
to apply their information retrieval skills in transdisciplinary areas; as the general pattern of scientific communication is similar in many scientific and technological fields.

6.5.3 Library orientation and library instruction

Having formulated the broad general goals for the programme of user education, it was possible to draw up a number of specific and limited objectives within this framework. A distinction will be made between library orientation and library instruction:

Library orientation is concerned with enabling the student to become aware of the existence of the university library and the services available there (WHAT is available) and enabling the student to learn about the general use of the library:
(a) WHEN the library is open
(b) WHERE specific items are to be found
(c) HOW to actually obtain/borrow the material required

Library instruction is concerned with enabling the student to obtain information required for a specific purpose, by making full use of the resources and materials available at the library. It is concerned with problems of information retrieval.
6.5.4 Short term objectives for orientation

After library orientation, the student should:

1. Be aware of the existence of the university library, what it contains, and when it is open.
2. Have the ability to locate handbooks
   - encyclopedias
   - bibliographic tools
   - periodicals (on open shelves)
   - dictionaries
   - the reprocentre
3. Be able to distinguish between the use of the author catalogue and the subject catalogue.
4. Have the ability to use a closed access library and be able to fill in a requisition form for the three most common types of loan (books, journals and parts of a series).

6.5.5 Short term objectives for introductory course in information retrieval (for third/fourth year students)

Instruction in methods of information retrieval is often given in two stages - an introductory course for undergraduates and a more advanced course for postgraduates. The following is a list of short-term objectives for an introductory course:

After completing the course, the student should have the ability to:

1. Have a concept of the time pattern for information flow from producer to receiver.
2. Be aware of the existence of different channels of communication from information producer to receiver.

3. Recognize the different types of information search:
   - Current awareness searches
   - Retrospective searches
   - Fact or data searches
   - Browsing

4. To locate, select and obtain information relevant to a specific subject topic of his/her own choice (such as the undergraduate research project) by:
   (a) carrying out the logical stages in a retrospective information retrieval search:
      - Definition of search topic
      - Expression of search topic in a number of search terms
      - Limitation of search with respect to extent and time
   (b) using the various tools available for information retrieval:
      - Project catalogues
      - Patent indexes
      - Report indexes
      - Indexes to congress publications
      - Indexes
      - Abstracts
      - Reviews
      - Bibliographies
      - Subject catalogues
5. To present the information obtained in the form of a written list of references.

6.5.6 Additional specific objectives for postgraduate course in information retrieval

Additional objectives for the postgraduate course were, that, after completing the course, students should have the ability to:

1. Follow the logical sequence, or flow, of a computer-based information search.

2. Construct a suitable search profile (with the aid of a documentalist) for covering his/her programme of research.

3. Compile a personal record system, which will be of value in compiling an accurate and consistent bibliography in connection with thesis writing.

The goals and objectives for the programme of user education were then discussed with students and staff representatives on the Education Boards of the six Schools of Engineering, as will be described in 7.7.2. Both students and academic staff appeared to be satisfied with the goals and objectives described.
Chapter 7

PLANNING A PROGRAMME OF USER EDUCATION -
TEACHING METHODS AND MEDIA, COURSE CONTENT AND
TIMING OF THE COURSE

7.1 Introduction

In Chapter 6, an attempt was made to formulate the
goals and objectives for a programme of Library user
education at Chalmers University of Technology
Library (6.5). Attention was then given to the
choice of suitable teaching methods and media, and
to questions of course content and timing.

The planning and organization work required close
cooperation between representatives of the library
and academic staff and the students.

This chapter will start with a discussion on factors
affecting the learning process (7.2), followed by a
description of various teaching methods and a
discussion on their application in library user
education (7.3). The choice of methods and media,
course content and timing for the orientation part
of the programme will be described in 7.4, for the
introductory information retrieval course in 7.5,
and for the postgraduate information retrieval course
in 7.6. A brief description of the practical
organization of the programme of library user
education at Chalmers University of Technology will
be given in 7.7.
At an early stage in the planning and development of the programme of user education, it was found that there was an interaction between the planned instruction and existing library practice. The programme was planned to enable students to acquire the ability to use the library and its information resources. Consideration of the most suitable methods and media for teaching led to the question, "Is this what the students need to know?", with regard to existing practices. This sometimes led to modifications in existing library practices. Interaction between the various stages of the developing programme of user education and existing library practice is illustrated in Fig. 1. Section 7.8 gives examples of changes in library practice which arose at the early planning stages of the various parts of the programme.

7.2 Factors affecting the learning process

Education was described in Chapter 6, as a process which changes the learners. This process can obviously be affected by a wide variety of factors. Hills has derived, in 1974, from "an examination of the main learning theories - six overall factors which could apply to the practical learning situation of the student (Hills, 1974 a, p.46):

1. Physical, psychological and social factors.
2. Factors of maturation and readiness.
3. The need for motivation.
Fig. 1. Development of a course of education in relation to existing library practice.

- Library practice
- Definition of objectives
- Choice of methods and media
- Trial of course
- Evaluation
- Should the objectives be changed?
  - Yes
  - No
- Have objectives been achieved?
  - Yes: Continue course
  - No
4. The need for the student to be involved actively in his learning.

5. The need to relate new work to existing knowledge.

6. The need for a continuous evaluation of progress.

Factors 1 and 2, though of great importance, will be regarded as being outside the scope of this study, since they are either completely outside the control of both teacher and student, for example maturation, or are only partially under the control of teacher and student.

Factors 3 to 6 are to a large extent under the control of the teacher, and these factors will be considered in relation to the programme of library education:

A) **Motivation** - Instruction should be given at a point of high motivation, as for example when the student wants to obtain information in connection with a particular project.

B) **Activity** - Active work on a problem - learning by doing - is likely to be more effective than simply being told how to do a particular piece of work.

C) **Understanding** - Library education will be more effective if the student understands what he is doing and why he is doing it - that is, if new facts can be related to existing knowledge.
D) **Feedback** - Feedback, information to the progress being made should be available to the student.

These four factors can be expressed, as Hills suggests, in the "needs of the learner".

A) the need for the student to be sufficiently motivated.

B) the need for the student to be actively involved.

C) the need to relate new work to existing knowledge.

D) the need for the student to be able to evaluate continuously his progress.

In the next section 7.3 various teaching methods for library education will be considered in relationship to the four factors of motivation, activity, understanding and feedback.

7.3 Teaching methods and media for library education

7.3.1 Teaching methods may be roughly divided into those which are suitable for group instruction, those suitable for individual instruction and those suitable for both. See Fig. 2.
Fig. 2. Teaching methods for group and individual instruction.
Choice of teaching methods and media depends on the learning/teaching situation, the subject material, the students and the teachers. No single method could be suitable for all occasions, and there are many reports of the use of different methods in library user education. Summaries of methods used in American library orientation and instruction programmes have been given by Phipps (Phipps, 1968) and Melum (Melum, 1971 a). Methods of user instruction employed in British, Danish, Finnish, Norwegian and Swedish libraries have been summarized in Chapter 4. A recent literature review and bibliography, which includes references on teaching methods, has been written by Crossley and Clews (Crossley & Clews, 1974), and a recent book, which gives examples of the use of different teaching methods in library instruction, has been edited by Lubans (Lubans, 1974).

From section 7.2, it can be concluded that the methods chosen for library user education should involve the active participation of the student, at a point when he/she feels motivation to use the library, for example in connection with studies in some specific discipline. The student should be provided with information on the progress made during the active problem-orientated activity.

Figures taken from an American survey (Rigg, 1969) indicate that "learners retain about 10% of what they
read, 20% of what they hear, 30% of what they see, 50% of what they see and hear, 70% of what they say as they talk and 90% of what they say as they do a thing". On neurophysiological grounds one would expect there to be considerable differences between different individuals with regard to the most effective channels of learning; therefore, one must regard statements such as that quoted with a certain amount of scepticism. Nevertheless, teaching methods which make use of a combination of sensory inputs are likely to be more effective than those which rely on a single channel of communication.

Traditional library instruction has made considerable use of the lecture method for large groups, the guided tour for smaller groups, and individual help to the students who asks for this at the information desk. As will be shown in the following subsections, these methods do not fully meet the four factors described in section 7.2. During recent years there has been considerable growth in the use of audio-visual methods and to a certain extent computer-aided instruction. In the following subsections, use of the various methods will be examined, and their advantages and disadvantages discussed.

7.3.2 The lecture

Lectures are one of the traditional forms of teaching in higher education. They are used for teaching
large groups of students, and they make use of both auditory and visual sensory inputs (via the blackboard or overhead projector). The lecture method has the great disadvantage that the speed of delivery of information cannot be controlled by the receiver, nor is repetition possible unless printed handouts are provided, or the student manages to write a synopsis, or some recording is made of the actual lecture. If attendance is voluntary, students who come to a lecture must feel some motivation. They play a fairly passive role, though the taking of notes involves the student actively in the learning process, particularly if an attempt is made to record the main points of the lecture in a logical sequence. The lecture gives the student a possibility to relate new facts to existing knowledge but provides no feedback as to whether this has occurred or not.

The lecture, as a form of communication in higher education, has been strongly criticized, not least by the students themselves (McLeish, 1968). Yet as has been shown by, amongst others, Hills, in an investigation of some applications of self-teaching systems, lectures do have considerable appeal for students. Attendance at lectures does not appear to be affected by the availability of outline notes. Both students and lecturers said that they felt that lectures gave an opportunity for personal contact.
Students were able to note which points were stressed by the lecturers, and staff were able to obtain some feedback from the students (Hills, 1974).

With regard to orientation in library use, Ford stated in 1973 that "the lecture commonly given to freshmen students at the beginning of their first session, must surely be a waste of time. The library, with its vague connection with academic work, can hold little attraction for a student struggling to adjust to university life" (Ford, 1973).

What part could the lecture play in a course in information retrieval? The lecture must be a particularly unsuitable method for conveying information about bibliographic aids. Lectures about this type of library material tend to sound like a catalogue of unfamiliar names - the "catalogue aria". Accompanying illustrations, are, even with the help of an overhead projector, difficult to make clear. However, lectures can be used as a stimulus, to present an overall view and to convey enthusiasm about the subject. Moreover, lectures can be used for groups of different sizes - an advantage in practical time-tabling. Thus lectures might be suitable for providing a general introduction to a course on information retrieval.

7.3.3 Seminars, tutorials and demonstrations

Seminars, tutorials and demonstrations are given to smaller groups of students than the average lecture.
The atmosphere tends to be less formal, and there is greater opportunity for integration both between staff and students and between the students themselves. It is possible to provide motivation, to see that students are actively involved, say in a practical exercise during which they receive feedback as to their progress. An attempt can be made to relate new information to existing knowledge. It is very difficult, and extremely inefficient to explain the use of various specific tools for information retrieval in the absence of the source materials. This would be rather like trying to explain the use of the Cathode Ray Tube in the absence of laboratory equipment, or studying music without actually listening to it. Demonstrations might prove to be a good way of teaching small groups, of about 5 or 6 students, the use of various tools used for information retrieval. Students could be given the opportunity of actively searching for information about some topic in which they were interested.

7.3.4 The guided tour

The traditional approach to library orientation is the so-called guided tour (or "herded" tour), in which students are given a short tour of the library, during their first weeks as university students. Harlan has described a guided tour as follows:

"Batches of students - I have seen as many as thirty in a group - are herded through a dozen or so stations."
The guide is not always a librarian, nor is he always well-prepared. 'This', he says with a wave of his hand, 'is the Periodicals Room', 'That', with a nod, 'is CBI, a universal English language bibliography, dictionary arrangement, with author, title and subject entries: You must remember that the main entry is author' ... Small wonder that at the third and fourth station, most of the students stop listening. Libraries and librarians, they conclude, are as bad as anticipated. Obviously one's efforts are best applied in finding ways of avoiding, not utilizing the library."

(Harlan, 1970).

The type of orientation described above, is often given when students have little or no motivation to actually use the library. The students themselves take little active part in the teaching/learning process, but tend to follow passively round the various stations. From the point of view of library administration, the guided tour type of library orientation makes heavy demands on library staff time. There is also the problem, common to courses with high-recurrent frequency, of the guide remembering exactly what has been said to each particular group.

7.3.5 Audio-visual methods

During recent years, there has been an increasing
interest in the use of audio-visual media such as films, video-tape, tape/slide presentations and audio-tapes plus illustrated material, for the transfer of a moving sequence of events, such as in the physiological reactions or progress in an operation. In library education, however, there are few areas where it is necessary to use moving images. The information can be conveyed in a series of units such as slides or overhead transparencies or printed illustrations. This would suggest that the tape/slide medium or the use of audio tape in conjunction with printed material, as in the point-of-use teaching devices at the Barker Engineering Library at Massachusetts Institute of Technology (Gardner, 1972) would be particularly suitable for library user education.

The advantages of tape/slide productions are:

1. **Flexibility.** Tape/slide productions can be used for both group teaching, as for example, an illustration of a lecture or seminar, or for individual tuition, as in preparation for a course or for repetition. See Fig. 2.

2. **Constant availability.** The use of the material does not depend on the presence of a lecturer or librarian. It can be used by the student, when the need arises.

3. **The presentation of the material is not complicated.** The tape/slide material is easy
to project and easy to store.

4. Speed of presentation can be controlled — either by the lecturer in group instruction, or by the individual student.

5. Costs of production are relatively low.

6. It is easy to update tape/slide material.

It would appear that tape/slide productions, which enable colour to be shown, but not motion, are particularly suitable for use in library education programmes. They can be used in a variety of ways, combined with other methods of instruction such as lectures and programmed learning. They make use of a combination of two sensory inputs. Production costs are not too great, and production can be undertaken at many libraries by the library staff themselves without external professional help.

However, Hills found, in the investigation of self-teaching methods referred to above, that when tape/slide presentations were used as a substitute for normal lectures, these were "not well received". Both students and staff were critical of the impersonal nature of the tape/slide lectures. In contrast, when tape/slide presentations were used for individual instruction, students found these "more acceptable". This favourable attitude to the individual use of tape/slide material has been observed in other studies, for example, in investigations of self-instructional material in medical education (Dunn, Harden, Holroyd,
Similarly, tape/slide presentations have proved effective and popular for the presentation of laboratory work in physiology at the University of Gothenburg, (Walum, 1975). Individual presentation allows the student to control the rate of information and to repeat parts of the presentation, if this is necessary.

In Britain, there has been a growing interest in the use of tape/slide presentations for library instruction since 1970, when the Standing Conference on National and University Libraries (SCONUL) set up a Working Group on Tape/Slide Guides to Library Services. (See Chapter 4). It was decided to carry out experimental use of a number of the SCONUL tape/slide guides in Sweden, in order to see if this material could be used for library instruction at Chalmers; this work is described in Chapter 9.

Let us consider the use of other audio-visual media in library education. **Filmstrips** possess many of the advantages of the tape/slide presentations, but they have a number of disadvantages: the pre-set sequence compels the pictures to be shown in a given order. They are easily damaged - by scratching or heat and are difficult to repair. They are also difficult to update. When one frame is outdated, the whole filmstrip must be remade.

**Films** possess the ability to convey both motion and
colour. However, in library instruction, one seldom has the need for conveying motion, and the use of moving images may well prove a distraction, rather than enhancing the learning effect. Everyone is familiar with the expensively produced ciné film, and library instruction films will be compared, usually to their disfavour, with commercial products. To make a successful film is time-consuming and expensive. Films can be used to create an atmosphere of reality, which could be useful for students prevented, say by distance, from visiting a certain university library. It is significant that the Open University in Britain made two films on the use of libraries - one showing the use of the public library, and the other, produced for those students who were to attend summer school at some university, on the use of the university library under these conditions. The last film has a playing time of 20 minutes. These films are technically well-produced and create an atmosphere of reality, useful for the student who has no opportunity to actually visit the library at the time of seeing the film. In the case of the Open University, it is obviously worthwhile to produce well-designed audio-visual material that can be used for teaching thousands of students.

Video tapes, like films, can be used to convey both motion and, in some cases, colour. They possess
one considerable advantage over film material - it is possible to re-use the material, thereby making updating less expensive. However, it should be noted that updating of video-tapes is a time-consuming activity. Quality of product will, as in the case of films, be compared with commercial film and television products. Video-recording can be used, as with films, to create an atmosphere of reality and convey moving images, but these are requirements seldom met with in library instruction. Short video-recorded programmes might well be used to illustrate lectures, as a means for creating interest. Video recording can make use of tape, film or discs for the actual storage of the recorded material. One of the problems facing libraries, in the use of video material, has been the lack of standardization between different systems. It would appear that cassette systems are easier to use, as audio-cassettes, in library education. There are at present two types of TV-cassette systems, for play-back alone, and systems for both recording and play-back. The chief problem facing the purchaser of video equipment is the incompatibility between different systems. If standardization were possible, it would be easier to concentrate on the production of a series of high quality products for a wider distribution. Video recordings can be played on internal TV systems. The advantages of these methods are that they allow for careful
preparation of material and can make use of the best teachers available. As the material is recorded, it can be used many times. Internal TV systems can use displays suitable for audiences of different sizes. On the other hand, the personal contact of the lecture, tutorial or seminar is lost. The student cannot stop the programme and ask questions, and discussions may be difficult to organize; the instruction tends to place the student in a rather passive situation (See 7.3.11).

7.3.6 The book/printed guide

Printed information, in book, compendia, or guide form, has the advantage that it is available for use, as and when required. Individual students can work at their own speed, repetition is possible, and visual display in the form of diagrams is easy to achieve. What role can printed material serve in library education programmes?

Many libraries provide printed guides on the use of the library, as part of their orientation programme. Such guides should always be written with the user in mind. It is essential to avoid the use of library jargon. If they are to be distributed to students, the timing of the distribution should be planned. Many students receive an overwhelming mass of information during their first weeks at university, therefore this is not perhaps the best time to give out further material.
Printed material can also be used for later stages of library instruction. These may take the form of "Guides to the use of the literature in ...". In Chapter 4, it was seen that 58% of the academic libraries in Britain made use of subject guides for individual student instruction. The use of such guides for individual instruction meets the needs for motivation - the student uses them when necessary. If the guides are consulted in order to find out how to obtain information, the student has to work actively. A literature guide is based on some form of logical concept, and should therefore provide the opportunity for the relation of new information to existing knowledge. If the guides are used in the active search for information, a certain amount of feedback is provided, in that the student discovers whether he/she can obtain the information or not. Thus the provision of printed, subject-based guides to the literature could provide a useful way of library instruction.

7.3.7 Practical exercises

As has been pointed out in section 7.3.1, students learn best by actively carrying out a practical exercise, which they understand and in which they are interested. The importance of subject-orientated practical exercises in library instruction has been pointed out by, amongst others, Kolding Nielsen, who states
"one principle for all forms of exercise must be that these should be, and be felt as relevant to the subject" (Kolding Nielsen, 1974). The seminars organized by the National Lending Library, on the use of literature in the natural sciences, medicine and the social sciences, also placed great emphasis on the use of practical exercises in library user instruction. It would seem that practical, subject-orientated, exercises would be a very suitable method for library instruction, as students would feel motivation for active study, and constantly receive feedback on their progress (See 7.3.11).

7.3.8 Programmed instruction

Programmed learning can be carried out by the user of a variety of media - the book, automatic projection of slides, or by means of computer-aided instruction, CAI. Programmed instruction possesses many advantages for library instruction. Students can work at their own individual pace. They actively participate in the learning process, and receive direct feedback as to the progress that they are making. It is also possible for the teaching staff to obtain a record of the student's progress. Students work as isolated individuals; there is little or no interaction with the rest of the group or with the lecturer. This might be an advantage for some students, but as Revill has pointed out, (Revill, 1970) the above factors of isolation
"may not favour the extrovert student who prefers the companionship and competition of the classroom. Research does indicate that introverts learn more easily from P.L. than extroverts." The use of CAI in library instruction has been developed largely in the USA. Axeen rewrote the material that she used in her course "Teaching the Use of the Library to Undergraduates" in 14 units of instruction, each requiring two hours of use of the terminal. She compared the results of students who had taken the regular lecture course, with the results of students using the computer-based programme and found no statistical difference in the amount of learning (Axeen, 1967). CAI library instruction has been used at a number of American libraries such as the Ohio State University and the University of Denver. As is pointed out by Clark, "there is no doubt that writing long courses is time consuming" and the participation of the librarian "should be confined to teaching library skills", leaving the programmer and educational technologist to work out the coding of the material (Clark, 1974). There is a great advantage in combining programmed instruction with practical exercises, as has been carried out by Wendt at Southern Illinois (McCoy, 1962), where use is made of a sample catalogue drawer. Computerized library courses certainly teach the student how to interact with the terminal and use computer dialogue. At M.I.T. in Project Interex,
use is made of the computer to teach the user how to carry out an information search. These early attempts point to a very interesting area for further development in library education methods. As greater use is made of the computer facilities for interactive information searching, it is particularly important to make use of terminal instruction programmes, which permit an optimization of the interactive system at the man-machine interface (See 17.2.3).

7.3.9 Self-guiding material
Under this heading come such aids to library orientation and instruction as visual signs, colour coding and self-guided tours following a visual indication line. In the library, it is necessary to make the user aware of the resources available and their location. This can be achieved by the use of clear and attractive signs - a permanent visual display. Schemes of colour coding have been carried out in a number of libraries. One place where such a scheme has been developed in detail is at the Hatfield Polytechnic Library, England, by Carey (Carey, 1971, & Carey, 1974). Colour coding is used to reinforce clearly printed visual signs - thus material belonging to a certain broad subject area can be given one colour, subject matter pertaining to another subject area can receive a different colour and so on. Signs could also be
used to indicate how to fill in a loan request form in a closed access library, and for indicating how to get from one area to another. Self-guided tours could also be used as a form of library orientation, where commentaries are provided in the form of an audio-taped recording. Self-guiding devices could clearly be of use for various aspects of library orientation.

7.3.10 Individual instruction at the information desk

The assumption is generally made that the best form of library instruction can be given by the personalized service at the reference desk. This is because the student asks a question about the use of some part of the library when he/she is motivated to learn about that particular point. The student is actively involved in the learning process, and is receiving tuition from an expert. However, this idealized picture takes little account of reality. The reference librarian may be harrassed by several enquiries, telephones ringing and so on. Many students are shy, and, if they see that the librarian is busy, they don't like to explain that they didn't really understand what was being said. The student numbers have increased, but there has been no corresponding increase in the number of librarians. As a result, there is rarely the time to provide adequate explanations of why a particular step is carried out, in the words of Lubans, "bibliographic first aid
is provided" but the student does not necessarily receive the understanding necessary to cope with similar situations in the future. Thus "the need to relate new work to existing knowledge" is not satisfied.

7.3.11 Summary of teaching methods for library education
An attempt has been made to summarize the discussions in the preceding sections 7.3.2 to 7.3.10, with respect to the factors affecting the learning process, the number of sensory inputs utilized, and student-teacher, student-student interaction, in Table I.

In Table I the following symbols are used:

+ = presence (of a factor etc.)

- = absence

M = the need for a student to be sufficiently motivated (Motivation)

A = the need for a student to be actively involved (Active work)

U = the need to relate new work to existing knowledge (Understanding)

F = the need for a student to evaluate continuously his progress (Feedback)

Au= Auditory sensory input

V = visual sensory input
R = Possibility for learner to control the rate of flow of information

T - S = Teacher - student interaction

S - S = Student - student interaction

<table>
<thead>
<tr>
<th>TEACHING METHOD</th>
<th>FACTORS AFFECTING LEARNING</th>
<th>SENSORY INPUT</th>
<th>INTERACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>A</td>
<td>U</td>
</tr>
<tr>
<td>Lecture</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Seminar/demonstration</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Guided tour</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Film/video, tape/slide for group instr.</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Tape/slide for individual instr.</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Book/printed media</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Practical exercises</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Programmed instruction</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Self-instruction</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Individual help</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 1. Learning methods - a summary of factors affecting learning, sensory inputs and student-teacher interaction.
From Table 1, it can be seen that no one method is suitable for all learning/teaching situations or for all individuals. The various methods and media should be used to supplement each other in any given programme of education. Enright has pointed out, with regard to media, that "Too much attention has been given to the possibilities of the new media supplanting the book, and far too little to the ways in which each can and does supplement the others." (Enright, 1972). The use of new media and methods may well stimulate increased use of other media and methods. Thus teaching by various means in a programme of library education may well lead to the increased use of media - both learning media such as books and tape/slide guides, and media for information retrieval such as abstracts and indexes.

With regard to library education, it can be seen, from Table 1, that certain methods appear to be more suitable than others for this type of instruction. Such methods are small group methods - seminars and demonstrations - practical exercises and programmed instruction. Other methods which should prove useful are lectures, the use of printed media, self instruction methods, individual tape/slide instruction and individual help. It appears that the guided tour, and various audio-visual methods such as films and video-tapes would be less suitable. In the sections 7.4 - 7.6, the choice of methods for orientation and instruction in the user education programme at
Methods, course content and timing of the orientation part of the library user programme at Chalmers University of Technology Library

In Chapter 6, section 6.5.4 the short term objectives for the library orientation part of the programme are formulated. The first of these is: "Be aware of the existence of the library, what it contains and when it is open". The user study carried out at Chalmers University, and described in Chapter 2, has shown, amongst other things, that few of the undergraduates (6%) used the university library as a place for optional studies. As the majority of the undergraduates (92%) estimated that they bought most of the literature required for their studies, few students used the library for borrowing. Thus it was of great importance to make students aware of the existence of the university library and attract them to it.

Printed handouts for new students

I decided, for reasons set out in section 7.3.4, not to make use of the guided tour, nor did I think that the lecture was particularly suitable for orientation (See section 7.3.2). I decided to send out information, in printed form, to new students, at different times. The first information was in the form of a single sheet, handwritten and reproduced by offset printing. See Figs. 3 and 4.
This paper contained information likely to be of interest to the new student. "At Chalmers University of Technology there is a Library, where you can read Yachting News (and 4,700 other periodicals)." It continued with information that there were study places for student use, and a reference collection of dictionaries, encyclopedias, handbooks and tables for consultation, and that there was a reserve book collection of set course literature. It also contained information on the hours of opening of the Library and the vital information that there was a pleasant cafeteria. The sheet of information was handwritten in order to contrast with the vast quantities of typewritten information given out to the students. It was also illustrated as can be seen from Figs. 3 and 4. Several details were written in for hand, in red, in order to provide a colour contrast to the black and white effect. The final word was VÄLKOMMEN or WELCOME in red. These handouts were distributed with the help of the student union, to all new students.

7.4.3 Guide to the use of Chalmers Library

The second printed handout was intended for students after their first term, and took the form of a printed Guide to the Use of Chalmers University Library. I hoped that this guide would be a suitable method for learning, not only about the objective already described (in 7.4.1) but also for objectives
Vet Du
att på Chalmers finns det ett huvudbibliotek CTHB där Du kan läsa 'Båtlytt' och 4,700 andra tidskrifter

Och Du kan räddas från att drukna i den starkt växande informationsfloden med hjälp av informationssökning.

alltså: Informationssökning i Informationsökning

Fig. 3. Printed handout for new students (first side).
På biblioteket kan Du också sitta och studera vid läsesalens studieplatser.

Kurslitteratur och referensböcker finns tillgängliga.

Du kan kopiera material vid bibliotekets reprocentral till låga priser.

och **FIKA i KAFÉET**

(på andra planet)

**BIBLIOTEKET ÄR ÖPPET:**

<table>
<thead>
<tr>
<th>Terminerna</th>
<th>Måndag - Fredag</th>
<th>Lördag</th>
</tr>
</thead>
<tbody>
<tr>
<td>under termierna</td>
<td>9.00 - 20.00</td>
<td>9.00 - 12.00</td>
</tr>
</tbody>
</table>
| under ferierna  | 9.00 - 16.00    | 16.00 - 18.30 (stängt)

Fig. 4. Printed handout for new students (second side).
2 to 4 in 6.5.4:

2. Have the ability to locate handbooks
   encyclopedias
   bibliographic tools
   periodicals (on open shelves)
   dictionaries
   the reprocentre

3. Be able to distinguish between the use of the author catalogue and the subject catalogue.

4. Have the ability to use a closed access library and to be able to fill in a requisition form for the three most common types of loan (books, journals and parts of a series).

Thus the guide, See Appendix, Chapter 7, contained the following (objective number is given in brackets).

(1) A section on the resources available at the Library:

JOURNALS

5,000 journals are available for loan, the latest numbers of approximately 1,500 of these journals are available in the periodical reading room.

BOOKS

There are over 30,000 books, covering different fields of technology, available on loan.

RESERVE BOOK COLLECTION

There is at least one copy of all the set literature available for reading in the Library.
REFERENCE LITERATURE
Reference literature - encyclopedias, handbooks, datebooks, and tables are available in the main reading room, or in the Chemistry section of the Library. This reference literature is marked "R".

INTER-LIBRARY LOANS
If the Library doesn't have the journal or book that you want to borrow, this can usually be obtained from another library. These inter-library loans are usually free.

MICROFICHE or MICROFILM
Many reports and theses are now published in micro form. It is possible to use special apparatus to read this material in a room opposite the Chemistry Library.

TOOLS FOR INFORMATION RETRIEVAL
Guides to the use of the literature
Periodical lists
Report catalogues
Bibliographies
Abstracts and Indexes
Project catalogues
All these are available in the main reference hall

INFORMATION RETRIEVAL SERVICE
The library staff will help you with your information problems. In addition, there is a special service organized by the Library and the Swedish Academy of Science ...
COMPUTER BASED INFORMATION RETRIEVAL
The Library can give information on computer-based information retrieval, via the Library at the Royal Institute of Technology, Stockholm.
Ask for details at the enquiry desk.

ROOMS FOR GROUP WORK
There are special rooms available for group work.
Ask for details at the enquiry desk.

ROOMS FOR RESEARCH WORKERS
There are places available for research studies.
Ask for details at the enquiry desk.

TELEX
The Library has a Telex apparatus, which is available for use for all institutions at Chalmers University.

PHOTOCOPIES
Low price photocopies can be made at the Library's Reprocentre on the basement floor. It is possible to make copies of micro-material.

CAFE
On the first floor, there is a café where you can obtain sandwiches and coffee etc. during term time.

(1) The hours of opening during term and vacation were given.

(2) Plans showing the location of material and resources were included.

(3) There was a short explanation of how to use the author and subject catalogue:
Do you know the name of the Author to the book you want? Use catalogues.

Are you looking for material on a certain SUBJECT area? Use catalogue.

If you have problems looking for material, ask the enquiry desk. The librarian at

A short description of lists and periodicals - The Journals and Periodicals available at Chalmers Library, and List-Tech - a union catalogue for foreign technical journals and periodicals in Swedish libraries - was given.

A short description was also given of the closed-stack library and the need to fill in requisition forms:

At Chalmers Library, the greater part of the collection is stored in a closed-access book store. Therefore you have to fill in a special loan requisition form when you want to borrow material.

Information was also given as to who could use the library (see 7.8) and how identification took place.

The printed guide has the advantage of being readily available for individual instruction, at times when the information is desired. It can be designed to
be conveniently portable, can be fitted into a pocket or handbag, and can thus be used in various parts of the library. The construction allows immediate feedback - if the person using it wants to refer to previous information, this can be obtained by turning back to that point. A guide can also be used again and again. A printed guide is, moreover, relatively cheap and easy to produce.

This guide was written with the user in mind. Technical jargon was strictly avoided throughout. It was produced in a size that would fit into a pocket or handbag. The final layout was carried out by members of the library staff and two architects who had just completed their studies at Chalmers, and now ran a printing firm. They had also been concerned with the production of material for other departments at the university, for example the Planning Section. These architects were particularly well-suited to judge the type of layout and illustration that would appeal to presumptive users. The guide was printed in black and red on glossy paper and was liberally illustrated with humorous drawings. (See appendix, Chapter 7).

The printed guide to the Use of the Library was 16 pages in length. It was planned to distribute the Guide to students in their second term of studies at the university, at a point when they were no longer being bombarded by masses of information and might
actually require to begin using the library. The Guide was distributed in the individual "boxes" possessed by the students, or at introductory lectures.

7.4.4 Location of material and services

Objective 2 in section 6.5.4 states that students should, after orientation, have the ability to locate various material and resources. A great deal can be done to facilitate this. It was decided to concentrate on self-instructional material, which would be available whenever a user wished to use it.

It was decided to try to design a self-guiding colour-shape coded scheme for the location of material available for direct access at the library. Schemes of colour-coding/shape-coding have been carried out in a number of libraries. One place where such a scheme has been developed in detail, is at Hatfield Polytechnic Library in England, by Carey (see 7.3.9).

During their first weeks at Chalmers University, the freshers pass through a series of "initiation rites". They are known as the "nollas" or the nothings, and have to wear a cards with a large 0, during the first month. Each of the six Schools of Engineering has its own special colour, and the 0 card is printed in the colour of the wearer's School of Engineering. Therefore this colour should
be one of those facts that a new student has a reasonable chance of learning during his first weeks at the University.

The colours of the School of Engineering are as follows:

- Architecture - red
- Chemical Engineering - green
- Civil Engineering - blue
- Electrical Engineering - yellow
- Engineering Physics - black
- Mechanical Engineering - brown

Any colour-based scheme for locating material at the Library at Chalmers, should, logically, be based on a colour scheme already familiar to the largest borrower group. (It has been shown in the 1974 day-by-day study of the use of the library that engineering undergraduates comprised about 70% of the daily users visiting the library). The actual idea of making use of the existing colour scheme for the Schools of Engineering had been suggested by one of the administrative staff at Chalmers.

With such a colour-coding scheme, material pertaining to, for example, electrical and electronic engineering is coded with yellow symbols - the colour of the School of Electrical Engineering. This should help students to select relevant material for their needs more quickly and easily. Objections were made to the idea of colour coding, on the principle that some users were colour-blind. The colour code, is,
however, intended as a complement to the usual written sign, and the fact that a minority will receive no help from it, cannot be used as an argument for depriving the majority of users of additional selection help. A more serious argument is that the material stored at Chalmers cannot be divided into the six categories permitted. However, this difficulty can be overcome by providing two or more colour combinations. The colour coding gives a first indication of useful material.

At Chalmers University Library there is only a very limited amount of material on open access, so any colour-shape system could be fairly simple. Symbols were chosen to represent different types of material to be found in the library:

- **Periodicals**
- **Bibliographic aids, Abstracts and Indexes**
- **Reference Literature:** Tables, encyclopedias, handbooks, dictionaries.

Fig. 5. Symbols representing the different types of material to be found in the library
The use of the different symbols for different types of material was used primarily to help with location (Objective 2), but, in addition, this symbol representation would also help to make the students aware of the different kinds of material possessed by the library (Objective 1). It has been shown, in the pattern of library use study, described in Chapter 14, that many of the users were unaware that the Library possessed a Reproduction Centre. The existing sign was a small black and white notice placed on the circulation desk. The Reproduction Centre is situated on a different floor to the Reading Rooms and Catalogue Halls. A series of signs were put up with red letters of height 75 mm on a white background. These had arrows which clearly showed the direction to the Reproduction Centre. Signs were also placed outside the Chemistry Library giving the same type of information.

The existing signs over the catalogues were white letters on a black plastic background. The size of the letters was 25 mm. These signs were replaced by much larger signs made out of "lifebuoys" - the symbol for a life-saving action for the student drowning in a mass of information. This theme has also been used in the first handouts for new students - see Fig. 3 and as illustrations for newspaper articles about information retrieval. See Fig. 6.
Fig. 6. Illustration for newspaper article.
The fourth objective was concerned with students learning how to fill in loan requisition forms. I felt that details of how to fill in a loan form should be available just at the place and time when these were required by the users. So a large poster sign was made, showing the three most common types of request - books, periodicals and parts of series. This was hung up over the author catalogue, so that users would be able to see how to fill in their requisition forms (see Fig.7). If a faulty request was handed in at the circulation desk, the person working there could simply point to the sign and ask the user to correct the form. Details of how to complete loan forms for unusual, specially catalogued material were not included, as I felt that this wealth of detail would be confusing. About 80% of the material borrowed comes under the three categories described above.

7.5 The introductory course in information retrieval for engineering undergraduates

7.5.1 In chapter 6, section 6.5.5, the objectives for the introductory course in information retrieval are set out. In planning this course, I then made a list of the various subjects to be covered.

7.5.2 Course content

1. A brief description of the rapid increase in scientific and technological publications.
Fig. 7. Sign showing how to fill in a loan requisition form.
2. Scientific communication - the different channels.

3. The forms of printed communication - with division into primary and secondary information sources.

4. Different types of literature search:
   - current awareness
   - retrospective searches
   - factual searches
   - browsing

5. Methods of information retrieval.

6. Use of different tools for different information retrieval purposes.

7. A practical information search centred on the student's own particular topic of interest.

7.5.3 Methods

I then had to decide which methods to use for each part of the course.

For reasons described in 7.3.2, I thought that the lecture might be suitable for providing an overall introduction - the pattern of scientific communication, and the different types of literature search and the basic methods for carrying them out. I also hoped to be able to convey enthusiasm for literature searching, in this way.

Printed lecture material was provided, in the form of a compendium - Scientific Communication (Fjällbrant,
in order to enable students to cope with rather a lot of new information, much of which was in diagramatic form, which would have been difficult to notate.

I also intended to use the lecture form for an introduction to subject-based literature searching, and for an introduction to computer-based information retrieval. In the second case, printed notes were provided (Fjällbrant, 1974 c).

With regard to one of the specific objectives, in 6.5.5 - (Number 5) - using the various tools available for information retrieval, I felt that the brief introduction provided by the lecture, should be reinforced by demonstrations for small groups (5 or 6 students). In this way, it would be possible to teach the use of the bibliographic tools, by actually using them to look for material suggested by the students themselves.

The most efficient way of learning how to carry out a literature search is almost certainly by carrying out an actual search on a topic in which one is interested - learning by doing (7.3.7). The main part of the undergraduate course was therefore designed to include a practical literature search on a subject of the student's own selection. It was planned that, at the beginning of his/her search, the student should be able to obtain practically immediate help from a member of the library staff, and that, there-
after, the student would gradually go on to do more and more work on his/her own.

I hoped that this practical training would enable the students to learn how to carry out information searching. However, should the student want to carry out, at a later date, information searches for his/her later studies or for engineering work, it would be very difficult to remember all the numerous details of the various information retrieval tools. This would require that a student learnt a great number of facts, many of which would never be used again. I felt that it was important to teach the students how to look up the details, as and when they were required. The problem was that there were very few Guides to the Literature in Engineering Fields, written in Sweden. The guides that were written in English or German did not include Scandinavian information sources, and these were naturally of interest to Swedish engineering students. For this reason, I decided to produce a series of "Guides to the Literature ..." in the various branches of engineering studies at Chalmers University. (Fjällbrant & Reimer-Jönsson, 1974 a) (Fjällbrant & Reimer-Jönsson, 1974 b) (Reimer-Jönsson, 1975) (Fjällbrant, 1974 d) (Fernholm, Fjällbrant & Reimer-Jönsson, 1974) (Berntler, Fjällbrant & Reimer-Jönsson, 1975).
These subject guides were constructed on a functional, rather than a morphological, principle, that is, the various bibliographic aids and tools for information retrieval were arranged according to the function that they perform for the user, rather than according to any specific structure they might possess. Thus one tool might appear in several places in the guide, if it could be used in several different ways. Each guide had an outer cover printed in the colour of the School of Engineering for which it was primarily intended. Thus the Guide to Information Sources in Electrical Engineering was yellow, while the Guide to Information Sources in Civil Engineering was blue, and so on.

The guides were also arranged according to the time sequence of scientific publication. See Figs 8 & 9, with the most recent information - about actual projects - first, and information in book form much later. This is in contrast to the usual arrangement of guides to information sources. All the subject guides produced had the same general arrangement. This was in order to facilitate transdisciplinary information searching. Thus if a mechanical engineering student had learnt how to use the handbook "Guide to the Literature in Mechanical Engineering and later faced a problem that required information about some aspect of electrical engineering, he could consult the equivalent guide and use it in the same way as that with which he was already familiar. The
Fig. 8. Aids for information retrieval
Fig. 9. The time sequence for publication of research results in the physical sciences
guides were meant to serve the students as reference handbooks for the next few years, there being no point at all in trying to remember the details of different bibliographic aids, when these can easily be looked up as and when needed.

While the lectures could be given to larger groups, the demonstrations and practical information searches would have to be limited to relatively small groups - maximum size 15 students. During the demonstrations of bibliographic material, these groups would have to be subdivided, so that everyone had a chance to see what was being talked about. Courses were designed for 30 students for lectures (limited by the actual size of the seminar room) and a maximum of 15 students for demonstrations and practical work - otherwise everyone would be wanting to use the same material at the same time. The groups of students taking part in a particular course were homologous - that is, from the same School of Engineering.

7.5.4 Timing

As student motivation plays such an important part in determining the success or failure of library courses, it was important to time the course on information retrieval to coincide with a point of high motivation. It was suggested that there should be a number of courses available throughout the year, for the different Schools of Engineering, and that the students could decide when to attend such a course. It was
suggested that they should take part in such instruction at the start of their undergraduate research project, which they normally carry out during the third or fourth year of study. The undergraduate research project is often started by carrying out a retrospective literature search, so the students would have very high motivation for learning how to do this work. Students at Chalmers University of Technology work at different rates - thus some students complete their degrees in four years of study, while others take a longer time. The availability of a number of courses in information retrieval would allow individual students to attend such a course when they had a need for it, in conjunction with their other studies.

7.5.5 Length of course

The total length of the course was planned at 14 hours (2 "week-period hours"). This was arranged as follows:

Lectures.

1 hour - Scientific communication
1 hour - Principles of information retrieval
1 hour - Subject-based information retrieval
1 hour - Introduction to computer-based information retrieval

Demonstration. 1 hour - Bibliographic aids and other tools for information retrieval
Practical work. 6 hours - Supervised manual information search in connection with the student's undergraduate research project

3 hours - Individual study, including the presentation of a list of references obtained during the information search

7.6 Postgraduate instruction

7.6.1 Background experience

As the present postgraduate students have not attended any introductory undergraduate course on information retrieval, it would be necessary to include the material on manual information searching that forms part of the undergraduate course. However, postgraduates starting on their doctoral research work, are at a stage when obtaining information is one of the most important parts of their work. They are highly motivated to carry out a practical information search within their field of research. This retrospective information search is of the "all-inclusive" type, in contrast to the "background" retrospective search required at the beginning of the undergraduate research project.

Planning the postgraduate course was made easier by the fact that there was experience of courses in
information retrieval for research students, both at Chalmers University of Technology and at the medical faculty of Gothenburg University, where courses had been held since 1971. The courses at Chalmers had consisted of two days of lectures and practical work for large groups - up to 65 students. These postgraduates came from all six Schools of Engineering, as well as from the natural science faculty at Gothenburg University. At the end of the 1974 course, students were asked to fill in a questionnaire which enabled them to express their opinion about the different parts of the course. There was a preference for practical work rather than lectures. Students wished to spend more time on constructing their own search-profiles for computer-based information retrieval. The most strongly expressed opinion was for instruction for smaller groups which consisted of students from the same School of Engineering. This is hardly surprising, since it is very boring to listen to details of information searching in some other discipline.

The courses for the medical postgraduates had originally been given to groups of 30 students. However, experience showed that this was too large a number for efficient practical work - too many people wanted to use a given bibliographic tool at the same time. By 1973, the course was being given to groups of 15 students and this seemed to be about the right
number. The medical courses grew in popularity, so that, by 1973, there were 60 applicants for 15 places. At this point, the medical faculty provided an extra allowance of money to allow the courses to be duplicated. The increasing popularity and financial assistance could be regarded as an indication that the students thought that the course was relevant to their needs and that the academic staff were satisfied that it was of use in the total postgraduate instruction programme. Indeed it was not unusual for individual departments to approach the library staff, after such a course, which one of their junior staff had attended, and ask for seminars about the structure of the medical literature and methods of information retrieval. Furthermore, when a similar course was suggested at the university of Aarhus in Denmark, in 1974, the staff responsible for the instruction at Gothenburg were asked to organize and teach the Danish course.

7.6.2 Proposed course

With this background experience, it was decided to give a 35 hour course in methods of information retrieval - both manual and computer-based, for homologous groups of 15 students. The postgraduate course was based on the introductory information retrieval course, and the same objectives
were applicable. The 35-hour course allowed more time for training in the use of tools for obtaining information from patents, standards and reports.

The handbooks "Guides to the literature in ..." produced for the undergraduate course could be used for the postgraduate course.

Objectives additional to those of the introductory course have been expressed in section 6.5.6. The first two of these were concerned with computer-based information retrieval. I planned to use the lecture (2) to give a general introduction to the subject - the data bases available for searching, the types of search possible - retrospective and Selective Dissemination of Information and interactive real-time searching.

The main part of the course would be taken up by the practical construction of a search profile for a recurrent off-line S.D.I. search. This practical training would be directly related to the manual search, in that the references and search terms obtained during the former, would be used as the starting point for the construction of the computer search profile. This part of the course would be taught by a documentalist well versed in the SDI system in use at the Royal Institute of Technology Library, Stockholm. It was hoped that when the Library at Chalmers got a terminal, that training could also be provided in on-line searching (See 17.2.3).
As the participants were to be limited to 15 per course, teaching would be in a small group form, and even the introductory lectures could be of the less formal type, with opportunities for questions and discussion. Small group teaching allows immediate feedback from the students to the teacher so that instruction can be rapidly adjusted to the needs of the group. Another advantage of small group instruction in library use and methods of information retrieval is that this establishes contact between students and a member or members of the library staff. As Stevenson points out, "This, assuming the impression created by the librarian is favourable, can only be beneficial in the later period of less formal contact" (Stevenson, 1973).

The third objective in section 6.5.6. concerned personal record keeping. The course would include a two-hour seminar on personal record keeping, and practice in the presentation of references. I wrote a compendium - To arrange references and present results - A guide for postgraduates and other research workers." (Fjällbrant, 1975 a).

7.6.3 Timing

The point of highest motivation for the postgraduate students should be at the start of their doctoral research project, so it was suggested that courses in information retrieval should be available in
connection with this point.

7.6.4 **Length of course**

It was planned to have a 35-hour (or 1 study week) course, in which the students would carry out a considerable amount of individual practical work.

It was planned to arrange the course in the following way:

One day for manual information retrieval methods. (Similar to the undergraduate course).

One day for computer-based information retrieval - 2 introductory lectures followed by practical search profile construction under the guidance of a documentalist.

Discussion on reference arrangement and personal record keeping and the presentation of technical information.

Individual literature search on a subject of the student's choice. During this search, help could be requested from the library staff but there would be no direct supervision.

7.7 **Organization of the programme of user education at Chalmers University of Technology Library**

7.7.1 The proposed programme for user orientation/instruction at Chalmers University of Technology Library, based on the goals and objectives expressed in Chapter 6, included three stages:
1. Short library orientation for new users.
2. Introduction to information retrieval for 3rd/4th year engineering undergraduates.
3. Advanced course in information retrieval, including computer-based information retrieval for postgraduate students.

In addition, "Refresher" courses in library techniques and methods of information retrieval were planned for industrial engineers.

This proposed programme in library orientation and instruction, was presented by the Director of Chalmers Library, to the combined Faculty Education Board (FUN), for all six Schools of Engineering.

This Faculty Board is made up of the Vice-Chancellor, the Pro-Vice-Chancellor, representatives of the members of the academic staff, research student representatives and undergraduate representatives from the various Schools of Engineering. The Faculty Board expressed general approval of the programme of library orientation/instruction and suggested that financial support should be provided by the central university authorities for the development of the programme by the University Library. However, decisions as to the acceptance of such a programme, timing, length and content of courses were the responsibility of the Educational Boards of the individual Schools of Engineering. These Educational Boards are composed of representatives of
the academic staff, research students and undergraduates.

7.7.2 Discussions with the Educational Boards of the Schools of Engineering and the School of Architecture

The goals for the programme of user instruction were discussed with the undergraduate students, research students and academic staff representatives on the Education Boards for each of the Schools of Engineering and for the School of Architecture. There was general agreement that the goals expressed in 6.5.2 were adequate.

In planning the programme of user education at Chalmers Library, decisions had to be made as to priorities. As has been shown by the day-by-day analysis of the use of the Library (see Chapter 14), the engineering undergraduates were by far the largest categories of library users, so it was decided to start by concentrating on courses for the undergraduates.

The suggested specific objectives for the introductory course in information retrieval for undergraduates (see 6.5.5) were discussed with the representatives on the individual Education Boards. The undergraduate students confirmed the findings described in 6.4.1 that it would be useful to be able to learn how to find out information in connection with the undergraduate research project. Several members of staff suggested that certain seminars also required a
literature search. The objectives presented seemed reasonable for such a course. Members of the library staff described plans for the development of self-guiding orientation material, which it was hoped would be of use to new users. Development of courses in information retrieval for postgraduates was also discussed - the objectives for such a course were outlined (see 6.5.6) and plans were made to follow up the undergraduate courses with courses for small groups of postgraduate students with similar study areas, and, therefore, related information needs.

Following these preliminary discussions, a basic plan for a 14-hour introductory course in information retrieval was drawn up (See 7.5), and this proposed plan was presented to the six individual Education Boards by the Library Director and one or two members of the library staff.

The general programme was discussed in detail, and particular attention was paid to the suggestions for the undergraduate course. The groups agreed to meet again in two or three weeks' time to reach final decisions on course content, length of course and problems of timing. In the meantime, the various representatives had the opportunity to discuss these features with their own groups.

The point that emerged from the series of second meetings was that the different Schools of Engineering
had different needs for library instruction and that they all needed different solutions. The Library staff adopted a policy of maximum flexibility, and courses were designed to meet the needs expressed by the users.

The School of Architecture. The education plan followed by students at the School of Architecture was undergoing a thorough revision at the time of these discussions. It was planned to carry out project-linked teaching throughout the four years of university study. In view of this, both student and academic staff representatives requested that the first year architecture students should receive a compulsory course in methods of information retrieval. They suggested that the basic 14-hour course should be offered to these first year students, and that a practical literature search should be carried out by the students in connection with a project selected by students and staff, in relation to the general course of study.

The School of Chemical Engineering had a number of already well-established courses in information retrieval for their undergraduate students, and a series of extra meetings was held with the organizers of these courses. It was suggested that the teaching which already existed could be supplemented by the library staff. Thus, a general introduction to scientific communication and methods
of information retrieval could be given to first year students, in order to provide a frame of reference for later practical work. In addition, demonstrations of special bibliographic aids, such as Science Citation Index, could be provided for third and fourth year students, as part of their course in Chemical Engineering. A short introductory lecture on computer-based information retrieval could also be given at this point. The Library had also spent a considerable length of time on the development of self-instructional material for use in teaching principles of information retrieval and the various aids for this. It was decided that the library staff and academic staff would cooperate in the testing of this material, so that it could be used by the academic staff in their "literature courses".

The School of Civil Engineering accepted the basic plan presented by the Library. They suggested that the 14-hour undergraduate course should be compulsory for all students registered from 1971.

The School of Electrical Engineering accepted the basic plan suggested by the Library - with the undergraduate course as an optional course for third and fourth year students. (It was pointed out that all courses in the fourth year were optional courses and it would have been very difficult to make an exception to this general pattern).
The School of Engineering Physics also approved the basic programme presented by the Library, but arranged that the introductory course in information retrieval should be a compulsory part of the undergraduate research project.

The School of Mechanical Engineering accepted the same basic plan, with the undergraduate course compulsory for all students registered from 1972.

7.8 Modifications in existing library practice

7.8.1 As was pointed out in 7.1 there was an interaction between the planned instruction and existing library practice (see Fig.1). This resulted in several changes in existing library practice. Some examples of these changes will be given in this section.

The general aims for Chalmers University Library have been stated in an article by Fjällbrant and Westberg (Fjällbrant & Westberg, 1975).

"1. To contribute to the realization of the aims of the university, with regard to teaching, learning and research, by acquisition of printed and other material necessary to cover present day and future information needs.

2. To register and store the information material acquired in such a way that it not only permits, but actively stimulates the maximum use of this material."
3. To adapt these information resources and services to the changing needs of the university and society.

4. To contribute to the integration of both national and international information resources within the university."

When the text for the Guide to the Use of Chalmers Library was being drawn up, it was necessary to describe conditions of borrowing (HOW to obtain material) and the services available (WHAT was there to be used) - See 7.4.3. The actual text to use was the subject of considerable discussion. A prototype was drawn up and presented to the Heads of the various Library Departments for their opinions and views. In the resulting discussions, it was realized that some of the existing library practices were not really in agreement with the aims expressed above. Thus with regard to the borrowing regulations, the existing regulations stated that borrowers had to have some form of guarantor, either collective through an organisation, such as the student union, or individual - through a person registered in the Gothenburg telephone directory. The library staff were all agreed that this system was, in practice, clumsy, and that it could not be said to "actively stimulate the use" of the material held by the Library. Furthermore the regulations were not particularly helpful for the recovery of lost material. So the rules for borrowing were changed, in order to
make borrowing easier, and stimulate the use of the collections. Thus it was decided that students from Chalmers could borrow by showing their student legitimation and other borrowers had to show an official identity card. (The vast majority of Swedish citizens possess these cards). For people who did not have either of these means of identification - a very small number - the special regulations were retained. In the Guide to the Use of the Chalmers Library, it was stated that Chalmers Library can be used by ALL who wish to make use of its services. This is in marked contract to the negative impression created by rules and regulations about who may borrow and who may not. Similarly, instead of saying that "Reference books may not be removed from the Library", it was said that "Reference books are always available in the Reading Room."

Another example of modification of library practice was in the treatment of the reserve book collection. Previously there had often only been one copy of some of the set books, and students who had come to the Library to look up some point, had sometimes found that there was no copy available for reference. In connection with the description of this service, it was decided to buy an extra copy of this type of set literature, so that there was always one copy available for reference, and that the other copy could be borrowed for home reading. In this way a modification was made in the accession policy.
Modifications were also made in the provision of other services - such as special study rooms for research workers, rooms for group work, and information in connection with a literature search service provided in conjunction with the Swedish Academy of Science.

The study of the day-to-day use of Chalmers Library (see Chapter 14), had shown that many users were unaware that the Library possessed a Reprocentre with a copying service. Information about this service was obviously required, so a short description was given in the Guide. In addition, signs were put up showing the way to the Reprocentre.

7.8.2 Methods of attracting users to the Library

Methods were planned to attract students to the Library. The User Survey of Chalmers Library (See Chapter 2), had shown that 9% of the undergraduates and 30% of the postgraduates had children. When wishing to borrow material, parents may need to bring their children with them. With a closed-stack system of library storage, there is always a period of waiting for the material ordered. The children have to wait too. Why not then make the University Library a place where they feel welcome too? So a group of children's furniture was bought, plus books and games, etc. Parents can either leave their children there whilst ordering material, or sit and read with them while waiting. See Figs. 10 & 11 and (Fjällbrant, J. 1975; 'Fjällbrant, 1975 b).
Fig. 10. The children's corner at Chalmers Library.

Fig. 11. John playing chess.
The Library was lucky, in that it possessed a café, where users could buy tea and coffee and sandwiches. However after this café closed at 16.00, it was impossible to get a cup of coffee. So a coffee machine was installed in the entrance hall. The entrance hall was redecorated, painted an attractive pale yellow colour and made into a pleasant recreation area. Special light-boxes were constructed with concealed fluorescent lighting behind an opaque perspex screen. These boxes were then used in two ways - for exhibitions of various kinds and for providing information. As an example, the Library at Chalmers possesses some valuable old material, such as the Diderot Encyclopédie. It is difficult to safeguard older material that is used for exhibition purposes. However, it is possible to take photographs - negatives - of the beautiful illustrations - these negatives are then displayed in the boxes, with a short note as to the origin of the material. Illustrations from engineering periodicals of the later 1800's also provide much attractive material for this type of display.

Notices and short articles about services available at the Library were published regularly in Chalmers University News, and hours of opening were published in the local Gothenburg Post daily paper.
Chapter 8

EVALUATION OF THE USER INSTRUCTION PROGRAMME AT
CHALMERS UNIVERSITY OF TECHNOLOGY

- AN INTRODUCTION

8.1 Introduction

8.1.1 This chapter is intended to provide an introduction to evaluation in education, and its purpose (8.1.3). This will be followed by a brief description of the targets (8.1.4), scope (8.1.5), methods (8.1.6) and timing (8.1.7) of evaluation.

A description of previous evaluation of user instruction in libraries will then be given (8.2). The final part of the chapter (8.3) will give an account of the evaluation work carried out in connection with the programme of user instruction at Chalmers University of Technology.

8.1.2 What do we mean by evaluation?

Evaluation has been described in many different ways by educational research workers. Many of the definitions given are very general, for example that of Scriven (Scriven, 1967) "evaluation attempts to answer certain types of questions about certain entities". This type of definition is not very helpful for an understanding of evaluation. Evaluation is concerned with the collection of information about the effects of an educational course or programme. It often involves the comparison of observed effects with expectations or intentions. It is important to consider why evaluation is carried out, when attempting to understand what evaluation is.
Evaluation is concerned with the collection and analysis of information about the input, in terms of education potential, variables affecting the educational process, and the end product or output. Evaluation can be directed towards the various aspects of the educational course or programme. Thus attention may be focused on the educational process or on the output or product of this process. The purpose of evaluation is to collect and analyse information that can be used for rational educational decision making. This definition of the role of evaluation does not include the element of judgement, which is part of educational decision making. Stake has pointed out that "most evaluation specialists have chosen not to judge" (Stake, 1967) even though many educationalists try to get them to do this. Scriven has charged evaluators with the responsibility for judging the merit of an educational practice. He makes the point that it is not sufficient to ask "How well does the course achieve its goals?" one must consider whether the goals are worthwhile or not "How good is the course?" (Scriven, 1967). The latter question is concerned with a judgement of the aims of the course rather than with the functioning of the course. It is apparent that course evaluation and judgement of aims both form part of the wider area of educational decision making. Many recent evaluation studies do include a judgement element.
8.1.3 The purpose of evaluation

The purpose of evaluation has been described as follows (Astin and Panos; 1971) - "The fundamental purpose of evaluation is to produce information that can be used in educational decision making". Educational decisions (like other administrative decisions) involve choices between available alternatives which are based on both educational and economic factors, and which often involve subjective judgement and value decisions. The role of evaluation is to provide information which can be used for rational decision making. Thus evaluation can be used for decisions about whether to continue or terminate a given course, about the modification of an existing programme, or about the adoption of an innovation.

8.1.4 The targets of evaluation

An education course or programme can be represented in the following diagram (Fig. 1):

![Diagram](image)

where $S =$ Student input (state of pre-knowledge) etc.

Fig. 1. Relationship between educational process and educational product
8.1.5  The scope of evaluation

Evaluation may be carried out with regard to specific educational courses or to general educational systems. An example of the latter is Husén's study "International study of achievement in mathematics" (Husén, 1967), where the aim was to evaluate differences in student achievement in mathematics in twelve different countries, with regard to such variables as school expenditure, teacher training, type of school organization and degree of urbanization. A distinction may be made between assessment and evaluation:

Individual assessment is concerned with the specific achievement of the individual student with regard either to his contemporaneous student group or to pre-specified goals.

Evaluation is concerned with the effects of a given educational course, programme or system.

In terms of Fig. 1, assessment is concerned with individual output measurement. However, as can be seen, total individual output for a given course, with regard to pre-specified goals, can be used in the measurement of the effects of educational processes, if other variables are controlled.

8.1.6  Methods of evaluation

Evaluation can be classified according to the method used for the collection and analysis of information. Three main types of evaluation can be described (c.f.
Howe and Delamont, 1974):

1. The "psychometric"
2. The "sociological or management"
3. The "illuminative or responsive"

Psychometric evaluation

Psychometric evaluation has evolved from the psychological discipline. During the latter part of the nineteenth century and the early part of the twentieth century, the application of quantitative methods of science was extended to psychology and so to education. This period saw the development of the "test" phenomenon, which culminated in the "test boom" of the 1920 to 1930 period. Enthusiasts regarded the tests as providing "objective" information which could be used in assessing the efficiency of a given educational programme or of the teachers. Psychometric evaluation is based on the assumption that it is possible to expose experimental and control groups to different treatments by means of psychometric tests, achievement tests or attitude scales. Thus the experimental group may be exposed to a new physics course, whereas the control group follows the traditional course; in every other respect the two groups are exactly comparable. Pre-tests and post-tests are given to both groups, and the analysis is concerned with establishing significant differences in the performance of the two groups. These are then attributed to the variable being studied - the new course. This method assumes that "irrelevant"
variables can be controlled, an assumption which is, in many cases, completely unjustifiable. In addition, this evaluation procedure is concerned with measuring output in terms of pre-specified goals and no attention is paid to unexpected effects.

**Sociological evaluation**

The management or sociological approach to education evaluation has developed from the discipline of industrial sociology. This method is used in the study of changes in the structure of an organisation or the roles of the participants in an educational programme or a specific institution. This type of evaluation makes use of interviews and questionnaires. Participant observation is employed in many cases as a complementary method. Attention is focussed on the organisation undergoing change, rather than on comparison with any control group. A recent example of the "sociological" approach to evaluation is to be seen in Gross's study of the fate of an educational innovation in a specific American primary school (Gross et al, 1971).

**Illuminative or responsive evaluation**

During recent years there has emerged a third type of evaluation which emphasizes participant observation and interviews as a means to obtaining an overall view of educational programmes. This type of evaluation has been called "illuminative" observation by Parlett (Parlett and Hamilton, 1972) and "responsive" evaluation by Stake (Stake, 1974). Illuminative evaluation is not limited by the initial formulation of aims, but allows
for the expression of unexpected results. The actual implementation of an innovation is regarded as the most important part of the study. Research is focussed on what is actually happening in response to the innovation. Questionnaires and achievement scores may be used but they are rarely given high priority. One objection that is raised with regard to this type of evaluation is the difficulty of being objective.

8.1.7 The timing of evaluation

In 1967 Scriven pointed out the distinction between formative and summative evaluation. This distinction is partly based on the timing of the evaluation, and partly on the purpose for which it is intended:

**Formative evaluation** is carried out during the development of a course or programme and provides direct feedback about the functioning of the different parts of the programme, thereby giving information which can be used to modify the educational process.

**Summative evaluation** is concerned with the evaluation of the educational programme as a final product.

Thus formative evaluation provides information which can be used to improve a course, whereas summative evaluation could be used to provide information about the overall worth of a given course, to help in the decision as to whether or not the course should be continued.

The learning/teaching situation is usually complex and
dependent on a variety of factors, many of which are random and unpredictable. Evaluation of the functioning of an educational programme closely parallels the situation in medical diagnosis — evaluation of the functioning of a complex individual. In both cases, it may be difficult to acquire sufficient information for a complete evaluation of the situation. The actual evaluation/consultation is a factor that may affect the existing situation. In both cases, decisions may have to be taken as a result of the information collected. In educational evaluation, one may attempt to avoid the judgement aspect — but decisions may then have to be made by some other group — decisions that will be influenced by the information collected and its presentation. Certain parts of this information can be collected by means of "tests", for example blood-pressure measurements, heart-rate etc., other information has to be collected by observation and by means of case-histories. All these ways of acquiring information are valuable and complementary — they contribute to an evaluation of the total situation. Each method has limitations, thus it is possible to collect detailed information by means of tests, but if the tests are concerned with some aspect that is of little relevance to the total situation, then the value of the results will be limited. In many cases, it is extremely difficult to carry out tests under truly controlled conditions, because the external conditions are changing throughout the time-period in question. An example of this is to be seen in a developing educational programme.
Detailed observations and discussion provide valuable information, but they are time-consuming and therefore expensive. The evaluation methods chosen will depend on the purpose of the study and the resources available. However, the greater the variety of the methods used, the greater will be the chance of obtaining a complete picture of the educational course being evaluated, as the interaction of the various methods will produce a "triangulation" effect - the same question being answered in different ways.

8.2 The need for the evaluation of library instruction

8.2.1 From the general account of evaluation given above, it will be obvious that all teachers evaluate. Attempts are made to improve existing courses, either as a result of personal observations, or from discussions with students participating in the course. During recent years, librarians have become more aware of the need to evaluate programmes of library instruction. For example, Revill stated, in 1970, that "there is a great need for proper evaluation of the various teaching methods adopted in the library" (Revill, 1970), and Lubans pointed out, in 1972, that the results of evaluation not only present possible alternatives for better programmes but also should provide standards of performance for such instruction" (Lubans, 1972). Yet the same author, Lubans, said, in 1974, that "Instructional programmes in all types of libraries have been infrequently evaluated, their need and affect have not been measured except in a few isolated cases" (Lubans,
1974). It would appear that, while many librarians are agreed on the need for, and the value of evaluation, with regard to user instruction, few have actually carried out systematic evaluation.

8.2.2 Previous evaluation of library user instruction

The learning/teaching situation implicit in library instruction is complicated, and, as has been pointed out in 6.4.8, the goals and objectives envisaged by students, academic staff and librarians often differ. This is particularly marked in the formulation of broad aims and goals for programmes for user instruction.

It is, therefore, perhaps not surprising to see that many of the evaluation studies described in the library literature give accounts of the evaluation of specific methods and media, which have been used in library instruction rather than evaluation of programmes of instruction. An example of such evaluation can be seen in the studies on the audio-visual "point-of-use" aids developed at the Barker Engineering Library, Massachusetts Institute of Technology (Stevens & Gardner, 1974; Gardner, 1972). Similarly, an evaluation of tape/slide instructional programmes "How to find a book" and "How to find a periodical" has been carried out by Lubans at the University of Colorado Libraries (Lubans, 1974 b). At the Institute for Educational Technology, University of Surrey, England, there is a current OSTI research programme concerned
with evaluation of the SCONUL tape/slide instructional programmes produced by a number of British University Libraries (Chesshyre & Hills, 1970; University of Surrey. Tape-slide evaluation project reports 1973 & 1975). In the latter evaluation project great emphasis has been placed on the formulation of specific objectives. Use has been made of pre- and post-instructional tests to measure short-term learning performance with regard to these objectives. User attitudes to specific presentations and to the tape/slide method of instruction have also been studied.

The use of videosonic machines for library instruction was examined by Genung in 1967 (Genung, 1967). The effects of Computer-Assisted-Instruction, CAI, in libraries has been studied and evaluated by, amongst others Axeen, 1967, (Axeen, 1967) and Hansen, 1972, (Hansen, 1972). These evaluations have been directed towards the educational process in a specific learning/teaching situation and psychometric methods have been used to collect and analyse the information.

Psychometric methods have also been used in comparisons of two or more methods of library instruction; but in these cases the evaluation has been product-directed. Thus, in 1971, Kirk compared two methods for instruction of students in introductory biology: lecture-demonstration and programme instruction (Kirk, 1971). This evaluation was carried out by means of performance studies and
examinations on library skills and the measurement of students' attitudes towards the programme. Kirk concluded that neither of the two methods showed superiority over the other. In 1973, Kuo carried out a comparison of six versions of library instruction lecture, audio-taped lecture, tape/slide presentation, television presentation, audio-visual instruction, audiotutorial plus follow-up lecture, using overhead transparencies, and audiovisual instruction followed by a discussion with a librarian (Kuo, 1973). Results indicated that the "combination" method of self-paced audiovisual study, followed by verbal discussion with a librarian, was the most effective way of increasing student achievement in the 90 question test designed to measure course retention. It was interesting to observe that Kuo found that the slide presentation of visual material was more effective than television presentation of the same material.

Psychometric tests which attempt to measure students' ability to use the library have been developed and made use of primarily in the U.S.A. These tests have been used for individual student assessment and as instruments for the product evaluation of instructional programmes. The most widely used of these tests have been described in a review by Bloomfield, 1974, "Testing for library-use competence" (Bloomfield, 1974). One of the tests constructed during the thirties is the "Peabody Library Information Test" designed by Shores
and Moore (Shores and Moore, 1940). One of the most widely used tests is the "Feagley Library Orientation Test for College Freshmen" designed in 1955 by Ethel M Feagley and others (Feagley et al, 1955). Attempts have been made to compare various tests and to examine their reliability and validity. Thus the Peabody Test was examined by Deer, in 1941, using 1,300 students (Deer, 1941). He concluded that the test gave satisfactory results for diagnostic purposes. Perkins carried out a study, in 1964, on the determination of the correlation between the Peabody and the Bennet Library Tests (Perkins, 1964). Correlation was found to be as low as 0.385.

Criticism of this type of library test can be made. They are artificial and do not adequately measure the students' ability to use the complex information tools available and thereby gain the information that would be of use for their studies. The question can be raised "What do the library tests actually measure?". Bloomfield states (Bloomfield, 1974) that librarians have so constructed tests on library skills that it appears that "we librarians have a poor understanding of the value of the library for our students". Thus emphasis has often been placed on the use of the card catalogue as a major source for locating material, out of all proportion to its value for obtaining information, when compared to other tools for information retrieval.

The difficulties in the design of suitable tests for library use - in the obtaining of information that is
of interest to the user - may well be partly due to
the aforementioned confusion of objectives between
librarians, academic staff and students. (See Chapter
6).

However difficult it is to measure short-term effects
of library instruction, it is far more difficult to
measure long-term effects of the instruction given.
The long-term effect on the student and his/her ability
to obtain information, is, however, of much greater
interest than the measurement of short-term skills with
regard to the use of specific bibliographic tools.

8.3 Evaluation studies at Chalmers University of
Technology

8.3.1 With regard to the programme of library instruction
at Chalmers University of Technology, it was decided
to evaluate the programme in a number of different
ways, in order to produce a "triangulation" effect
and thereby obtain as full a picture as possible of
the functioning of the programme of instruction. (See
Chapter 16.) As the programme of library instruction
was in a state of active development, many of the
methods used were intended to provide formative
evaluation on which course modifications could be based.
The part of the programme which had received highest
priority was the introductory course in information
retrieval for the engineering undergraduates. As a
result there was a corresponding concentration on the evaluation of this course. The following evaluations were carried out in connection with the programme of user instruction at Chalmers Library.

8.3.2 Evaluation of tape/slide material for user instruction

A number of audio-visual tape/slide presentations dealing with various aspects of library user instruction had been produced under the SCONUL tape/slide programme, at a number of British University Libraries (Earnshaw, 1973). These presentations were often subject-orientated and the text commentary was in English. If it were possible to use this audio-visual material for Swedish students, direct with the English commentaries, it would save considerable time and expense. For this reason, it was planned to carry out evaluation of this type of material by comparing the performance of an experimental group using a Swedish audio-commentary, with the performance of a control group using an English commentary. In all other respects the two groups were identical. Pre- and post-tests were administered to both groups and test performance was examined. Attitude questionnaires were also filled in by both experimental and control groups. The procedure is described in detail, together with the results and conclusions, in Chapter 9.
This evaluation is an example of the use of psychometric methods, directed towards a given medium, or process. The evaluation was carried out in order to provide information for a decision as to whether or not this type of material could be used for the user instruction programme at Chalmers University Library.

8.3.3 Evaluation of the undergraduate course in information retrieval

The aim of the various evaluation procedures carried out was primarily to provide direct feedback on the innovatory user instruction course. Information collected and analysed could then be used to modify the course. Emphasis was on formative evaluation in connection with the educational process in a specific undergraduate course. Various methods of evaluation were used and these will be briefly described below:

A) Attitude Measurement

Studies of student attitudes with regard to course content, instructional material, teaching methods and the organization of the course, were carried out. Students were asked to complete, anonymously, after each course, a three-page questionnaire dealing with the above mentioned aspects. In this way, students were enabled to compare their observations with their expectations. This evaluation was directed towards the educational process and made use of the psychometric approach. The evaluation was of the formative type, and is described in Chapter 10.
B) Evaluation by achievement
Performance measurement was carried out after each series of courses, by means of examination of each student's list of references, in order to see whether the students were able to carry out a practical literature search. Evaluation was directed towards the product of the course. Summation of the individual student assessments, according to groups with different motivation, as, for example, work on "undergraduate research project", enabled the effect of motivation on performance to be studied. These student assessments were used as part of the formative evaluation of the course, in that they provided information on the functioning of the course as, for example, in the presentation of the references. This evaluation is described in Chapter 11.

C) Evaluation by pre-structured interviews
Pre-structured telephone interviews were given to a random sample of students who had taken part in the undergraduate course in information retrieval. These interviews were intended to provide information as to how well specific objectives, such as the awareness of the tools for information retrieval, had been achieved. In this evaluation study, psychometric methods were used to examine the product of the course in information retrieval. The interviews were carried out some ten months after the initiation of the courses, and included students who had taken part in some 20 courses.
Some modifications were made to subsequent courses as a result of information collected - formative evaluation, but the evaluation could also be regarded as being of the summative type, in that information was given of the functioning of a nearly finalized course. A description of this evaluation is given in Chapter 12.

D) Illuminative evaluation

An attempt to carry out illuminative evaluation of the undergraduate information retrieval course was also made. Detailed observations were carried out on the behaviour of the students during the actual course, and both students and teachers were interviewed as to how it was to actually participate in this form of instruction. It was hoped that these detailed observations and interviews would give information as to how the course was functioning as a whole and how the different parts were functioning. This was non-preordinate evaluation, in which it was possible to find out unexpected information. This form of evaluation was regarded as being a useful complement to the other types. The information obtained could be used for the modification of the course under development - formative evaluation directed towards the educational process. This work is described in Chapter 13.

8.3.4 Evaluation of the programme of user instruction by the study of changing patterns of library use

In addition to the methods mentioned above, which were used specifically to evaluate the undergraduate
information retrieval course, an attempt was made to carry out a long term study on the use of the library with regard to reasons for use, materials used, success in carrying out literature searches, etc. It was intended to see if the total programme of instruction—orientation, introduction and advanced courses in information retrieval—affected the pattern of use of the library over a period of five years. As priority was given to the undergraduate course in information retrieval during the first year, and other conditions remained nearly constant, any changes in the pattern of the use of Chalmers Library during that time could be attributed to the effects of that course of instruction. Measurement was carried out by means of questionnaires. Patterns of use obtained after the introduction of the programme of user instruction were compared with the pattern of use obtained for a control group before the start of the innovation. In this way, changing patterns of behaviour for the users of Chalmers University Library, in response to an educational programme, could be studied. This is an example of the sociological method of evaluation being used for summative evaluation of the products of an educational programme. This evaluation is described in Chapter 14.

8.3.5 Evaluation of the self-instructional orientation material
Attempts were also made to evaluate the effects of the self-instructional orientation material, by means of observations of how students performed a series of tasks. Observations on the way in which the tasks were performed,
the time taken, and discussions with the student about their problems in orientation were carried out in order to provide information for eventual modification of the programme in orientation. A combination of psychometric methods and direct observation and discussion was used. The purpose of the evaluation was formative - for the modification of the process associated with the orientational material. This work is described in Chapter 15.

8.3.6 Summary

This chapter started by a discussion on evaluation and its purpose, together with a description of evaluation according to the four parameters of targets, scope, methods and timing. The advantage of using several methods of evaluation for a given educational programme was pointed out. A brief review of existing work in library user instruction evaluation was then given and related to the parameters previously described. The need for evaluation was realized by librarians, and obviously some evaluation was taking place, but few systematic attempts to evaluate programmes of user instruction by different methods had been made. Against this background, the evaluation carried out in connection with the development of the programme of user instruction at Chalmers University of Technology Library was described and related to the parameters previously given. Evaluation was carried out in several different ways, in an attempt to study the value of the innovatory programme, and long-term measurement of the effects of the educational programme was started.
Chapter 9

EVALUATION OF TAPE/SLIDE MATERIAL FOR USER INSTRUCTION
IN SWEDEN

9.1 Introduction

During recent years, there has been an increasing interest in the use of audio-visual media for library user education. When deciding which media to use, it is necessary to consider the type of information to be conveyed, the cost of production, ease of display and ease of updating.

9.2 The advantages of the tape/slide medium for library instruction

9.2.1 What are the requirements for audio-visual media in library user education? The information to be conveyed, for example in the use of an abstract publication via indexes and entries, does not involve motion. Colour would be of help for the identification of actual publications, but moving images are not required to show extracts from these publications. The information can be conveyed in a series of units, such as slides, overhead transparencies, or printed illustrations. This would suggest that the tape/slide medium, which allows use to be made of colour, but which cannot show motion, would be very suitable for use in library user instruction.

The advantages of tape/slide productions are, as described in 7.3.5:

1. Flexibility. Tape/slide productions can be used
for both group teaching, as for example an illustration of a lecture or seminar, or for individual tuition, as in preparation for a course or for repetition.

2. Constant availability. The use of the material does not depend on the presence of a lecturer or librarian. It can be used by the student, when the need arises.

3. The presentation of the material is not complicated. The tape/slide material is easy to project and easy to store.

4. Speed of presentation can be controlled - either by the lecturer, in group instruction, or by the individual student.

5. Costs of production are relatively low.

6. It is easy to update tape/slide material.

9.3 The SCONUL tape/slide project

9.3.1 In Chapter 4, it was seen that tape/slide presentations were used in many British university libraries, both for teaching groups and for teaching individual students. The growing interest in the use of tape/slide material for library instruction, in Britain, may be partly due to the SCONUL (Standing Conference on National and University Libraries) Tape/Slide Project. In 1970 SCONUL set up a Working Group on Tape/Slide Guides to Library Services, with the aim of producing a number of tape/slide guides on services available in libraries.
These guides were to be produced on a cooperative basis by a group of three libraries - with one library acting as the producer, and the other two as consultants - giving advice and criticism on the scripts and photographic material. (Earnshaw 1973). The SCONUL guides cover subjects such as "Introduction to Information Retrieval", "Guide to the Use of Chemical Abstracts", and "Guide to the Use of Literature in Medicine and Related Subjects".

Ten tape/slide presentations were produced in the first round of productions, (SCONUL Newsletters, 1972, 1973 (a) 1973 (b)).

9.3.2 The OSTI tape/slide evaluation project

In 1973, with the aid of a grant from the Office for Scientific and Technical Information (OSTI), a two-year project was set up between the Institute for Educational Technology and the Library at the University of Surrey, to investigate the preparation and evaluation of tape/slide guides for library instruction. Much of the work of the project has been concerned with the formulation of objectives for second round tape/slide productions, and evaluation of the guides. (University of Surrey. OSTI Tape/Slide Evaluation project reports 1973, 1975.)

Cooperation between the OSTI Evaluation Group at Surrey and research workers on the Library USER Project at Chalmers University of Technology, started in 1973, in connection with studying the use of the SCONUL tape/slide guides in Sweden.
9.4 The experimental use of SCONUL tape/slide guides in Sweden

9.4.1 During the spring and autumn of 1973, it was decided to make use of a number of SCONUL tape/slide productions for library instruction in Sweden.

9.4.2 At the Biomedical Section of Gothenburg University Library
Two tape/slide presentations - "Guide to the Use of Literature in Medicine and Related Subjects" and "Introduction to Information Retrieval" have been used in two separate postgraduate medical courses at the Biomedical Section of the Gothenburg University Library. The guides were used for group instruction (group size 20 - 25 postgraduate students). No formal evaluation was carried out, but informal discussions led to the impression that the tape/slide guides were very popular with the majority of the participants. They were particularly enthusiastic about the subject-orientated guide as teaching material. Perhaps the most convincing proof of the interest aroused was that the Library received requests to show the tape/slide presentations to individual hospital departments. There, they were shown to groups of postgraduate research students and practising clinicians at seminars on information retrieval.

9.4.3 At Chalmers University of Technology Library
Use has been made of several tape/slide guides - "Introduction to Information Retrieval", "Guide to the Use of Chemical Abstracts", "A Basic Guide to the Use of Beilstein" and "Guide to the Use of Literature in
Medicine and Related Subjects" - at courses for postgraduate students from Chalmers University of Technology, Gothenburg, and students from Gothenburg University. Again, the students liked this teaching medium as did undergraduates from Chalmers, who took part in a course of library instruction.

9.4.4 At the Swedish College of Librarianship, Borås
Tape/slide material has also been used regularly during 1973 and 1974 in the teaching of final year library school students at the Swedish College of Librarianship, Borås. These students, in the majority of cases, possessed no specialized scientific training. The guides were used both for group presentation of new subject areas and as a means of individual instruction - making use of a "Diavision apparatus" and sets of headphones. Again the presentations proved popular as a method of instruction.

9.5 A quantitative evaluation of tape/slide material
9.5.1 Experience of the use of tape/slide material, described above, gave the impression that students liked this teaching medium, and in view of the number of SCONUL tape/slide guides now available for use and their possible applications in Sweden, it was decided to carry out quantitative evaluations of their effectiveness as teaching material. At the same time, users were asked to complete a questionnaire on their views of the tape/slide guide. Amongst other things, information was sought on whether or not the use of tape/slide
guides with an English or Swedish text markedly affects the "immediate learning effect" of the material when used by Swedish students.

9.5.2 Method

For the purpose of the first evaluation, a general tape/slide guide was chosen - "Guide to Abstracting and Indexing Services" produced by the University of Surrey Library. The first evaluation tests were carried out, during the autumn term 1973, on a group of 90 final year library school students from Borås - this particular tape/slide guide was intended for teaching library school students, and preliminary evaluation measurements had been carried out on a corresponding group of students at the North London Polytechnic Library School. The tape/slide guide used was the English version - both photographic material and test were in English.

In the spring term, 1974, a second evaluation test was carried out on an identical group of 90 final year library school students - at exactly the same point in their training. (Intake at the Swedish College of Librarianship, Borås, takes place twice yearly). Conditions were, as nearly as possible, completely identical with those of the first evaluation test. The only factor that was changed was that the text, together with the pre- and post-instruction questionnaires, had now been translated into Swedish.

The tape/slide guides were used in a group-instruction situation (group size 20 - 25 students). The use of
the material was described, and students were given a questionnaire (in Swedish) about what they thought about this teaching method and the particular tape/slide production (See Appendix 1, Chapter 9). This questionnaire was based on that recommended in the SCONUL booklet "Tape/Slide presentations" (Earnshaw, 1973), in order to facilitate comparisons with similar "attitude" measurements being carried out in England. (See Appendix 2, Chapter 9). The purpose of the instruction and the learning objectives were described. Students were asked to read through the questionnaire, but not to complete it until after the tests.

A pre-instruction test was then given to the students, the tape/slide material was shown, and a post-instruction test - identical with the pre-test - was completed. The pre- and post-instruction tests had been designed and developed by Laurie Turner at the Institute for Educational Technology at the University of Surrey. The test consisted of 12 questions: 1 and 3 were "identification" tests - for example students were asked to label correctly a number of samples as "index", "abstract", or "neither"; the remainder of the questions were of the straightforward question and answer type. (See Appendix 3, Chapter 9). The pre- and post-instruction tests enabled the "immediate learning effect" of this particular tape/slide to be measured, for the two groups of students - group E using entirely English material, and group S using the same material with a Swedish commentary.
9.5.3 "Immediate learning effect"

The results of the two groups - E - English text and S - Swedish text - can be seen in Table I and Fig. 1. Results obtained for each question were expressed in terms of the McGuigan Gain Ratio:

\[
\frac{\text{Mean actual gain}}{\text{Mean possible gain}} = \frac{Y - X}{T - X}
\]

where \( X = \) mean group pre-test score, \( Y = \) mean group post-test score, and \( T = \) maximum possible score. (McGuigan and Peters, 1965).

It can be seen that there is a higher value for "immediate learning effect" in the S group, with the exceptions of questions 3, 4 and 6. Question 3 of the "identification" type showed the same values for E and S groups. Question 4 referred to the differences between "informative" and "indicative" abstracts and, in view of the results obtained for the other questions, it was surprising to see such a marked decrease - from 0.54 - 0.20 - in learning effect, when the text was in Swedish. Detailed examination of the Swedish text revealed that the translation was inadequate and, in fact, did not clearly bring out the differences between the two types of abstract.
### TAPE/SLIDE PRESENTATION 'ABSTRACTING AND INDEXING SERVICE' FOR SWEDISH LIBRARY SCHOOL STUDENTS

<table>
<thead>
<tr>
<th>E English text</th>
<th>S Swedish text</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Actual gain</strong></td>
<td><strong>Actual gain</strong></td>
</tr>
<tr>
<td><strong>Possible gain</strong></td>
<td><strong>Possible gain</strong></td>
</tr>
<tr>
<td>1) 0.33</td>
<td>0.50</td>
</tr>
<tr>
<td>2) 0.78</td>
<td>0.92</td>
</tr>
<tr>
<td>3) 0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>4) 0.54</td>
<td>0.20</td>
</tr>
<tr>
<td>5) 0.56</td>
<td>0.94</td>
</tr>
<tr>
<td>6) 0.46</td>
<td>0.67</td>
</tr>
<tr>
<td>7) 0.71</td>
<td>0.61</td>
</tr>
<tr>
<td>8) 0.53</td>
<td>0.56</td>
</tr>
<tr>
<td>9) 0.79</td>
<td>0.94</td>
</tr>
<tr>
<td>10) 0.42</td>
<td>0.68</td>
</tr>
<tr>
<td>11) 0.59</td>
<td>0.68</td>
</tr>
<tr>
<td>12) 0.75</td>
<td>0.99</td>
</tr>
<tr>
<td>Mean 0.54</td>
<td>0.64</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sample size</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>.90</td>
<td>.90</td>
</tr>
</tbody>
</table>

Table 1. Actual gain/Possible gain - "learning effect" for tape/slide material "abstracting and indexing services".
Fig. 1 RATIO BETWEEN ACTUAL GAIN AND POSSIBLE GAIN FOR TAPE SLIDE PRESENTATION "ABSTRACTING AND INDEXING SERVICES"
9.5.4 Attitude questionnaire

The speed of presentation of the tape/slide material appeared to be fairly satisfactory for both E and S groups of students, as can be seen in Fig. 2, which shows how the students regarded speed of presentation for the beginning, middle and end of the guide. It can be seen that speed of presentation presented few problems for the students using the English text version - results were very similar for both groups of students.

Students were asked if they would have liked to be able to stop the tape/slide presentation for various purposes and their responses to this question are shown in Table II. Many of the students - over 80% in both E and S groups - said that they would have liked to have had the opportunity of stopping the presentation, either sometimes or often, in order to make notes. This suggested that they would have preferred to use the material for individual instruction. However, a question about this produced the somewhat surprising result that 60% of the E (English text) group preferred group instruction, 16% preferred individual instruction and 24% did not have any marked preference. The corresponding figures for the S (Swedish text) group were 50% preferred group instruction, 28% preferred individual instruction and 19% had no marked preference.
Fig. 2 SPEED OF PRESENTATION

- English text
- Swedish text

Beginning

Middle

End

Very slow       Slow       Just right     Fast       Too fast
Fig. 3 HOW DO YOU REGARD THE LENGTH OF THE PRESENTATION?

Fig. 4 WAS THE PRESENTATION EASY OR DIFFICULT TO UNDERSTAND?
Would you have liked to stop the presentation?

<table>
<thead>
<tr>
<th></th>
<th>Often</th>
<th>Sometimes</th>
<th>Seldom</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>E</td>
<td>S</td>
<td>E</td>
<td>S</td>
</tr>
<tr>
<td>To make notes</td>
<td>10</td>
<td>11</td>
<td>73</td>
<td>73</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>8</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>To think about the</td>
<td>12</td>
<td>1</td>
<td>48</td>
<td>40</td>
</tr>
<tr>
<td>information given</td>
<td>21</td>
<td>25</td>
<td>11</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>For a pause</td>
<td>17</td>
<td>6</td>
<td>50</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>1</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>For other reasons</td>
<td>0</td>
<td>4</td>
<td>30</td>
<td>46</td>
</tr>
</tbody>
</table>

Table II. Wish to stop the presentation

The contents of the information presented can be examined from a quantitative aspect - with regard to the length of presentation, or from a qualitative aspect - with regard to ease of understanding. The students' views on the quantitative aspects of the presentation are shown in Fig. 3, and on the qualitative level in Fig. 4. Results are, again, very similar for both groups. A more detailed analysis of the qualitative contents of this tape/slide presentation can be seen in Table III, which gives the students' reactions to the different parts - beginning, middle and end - of the production. It can be seen that 80% of the students in both E and S groups considered the presentation to be either "interesting" or "very interesting" throughout its length.
Table III. Students' view on qualitative content of tape/slide presentation

Questions were asked about the technical presentation of the tape/slide guide, with respect to both photographic material and sound. 19% of the total of 180 students made adverse comments on the quality of the photographic material - mostly about the colour effects such as blue text on a black background. The use of too many "general" type pictures, showing a borrower asking questions of a librarian, was also criticised. One student commented unfavourably on the choice of a girl for the role of the unknowledgeable borrower and a man for the role of the well-informed librarian. Students in both groups were well-satisfied with the sound-voice part of the presentation - only 2% in each group expressed dissatisfaction.

A question about whether, or not, the apparatus used was found to be distracting, gave the answer that few - 9% -
of the students found the equipment used (projector and tape recorder) to be, in any way, distracting.

Students were also asked whether, or not, they would prefer to have the text in Swedish or in English. 70% of the E group (using English text) said that they would prefer to have the text in Swedish.

It was also asked whether the students had enjoyed this particular tape/slide presentation as a whole. From Fig. 5, it can be seen that a clear majority of students - about 90% - were positive in their attitude to this guide of abstracting and indexing services.

Having examined the students' attitudes to this specific tape/slide presentation, in some detail, it was interesting to obtain their views on the usefulness of this medium for presenting this type of information. The results of this can be seen in Fig. 6. A clear majority of students in both groups (83% in E and 85% in S) thought that this was a useful method for presenting this type of information.

### 9.6 Discussion

In view of the fact that there were some 10 completed SCONUL first round tape/slide guides, plus a number of other tape/slide presentations with English text, it was of importance to see whether these English text tape/slide productions could be used successfully for teaching purposes in countries where English is not the mother tongue. Further, it is of importance to know whether
Fig. 5  DID YOU ENJOY THIS PRESENTATION?

Fig. 6  DO YOU THINK THIS IS A GOOD METHOD FOR TEACHING THIS TYPE OF INFORMATION?
the English text productions can be used directly, or whether they must first be translated into the language of the users.

The results of the evaluation tests, carried out in Borås, show that, even when the tape/slide production was used directly, without any translation, there was a considerable "immediate learning effect". Mean values for the McGuigan ratio of actual gain/possible gain were 0.54. The McGuigan ratio increased when students saw the same presentation with a Swedish text - 0.64. If this value is corrected by removing the result for question 4, which was affected by faulty translation, the value of 0.68 is obtained, and one can see that it was an advantage for these students to have access to a Swedish text. However, the increase in size of the "immediate learning effect" is relatively small, when compared with the initial gain, obtained when using a production with English text. One can conclude that, in the absence of adequate translations, it is fully justifiable to make use of English language material for user instruction in Sweden.

When it is considered that the estimated time for making a tape/slide presentation of this type is approximately 350 man hours (Palmer, 1972), it seems that a practical alternative to the production of a complete new series of Swedish tape/slide presentations, is to make use of existing SCONUL guides, preferably giving them a Swedish text commentary. Translation needs to be done carefully, but the costs involved are far less than those incurred
in the production of new material. The SCONUL Tape/Slide Project is a stimulating example of inter-library cooperation within the field of user instruction and it would be very worthwhile if this cooperation could be extended and become international. In Sweden, it is intended to purchase copies of all SCONUL Tape/Slide Guides at the Chalmers University of Technology, Gothenburg, and these copies will be available for short loan to libraries wishing to see the presentation before making their own purchase.

The importance of careful evaluation of this type of teaching material is clearly shown in the "immediate learning" results for question 4, where there was an apparent poorer gain with Swedish text as opposed to English text. In spite of control, inadequate translation of the commentary had occurred, and this resulted in learning difficulties. This illustrates the need for detailed evaluation of each unit of information to be taught.

Swedish user reactions to the tape/slide medium were very positive. About 90% of the students said that they had enjoyed (to some extent) from "fairly" to "very much" this particular presentation on abstracting and indexing services. When asked for their opinions on the usefulness of this audio-visual medium for the teaching of this type of information — that is, when it can be conveyed in discrete units, step by step, or page by page — over 80% of the students concerned in the evaluation tests were positive. These quantitative
measurements confirmed the views given, in the informal
discussions, after the various courses described earlier.

9.7 Conclusions
It can be concluded from the experience gained from the
use of tape/slides in the various Swedish courses
described, and from the quantitative evaluation, that
user reactions to this type of audio-visual material
for library instruction are positive. In addition,
it has been shown that it is fully justifiable to use
English language tape-slide guides "directly" without
translation, for Swedish users. This results in a
considerable "immediate learning" effect. Carefully
controlled translation of the audio tape commentary,
further increases this effect.

As a result of these studies, it was decided to make
use of tape/slide material for library instruction,
in both the undergraduate and postgraduate information
retrieval courses at Chalmers University of Technology
Library.
Chapter 10

STUDIES OF UNDERGRADUATE ATTITUDES TO THE INTRODUCTORY COURSES IN INFORMATION RETRIEVAL GIVEN AS PART OF THE LIBRARY INSTRUCTION PROGRAMME

10.1 Introduction

The attitudes and opinions of the undergraduate engineering students who took part in the introductory 14 hour courses in information retrieval were sought in order to provide immediate information about various aspects of the course. Information was sought on the students' opinions with regard to course content, the instructional material provided, the teaching methods used, and the organization of the course.

The undergraduate courses in information retrieval were compulsory for students from the Schools of Architecture, Civil Engineering, Engineering Physics and Mechanical Engineering, whereas the course for students from the School of Electrical Engineering was non-compulsory.

10.2 Method

At the end of each course, students were given a three page questionnaire, which covered such points as their opinions on the course as a whole and the content, together with more detailed questions on the instructional material -compendia- provided and the teaching methods used - lectures, demonstrations, and practical exercises, and the organization of the course. They were also asked if any parts of the course should be increased/decreased, and they were asked to make other suggestions
The purpose of the evaluation was explained (many of the courses at Chalmers University are subject to evaluation, so the students are accustomed to completing such forms). It was also pointed out that the answers were to be anonymous. The students were very cooperative in leaving completed evaluation forms; in some of the groups spontaneous discussions arose as to ways in which the library could be improved. However, in the case of students from the School of Architecture - where courses were held for three groups of approximately 20 students - there was a failure to collect the completed evaluation forms from one group, due to a misunderstanding between the teachers concerned. So in this case, the results have been calculated from the returned forms - 41 - from the two other groups.

The undergraduate courses in information retrieval took the form of concentrated two day courses. The timing of these courses was adapted to fit in with the general undergraduate timetable. The academic year, at Chalmers University, is divided into two terms - an autumn-winter term and a spring-summer term. Each term is divided into two 7-week study periods. Courses in information retrieval were mostly placed in the first two weeks of each study period. However, demand was sometimes so great that "extra" courses were given during other weeks. The students' evaluation forms were collected directly after each course, and analyzed as soon as possible, after each main two week period. In this way, student reactions to the first series of courses could be made use of in planning subsequent courses and so on.
COURSE EVALUATION
COURSE IN INFORMATION RETRIEVAL FOR UNDERGRADUATES 1974/75

Tick the appropriate square.

Date ........................................

Section ......................................

Year of study ..............................

1. Overall gain from the course was:

1. Nothing [ ]

2. Little [ ]

3. Satisfactory [ ]

4. Good [ ]

5. Very good [ ]

II. Which do you prefer?

a) A concentrated 2-day course in information retrieval [ ]

b) A widely spread course in information retrieval e.g. 2 hours/week over several weeks. [ ]
### III. Evaluation of separate details

<table>
<thead>
<tr>
<th></th>
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<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Course coverage of the areas expected was:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Division of time between practical exercises, demonstrations and lectures was:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Compendium scientific a. communication was:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Guide to the literature was:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Compendium introduction to computer based information retrieval was:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Lectures were:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Demonstrations were:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Practical exercises were:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Administrative org. of course was:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### IV. The following parts of the course should be:
- Increased ........................................
- Reduced ...........................................
- Withdrawn ........................................
- Added ... ........................................

### V. Additional comments ........................................
- ....................................................................
- ....................................................................
- ....................................................................
- .....................................................................
10.3 Results

10.3.1 The record of students attitudes to the various aspects of the courses on information retrieval will be expressed in terms of study period in which the course was held - 1, 2, 3 and 4, and in terms of the groups of students concerned. Schools of Engineering are represented by the following symbols:

- Architecture ............. A
- Civil Engineering .......... C
- Electrical Engineering ..... E
- Engineering Physics ....... P
- Mechanical Engineering ... M

In the first and second study periods the student numbers included some very small groups - 11 from M in period 1, and 5 from P in period 2, so the total student responses were noted for these periods. However, it was seen that the responses of the group largely made up of electrical engineering students, taking a voluntary course, differed so much from the other groups, that, in addition, the responses of this group were examined separately, in order to allow comparisons with a later group of electrical engineering students taking a voluntary course.

The responses of the different groups are expressed in percentages, in order to allow comparisons to be made. The actual numbers of students concerned are shown below:

<table>
<thead>
<tr>
<th>Period</th>
<th>C</th>
<th>M</th>
<th>P</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>56</td>
<td>11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>34</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>35</td>
<td>49</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>33</td>
<td>22</td>
<td>41</td>
<td></td>
</tr>
</tbody>
</table>
10.3.2 Overall gain

Students were asked to state their opinions as to "overall gain" from the course. Responses can be seen in Table I:

<table>
<thead>
<tr>
<th>GROUP</th>
<th>Nothing</th>
<th>Little</th>
<th>Satisfactory</th>
<th>Good</th>
<th>Very good</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.) M + C</td>
<td>0</td>
<td>4</td>
<td>35</td>
<td>46</td>
<td>15</td>
</tr>
<tr>
<td>2.) E + P</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>56</td>
<td>36</td>
</tr>
<tr>
<td>2.) E</td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>53</td>
<td>38</td>
</tr>
<tr>
<td>3.) E</td>
<td>0</td>
<td>0</td>
<td>15</td>
<td>53</td>
<td>32</td>
</tr>
<tr>
<td>3.) M</td>
<td>2</td>
<td>0</td>
<td>24</td>
<td>59</td>
<td>14</td>
</tr>
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<td>4.) C</td>
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<td>24</td>
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<td>13</td>
</tr>
<tr>
<td>4.) A</td>
<td>0</td>
<td>44</td>
<td>41</td>
<td>17</td>
<td>0</td>
</tr>
</tbody>
</table>

Table I. Overall gain from course in information retrieval.

As can be seen from Table I, the electrical engineering students attending an optional course were those with the most positive degree of overall gain, whilst the architecture students, from the first year of studies showed much less "overall gain" than the third and fourth year civil and mechanical engineering students and the third and fourth year students of engineering physics. Courses for the latter four groups were compulsory. There was a marked positive swing in the later courses as compared with those of the first study period.
10.3.3 Course timetable
Students were asked whether they preferred concentrated two-day courses or courses spread out over a longer period. The majority of students preferred the concentrated type of course - figures ranged between 73% and 97% for the different groups. The question was complicated by problems of time-tabling. In cases where collisions had occurred, as in the case of the students of engineering physics in period 4, there was greater dissatisfaction with the two-day concentrated course. Many of the students requested that the courses in information retrieval should be fitted into the regular timetable, rather than placed as overlapping courses. A number of suggestions for time-tabling were put forward.

10.3.4 Course content
With regard to course content, students were asked whether the coverage agreed with their expectations. Responses can be seen in Table II.

<table>
<thead>
<tr>
<th>GROUP</th>
<th>Very good</th>
<th>Good</th>
<th>Satisfactory</th>
<th>Hardly satis.</th>
<th>Unsatisfactory</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.) M + C</td>
<td>7</td>
<td>62</td>
<td>33</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2.) E + P</td>
<td>36</td>
<td>56</td>
<td>8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2.) E</td>
<td>41</td>
<td>50</td>
<td>8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3.) E</td>
<td>35</td>
<td>51</td>
<td>12</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3.) M</td>
<td>18</td>
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<td>22</td>
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<tr>
<td>4.) C</td>
<td>15</td>
<td>70</td>
<td>15</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4.) P</td>
<td>8</td>
<td>74</td>
<td>13</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>4.) A</td>
<td>0</td>
<td>17</td>
<td>53</td>
<td>22</td>
<td>5</td>
</tr>
</tbody>
</table>
With the exception of the architectural students, most of the students appeared to be satisfied with the course content, in that it met with their expectations.

Information as to course content had been printed in the "Handbook of studies" and information had also been distributed to individual students, and posted on the notice boards.

10.3.5 Organization of course

Students were asked their opinions on the division of time between practical exercises, demonstrations and lectures, and these opinions can be seen in Table III:

<table>
<thead>
<tr>
<th>GROUP</th>
<th>Very good</th>
<th>Good</th>
<th>Satisfactory</th>
<th>Hardly sat.</th>
<th>Unsatisfactory</th>
</tr>
</thead>
<tbody>
<tr>
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<td>6</td>
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<td>0</td>
</tr>
<tr>
<td>2.) E + P</td>
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<td>0</td>
</tr>
<tr>
<td>2.) E</td>
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<td>71</td>
<td>15</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3.) E</td>
<td>18</td>
<td>68</td>
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<td>0</td>
</tr>
<tr>
<td>3.) M</td>
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<td>55</td>
<td>29</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>4.) C</td>
<td>12</td>
<td>54</td>
<td>30</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>4.) P</td>
<td>9</td>
<td>86</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4.) A</td>
<td>0</td>
<td>20</td>
<td>59</td>
<td>12</td>
<td>7</td>
</tr>
</tbody>
</table>

Table III. Opinions on division of time between various parts of course.
The initial series of courses in the first study period contained four lectures and one hour of demonstrations. Students commented that they would like to have the number of lectures decreased and the time for demonstrations of the aids for information retrieval increased. So, in the series of courses from period 2 onwards, one lecture was omitted and the extra time used for demonstration purposes. This resulted, as can be seen in Table II in greater satisfaction. The first year architecture students were however less satisfied than the other groups of students.

10.3.6 Teaching material

Students were then asked to give their opinions on the course material: three compendia - "Scientific communication", "A guide to the literature in (specific subject)", and an "Introduction to computer-based information retrieval". Students views as to this material can be seen in Tables IV, V and VI:

<table>
<thead>
<tr>
<th>GROUP</th>
<th>Very good</th>
<th>Good</th>
<th>Satisf.</th>
<th>Hardly satisf.</th>
<th>Unsatisf.</th>
<th>No opinion</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2.)E + P</td>
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<td>56</td>
<td>42</td>
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<td>0</td>
</tr>
<tr>
<td>2.)E</td>
<td>6</td>
<td>53</td>
<td>44</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3.)E</td>
<td>18</td>
<td>50</td>
<td>29</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3.)M</td>
<td>4</td>
<td>47</td>
<td>45</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4.)C</td>
<td>6</td>
<td>52</td>
<td>42</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4.)P</td>
<td>4</td>
<td>52</td>
<td>43</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4.)A</td>
<td>0</td>
<td>17</td>
<td>44</td>
<td>15</td>
<td>5</td>
<td>19</td>
</tr>
</tbody>
</table>

Table IV. Opinions on compendium "Scientific communication"
<table>
<thead>
<tr>
<th>GROUP</th>
<th>Very good</th>
<th>Good</th>
<th>Satisfactory</th>
<th>Hardly satis.</th>
<th>Unsatisf.</th>
<th>No opinion</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2.) E + P</td>
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<td>42</td>
<td>33</td>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2.) E</td>
<td>32</td>
<td>38</td>
<td>30</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>3.) E</td>
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<td>3</td>
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<td>0</td>
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<tr>
<td>3.) M</td>
<td>14</td>
<td>55</td>
<td>29</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4.) C</td>
<td>18</td>
<td>45</td>
<td>30</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>4.) P</td>
<td>14</td>
<td>50</td>
<td>36</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4.) A</td>
<td>5</td>
<td>24</td>
<td>44</td>
<td>10</td>
<td>2</td>
<td>15</td>
</tr>
</tbody>
</table>

Table V. Views on the "Guide to literature in ..."

<table>
<thead>
<tr>
<th>GROUP</th>
<th>Very good</th>
<th>Good</th>
<th>Satisfactory</th>
<th>Hardly satis.</th>
<th>Unsatisfactory</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>2.) E + P</td>
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<td>38</td>
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<td>0</td>
</tr>
<tr>
<td>2.) E</td>
<td>9</td>
<td>56</td>
<td>35</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3.) E</td>
<td>9</td>
<td>44</td>
<td>38</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>3.) M</td>
<td>0</td>
<td>43</td>
<td>57</td>
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<td>2</td>
</tr>
<tr>
<td>4.) C</td>
<td>3</td>
<td>45</td>
<td>45</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>4.) P</td>
<td>0</td>
<td>52</td>
<td>47</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table VI. Views on the compendium "Introduction to computer-based information retrieval".
From the Tables IV to VI, it can be seen that the most popular of the written materials provided was the "Guide to the Literature in the different subject fields". These compendia differed for each group, but were constructed round a common basic plan. In the case of the last question, a number of the students pointed out that it was not much use being taught about computer-based information retrieval, if there was no possibility of seeing this demonstrated by the use of a terminal. The undergraduates from the School of Architecture were not provided with the compendium on computer-based retrieval as it was felt that this would be more relevant at a later stage in their studies.

10.3.7 Teaching methods
Reactions to the various teaching methods: lectures, demonstrations and practical exercises were then examined. The lectures throughout the courses, with the exception of those for the architectural students, were given by the same lecturer. Demonstrations were given by four members of the library staff, who were also responsible for leading the practical exercises.
<table>
<thead>
<tr>
<th>GROUP</th>
<th>Very good</th>
<th>Good</th>
<th>Satisfactory</th>
<th>Hardly satis.</th>
<th>Unsatisfactory</th>
</tr>
</thead>
<tbody>
<tr>
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<td>31</td>
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<td>1</td>
</tr>
<tr>
<td>2.) E + P</td>
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<td>74</td>
<td>21</td>
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<td>0</td>
</tr>
<tr>
<td>2.) E</td>
<td>6</td>
<td>71</td>
<td>23</td>
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<td>0</td>
</tr>
<tr>
<td>3.) E</td>
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<td>79</td>
<td>9</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3.) M</td>
<td>14</td>
<td>45</td>
<td>39</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>4.) C</td>
<td>12</td>
<td>55</td>
<td>36</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4.) P</td>
<td>9</td>
<td>61</td>
<td>30</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4.) A</td>
<td>0</td>
<td>5</td>
<td>56</td>
<td>29</td>
<td>7</td>
</tr>
</tbody>
</table>

Table VII. Opinions on lectures

<table>
<thead>
<tr>
<th>GROUP</th>
<th>Very good</th>
<th>Good</th>
<th>Satisfactory</th>
<th>Hardly satis.</th>
<th>Unsatisfactory</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.) M + C</td>
<td>3</td>
<td>38</td>
<td>53</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>2.) E + P</td>
<td>8</td>
<td>74</td>
<td>18</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2.) E</td>
<td>9</td>
<td>71</td>
<td>21</td>
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</tr>
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<td>3.) E</td>
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<td>9</td>
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<td>3.) M</td>
<td>8</td>
<td>55</td>
<td>35</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4.) C</td>
<td>9</td>
<td>61</td>
<td>27</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>4.) P</td>
<td>9</td>
<td>56</td>
<td>32</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4.) A</td>
<td>7</td>
<td>22</td>
<td>49</td>
<td>20</td>
<td>0</td>
</tr>
</tbody>
</table>

Table VIII. Opinions on demonstrations.
Table IX. Opinions on practical information retrieval exercise

Students reacted most favourably to the practical literature search, but even the lectures and demonstrations were regarded as "very good", "good" or "satisfactory" by the vast majority of students. The architectural students proved an exception to these general findings. It can be seen that there was a shift in the direction of more positive reactions from the early courses of the first study period, particularly with respect to the demonstrations. The period of time allotted to demonstrations in the first series of courses was one hour. This was subsequently increased, at the expense of the lectures, to two hours, and this allowed for more thorough demonstrations of the abstracts, indexes and bibliographic aids.
10.3.8 Course administration

During the whole of the academic year 1974/75, the courses in information retrieval were partly taught in provisional surroundings - due to rebuilding of the seminar room at the library. This resulted in many problems of organisation - far too many students in small rooms, inadequate audio-visual equipment etc. In addition, the courses in information retrieval were new and there were many difficulties in allocating space in the regular undergraduate timetable. This resulted in schedule collisions, which were particularly noticeable in certain groups. Advice in actual timing was sought from the student study councillors but, even with this help, a certain amount of overlapping occurred. Against this background, it was surprising to see how few of the students were critical of the organization of the courses. Student views are shown in Table X:

<table>
<thead>
<tr>
<th>GROUP</th>
<th>Very good</th>
<th>Good</th>
<th>Satisf.</th>
<th>Hardly satisf.</th>
<th>Unsatisf.</th>
<th>No opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.) M + C</td>
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<td>32</td>
<td>62</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2.) E + P</td>
<td>13</td>
<td>56</td>
<td>28</td>
<td>3</td>
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<td>0</td>
</tr>
<tr>
<td>2.) E</td>
<td>15</td>
<td>50</td>
<td>32</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3.) E</td>
<td>9</td>
<td>53</td>
<td>29</td>
<td>9</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3.) M</td>
<td>4</td>
<td>41</td>
<td>47</td>
<td>6</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>4.) C</td>
<td>6</td>
<td>48</td>
<td>39</td>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4.) P</td>
<td>0</td>
<td>35</td>
<td>35</td>
<td>13</td>
<td>17</td>
<td>0</td>
</tr>
<tr>
<td>4.) A</td>
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<td>12</td>
<td>32</td>
<td>32</td>
<td>17</td>
<td>3</td>
</tr>
</tbody>
</table>

Table X, Views on organization of courses.
Conditions varied considerably from group to group - thus the students of engineering physics in the fourth study period had particularly difficult timetable collisions and the architecture students had a reorganisation of their timetable which resulted in groups of about 20 instead of a maximum of 15. Groups which are too large are particularly difficult to cope with during the practical parts of the course - demonstrations and practical work - as there are too many students grouped round the tools being demonstrated and/or too many wish to use the same equipment at the same time. This leads to a general feeling of dissatisfaction which must even affect opinions on other aspects of the course. Specific problems concerning organization were often commented on in the section "further suggestions". Very few students complained of the difficult external conditions - overcrowding etc. Comments that were made were often humorous and during the actual teaching sessions students were very helpful in fixing up equipment and generally making the best of a difficult situation. They realized that these were new courses and that the difficulties being experienced would presumably disappear in the (not too distant) future.

10.3.9 Allocation of time to different parts of the course

Students were asked to say if they felt that any parts of the course should be increased. Students who had taken part in the first series of courses in study
period I, suggested that the time for demonstrations should be increased (25 students out of 67). An increase in time for the practical literature search was desired by 18 students. At the same time, 14 students suggested a decrease in the number of lectures. This resulted in a decrease in the number of lectures by one hour and a corresponding increase in time for demonstration. With regard to the practical literature searching, no increase in time allocated was possible, but reorganisation of the start of the search period with at least four librarians ready to give help to those students in difficulty, reduced the initial problems, thereby resulting in more effective search time. In the following groups of students, there were far fewer suggestions for increased demonstration time (a total of 13 out of 219). Suggestions for increased practical exercises were 22 out of 219 and for decreased amount of lectures 19 (12 from the architecture group). A number of students requested that increased time should be spent on computer-based information retrieval (16) and a few students suggested that there should be demonstrations of on-line information retrieval. Throughout the courses a growing number of students commented that they would like to have the opportunity to make active use of computer-based methods for information retrieval.

10.3.10 Additional views

Students were also asked if they had any additional
remarks or further suggestions with regard to the courses and their work at the library. 21 of the students specifically asked to have the courses fitted into their regular time-tables. This would be in the interests of both students and library staff and is at present under investigation. 18 of the students requested that the library should be open for longer hours in the evenings and/or on Saturdays and Sundays. 10 students said that they thought that the course had been useful to them, or as one put it "If one has found the way to the library, this can lead to habit. Good". 4 students requested fuller pre-course information; 2 from electrical engineering said that the course should be compulsory for all students in that School of Engineering; 2 students pointed out that it was much better to attend a course on information searching when the topic for the undergraduate thesis had been decided upon (this had been pointed out in every form of pre-course information dealt out to individual students and posted on the various notice boards round the University!) 3 students said that the course ought to have been available earlier than in the third and fourth study years.

10.3.11 Language difficulties

During the courses given in the first, second and third study periods it was observed that many of the students experienced language difficulties when carrying out their information searches. Further, it appeared that certain groups of students had greater difficulties
than others. It was decided, therefore, to ask the students to record whether or not they had language difficulties. This was carried out for the students from the Schools of Civil Engineering and Engineering Physics, who attended courses in information retrieval during the fourth study period. The first-year architecture students spent the main part of their search looking for Swedish material, so any analysis of their language difficulties would have been irrelevant. Of the students from the School of Engineering Physics 59% said that they had experienced no language difficulties, 23% had had few difficulties, and 18% a "certain amount of difficulty". On the other hand, students from the School of Civil Engineering had experienced much greater difficulty - 68% - "certain difficulties", 11% few difficulties and 18% no difficulty. These observations will be continued during the following year. It may be that students who have most of their set-course material in Swedish experience greater difficulties in information retrieval than the students who have a large proportion of their set material in the form of English texts. From a point of view of providing practical help - rearrangement of the reference books in the main catalogue hall at the library, will place an adequate supply of dictionaries, near at hand, for those people using foreign language tools for information.
10.4 Discussion and conclusions

The recording of student views and opinions on various aspects of the new courses in information retrieval provided by Chalmers University of Technology Library has been valuable from the point of view of course development. Thus as a result of early responses, lectures were reduced, demonstrations increased and part of the practical information searching exercise reorganized. The results of these measures could be seen in greater student satisfaction in subsequent courses.

Observations have shown that some of the students have considerable language difficulties during their information searches, therefore students will be asked to give an indication of such problems, and it is hoped that this can eventually lead to practical help - such as providing an adequate supply of dictionaries, and possibly to changes in teaching material.

Students from the School of Electrical Engineering, taking part in an optional course, showed a much more positive attitude to nearly all aspects of the instruction than did students taking part in compulsory courses. This is hardly surprising, as the students who choose to attend a course in information retrieval must have greater motivation than those who are compelled to attend.

The students taking part in these introductory information retrieval courses, did so during their
third or fourth study year, with one exception, that of the architecture students who came to this course during their first year at university. The actual timing of the course for the architecture students was particularly unfortunate, as the students had just completed an essay project, literature, references and all; then they had to attend a course which was supposed to teach them how to obtain information and produce a list of references. Thus they had poor motivation, and this certainly affected their opinions on the course.

Conclusions to be drawn from the student responses, so far obtained, are that the courses in information retrieval for the third and fourth year students from the Schools of Civil Engineering, Electrical Engineering, Engineering Physics, and Mechanical Engineering, are reasonably satisfactory from the point of view of the students. On the other hand, the course suitable for third and fourth year students requires considerable modification if it is to be suitable for first-year students of architecture. Thus lectures need to be fewer, demonstrations of a different type are required - more general orientation etc, and, most important, project-orientated literature searches integrated into general syllabus should be arranged. (See 16.2.4 and 17.2.2).
Chapter 11

EVALUATION OF AN INTRODUCTORY COURSE IN INFORMATION RETRIEVAL FOR UNDERGRADUATE ENGINEERING STUDENTS BY MEANS OF PERFORMANCE

11.1 Introduction

A commonly used method for measuring performance in response to an educational course is by means of examination. This involves the student in a learning situation in which he/she attempts to absorb as much information as possible about a given subject, often with the aim of retaining this for the short period necessary for passing the examination. This is particularly marked when the examination follows closely on the actual course. The advantage of the examination, from the learning point of view, is that perhaps the student will retain a certain amount of the material absorbed for examination purposes, over a longer period of time - a partial redundancy effect. The examination presents the student with a highly artificial situation which often bears little relationship to that real-life later situation in which he/she will be expected to make use of the information given in the teaching programme.

In the case of the 14 hour introductory course in information retrieval, an examination would have been a very unsuitable method for performance measurement, in that emphasis would have inevitably been placed on details of the use of bibliographic tools and the card catalogues - topics on which it is easy to set examination questions - rather than on the overall awareness
of which tools are available and when to select a particular type of aid.

For this reason, no examination was given. Performance was measured by the actual ability to carry out an information search and present the results of this in an easily understandable form. This was an attempt to make the performance measurement as similar as possible to later situations in which information searches had been carried out, as for example when working on industrial research projects.

11.2 The lists of references
Students were required to compile a list of references on their own search topic, showing the sources used and the references obtained in this way. Each student was provided with a typewritten sheet describing how to set out references, and giving examples. They were instructed to indicate the secondary and primary sources from which they obtained the references given. Thus:

Subject Catalogue Chalmers Library:
Ref.1.
Ref.2.

Engineering Index, Annual Vol. 1974:
Ref.1.
Ref.2.

British Technology Index, Annual Vol. 1974:

Electrical and Electronic Abstracts. Annual Vol. 1974:
" " " " " " " 1973
" " " " " " " 1972
These lists, showing the sources used, made it possible to see which method the student had used for his search and to allow quick checking where this seemed necessary. Thus a student might write Engineering Index 1974 - No references, and a check might reveal that the wrong search entry word had been used, so that the references had not been obtained.

Examples of lists of references are given at the end of this chapter.

It is not possible to measure success in information searching by the mere number of references obtained, for if students are searching for information on a relatively new topic, it may be difficult to find literature references. However, most of the topics set for undergraduate research projects tend to be on subjects about which a fair amount of information already exists, so that the absence of references was, in practice, seldom a limiting factor.

The lists submitted were examined with respect to correct bibliographic presentation, reasonable amount of references obtained, relevance of the references to the search topic. There was considerable variation in the standard of the lists presented for inspection - a number of them had obviously required far more than 14
hours work. Very few of the lists were "failed" (2%). These lists were returned to the students and suggestions made for improvement, in some cases the students came to the library and were shown how to work with the information tools once again, then a revised list could be submitted. Examples of literature lists are to be seen in the Appendices.

The most difficult aspect to assess was the relevancy of the references obtained. In the case of students carrying out the information search as part of their undergraduate research project, these lists were sent direct by the Library to the supervisor, who was asked for comments, only 2 supervisors complained that the students had irrelevant material, whereas some phoned the course organiser at the library to express their approval of the lists submitted by the students. In addition, a more rigorous check was carried out on one set of lists, during the 1974/75 courses, namely in electronic engineering, where the individual lists were checked by a member of staff. It was found that the vast majority of references recorded were highly relevant to the search topic. Students tended to approach the subject rather broadly, as compared with industrial engineers. It is planned to carry out similar checks within other subject fields during the 1975/76 session.

11.3 Number of references obtained in relation to School of Engineering

The number of references obtained by students from the five different Schools of Engineering who took part in
the introductory courses in information retrieval were recorded. These values can be seen in Table I:

<table>
<thead>
<tr>
<th>School of Engineering</th>
<th>Average No. of References/list</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architecture</td>
<td>13</td>
</tr>
<tr>
<td>Civil Engineering</td>
<td>15</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>17</td>
</tr>
<tr>
<td>Engineering Physics</td>
<td>21</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>17</td>
</tr>
</tbody>
</table>

Table I. Average number of references obtained

The values obtained for the average number of references per literature list show that the students from the School of Architecture, who took the course during their first year of study had fewest references. With respect to the third and fourth year students, it might have been expected that the students from the School of Electrical Engineering who took part in a voluntary course, might have had a greater number of references, than students who took part in a compulsory course, but this was not seen to be the case. Students from the School of Engineering Physics were those who obtained, on an average, the greatest number of references.

11.4 Number of references obtained in relation to purpose of search

Students were asked to indicate the purpose of their
literature search: Undergraduate research project, tutorial, or "other". The relationship between the number of references obtained and the purpose of the literature search, is shown in Table II for the different Schools of Engineering.

<table>
<thead>
<tr>
<th>School of Engineering</th>
<th>Undergrad. research project</th>
<th>Tutorial</th>
<th>&quot;Other&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architecture</td>
<td>-</td>
<td>13</td>
<td>-</td>
</tr>
<tr>
<td>Civil Engineering</td>
<td>16</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>22</td>
<td>-</td>
<td>15</td>
</tr>
<tr>
<td>Engineering Physics</td>
<td>22</td>
<td>-</td>
<td>19</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>24</td>
<td>18</td>
<td>13</td>
</tr>
</tbody>
</table>

Table II. Average number of references obtained for different purposes.

It can be seen from Table II, that those students working on their undergraduate research project obtained more references than those carrying out an information search in connection with some other type of work. This emphasizes the influence of motivation on performance in response to a given programme of education.

11.5 Conclusions

The literature lists submitted by the students, showed that nearly all the students who took part in the introductory retrieval course for undergraduates had managed to carry out a successful literature search.
The first year architecture students showed the poorest performances. This may partly be explained by the fact that they experienced less motivation than the third and fourth year students from the other Schools of Engineering. Students working on their undergraduate research project (and thereby possessing high motivation) produced the longest lists of references. These results show the importance of motivation on performance, in response to a course of instruction.

Partly as a result of this method of evaluation, it was decided to change the information retrieval course for the architecture students - offering the course later during their university studies, at a point where greater motivation was likely. (See 16.2.4 and 17.2.2.)
LITTERATURSÖKNINGSUPPGIFT

15/8 1975

Berth Olsson
Kenneth Pettersson
Christen Olsson
Sune Lindgren

För Maskinelements Institution

Litteratursökningsuppgift för examensarbete avseende Hybriddrift.

Söktmer på engelska: Flywheel
Energy Storage

Example 1. List of references
Dewey, C., Elder, F.T., Otis, D.R.

"ACCUMULATOR—CHARGED HYDROSTATIC DRIVE FOR CARS SAVES ENERGY"

Hydraul and Pneumatics (USA)
Vol. 27 No. 10 p. 180-183 (October 1974) (3 refs)

Lawson, L.J., Lockheed missiles and Space C.O. Sunnyvale, Calif. USA

"KINETIC ENERGY STORAGE FOR MASS TRANSPORTATION"

Mech. Eng. (USA)
Vol. 96 No. 9 p. 36-42 (September 1974)

Rogor, A.Ya

"HIGH—TORQUE—HYDRAULIC MOTORS AND THEIR APPLICATION IN MINING"

Russian Engineering Journal
Vol. 54 No. 2 p. 3-6 (1974)

Dzieyk, B

"MODERN HYDRAULIC MOTORS AND PUMP"

Ind. - Anz. (Germany)
Vol. 96 No. 31 (April 12, 1974)
Söderström, B. (AB Hägglund & Söner, Örnsköldsvik)

"THE ADVANTAGES OF HIGH TORQUE HYDRAULIC MOTORS"

Hydraul. Pneum. Power (G.B.)
Vol. 20 No. 231 p. 94 (March 1974)

INTERNATIONAL SOCIETY ENERGY CONVERSION ENGINEERING CONFERENCE

IECEC

Volvos Bibliotek

71 91 49 Dugger, G.L., Brandt, A., George, J.F., Perini, L.L.

"FLYWHEEL AND FLYWHEEL/HEAT ENGINE HYBRID PROPULSION SYSTEMS FOR LOW-EMISSION VEHICLES"

71 91 50 Lawson, L.J.

"DESIGN AND TESTING OF HIGH ENERGY DENSITY FLYWHEELS FOR APPLICATION TO FLYWHEEL/HEAT ENGINE HYBRID VEHICLE DRIVES"

71 91 31 Lapedes, D.E., Meltzer, J.

"AN EVALUATION OF HYBRID HEAT ENGINE/ELECTRIC SYSTEMS FOR LOW EXHAUST EMISSION POTENTIAL IN AUTOMOTIVE APPLICATIONS"

72 91 44 Gelb, G.H., Berman, B, Lipkis, R.S., Wang, T.C.

"PERFORMANCE ANALYSES OF HEAT ENGINE-BATTERY HYBRID VEHICLES"

72 01 45 Dunn, H.S., Wojciechowski, P.H.

"HIGH-PRESSURE HYDRAULIC HYBRID WITH REGENERATIVE BRAKING"
Third International Electric Vehicle Symposium
February 19-21, 1975

1:0328 75:1:29
Helling, J. et al
"HYBRID DRIVE WITH FLYWHEEL COMPONENT FOR ECONOMIC AND DYNAMIC OPERATION"
Paper 7453 (30 p, 15 fig, 15 ref.)

1:0330 75:1:31
Weber, R. et al
"FLYWHEEL ENERGY PROPULSION AND THE ELECTRIC WHEEL"
Paper 7458 (23 p, 2 fig, 19 ref.)

1:0332 75:1:33
Hagen, H. (MAN)
"THE MAN-ELECTRO BUS - PLANNING AND FIRST TESTS"
Paper 7460 (15 p, 6 fig, )

1:0333 75:1:34
Brusalgino, G. et al (Fiat Sp A)
"OUTLINE PROJECT OF A HYBRID BUS"
Paper 7461 (25 p, 17 fig, )
Clerk, R.C.
"FLYWHEEL ENERGY"
SAE Transactions, 1974
(CTH Bibl.)

Dann, Richard T.
"THE REVOLUTION IN FLYWHEELS"
Machine design, May 7, 1973
(CTH Bibl.)

Gilbert, R.R.
"FLYWHEEL FEASIBILITY STUDY AND DEMONSTRATION"
Lockheed Missiles and Space C.O. Sunnyvale Calif.
April 30, 1971 (LMSO - DOO 7915)
(genom CTH Bibl.)

Gilbert, R.R.
"FLYWHEEL DRIVE SYSTEMS STUDY FINAL REPORT"
Lockheed Missiles and Space C.O. Sunnyvale Calif.
July 31, 1972 (PB 213 342)
(Volvo Bibl.)

Gulia, N.V.
"THE DESIGN OF FLYWHEELS"
Russian Engineering Journal (No. 1, 1965)
(KTH Bibl.)

Gulia, N.V.
"A MECHANICAL - ENERGY STORAGE ACCUMULATOR"
Russian Engineering Journal (No. 3, 1970)
(Maskinel. Bibl.)
Gulia, N.V.
"ENERGY STORAGE OF SUPER FLYWHEEL"
Russian Engineering Journal (No. 12, 1972)
(Maskinel. Bibl.)

Gulia, N.V.
"GYROSCOPIC EFFECTS OF FLYWHEELS IN MACHINES"
Russian Engineering Journal (No. 7, 1974)
(Maskinel. Bibl.)

Hupkesi, Geurt
"THE FUTURE OF THE MOTORCAR ALTERNATIVE SCENARIOS"
Ekstos 223, June 1974
(CTH Bibl.)

Jutelius, Bo Gustav
"MILJÖKRAV GER ELEUSSEN NY CHANS"
Teknisk Tidskrift Nr. 8, 1975
(CTH Bibl.)

Baxter, J.W., Lawson, L.J.
"KINETIC ENERGY SYSTEMS FOR MOVING PEOPLE"
SAE, Society of Automotive Engineers (74 02 31)

Lawson, L.J.
"DEMONSTRATION OF KINETIC ENERGY WHEEL (KEW) PROPULSION FOR TROLLEY COACHES"
Lockheed Missiles and Space C.O.
(Specialrapport USA genom Ingenjörsvetenskapsäkademien)
Post, R.F., Post S.F.
"FLYWHEELS"
Scientific American (December 1973, No 6)
(CIH Bibl.)
Litteratursökningsuppgift för examensarbete avseende:

Numeriska metoder för lösning av stora differentialluktionssystem.

Eventuella söktermer på engelska: stiff ordinary differential equations, numerical methods.

I litteraturlistans skall anges:

Källa = referat/referenspublikationer, översiktsartiklar, artikel etc. samt i resp. källa erhållna referenser.

Referensen skall omfatta:
Författare (ev.), "Titel",
Tidskriftens eller motsvarande publikations namn.
Volym, årtal, häfte, sidor.

Exempel:

Science citation index 1965/69.


Ref. 2. --------- - - - - - - - - - -

Example 2. List of references
Numeriska metoder för lösning av stjälta differentialekvationssystem
Utfört delvis i samband med examensarbete

Ref. 1. Gear, C.W.
Numerical Initial Value Problems in Ordinary Differential Equations
Prentice-Hall, Englewood, Cliffs, N.J. 1971
Från ref. 11 & 12

Ref. 2. Gear, C.W.
The Automatic Integration of Stiff Ordinary Differential Equations
IFIPS Conference Proceedings 1968
Från ref. 13

Ref. 3. Gear, C.W.
Numerical Integration of Ordinary Differential Equations
Från Science Citation Index 1965-69

Ref. 4. Gear, C.W.
Automatic Integration of Ordinary Differential Equations
Comm. Acm Vol. 14 s. 176 1971
Från Science Citation Index 1971

Ref. 5. Lambert, J.D.
Computational Methods in Ordinary Differential Equations
Wiley & Sons 1973
Från ref. 12 & 13

Ref. 6. Lambert, J.D. & Shaw, B.
A Generalisation of Multistep Methods for Ordinary Differential Equations
Numer. Math. Vol. 8 s. 250 1966
Från Science Citation Index 1965-69

Ref. 7. Dahlquist, G.
Stability and Error Bounds in the Numerical Integration of Ordinary Differential Equations
KTH Nr 130 1956
Från kortregister CTH biblioteket
Ref. 8. Dahlquist, G.
   A Special Stability Problem for Linear Multistep Methods
   BIT 3, s.27 1963
   Från ref.10

Ref. 9. Dahlquist, G. & Lindberg, B.
   On some Implicit Onestep Methods for stiff systems of
   Ordinary Differential Equations
   TRITA NA 73.02 1973
   Från ref.10

Ref. 10. Lindberg, B.
   IMPEX2- a Procedure for Solution of Systems of Stiff
   Differential Equations
   TRITA NA 73.03 1973
   Från ref.12

Ref. 11. Karasalo
   A Survey of some working Algorithms for the Initial
   Value Problem
   Stencil från kurs av SAAB-SCANIA
   Från handledaren

Ref. 12. Oppelstrup, J.
   Integrationsmetoder för Ordinära Differential Ekvationer
   Inst. för tillämpad Mat. ITM arb.rapport Nr.5 1973
   Från handledaren

   A New Singlestep Implicit Integration Algorithm with A-stability
   and improved Accuracy
   Simulation July 1974
   Från 'Browsing'

   Some New Multistep Methods for Solving Ordinary Differential
   Equations
   Från 'Browsing'
Ref. 15. Ehle, R.L.
A Comparison of Numerical Methods for Solving Certain Stiff Ordinary Differential Equations
Report Nr.70, Dept. Math., Univ. of Victoria, Canada 1972
Fran ref. 10, 11 & 12

Ref. 16. Factor, R.L.
A Class of Implicit Methods for the Solution of Stiff Initial Value Problems
Progress report Nr.28-11 Systems Research Center Case, Western Reserve University, Cleveland, Ohio 1970
Fran ref. 13

Ref. 17. Guderley, K.G. & Hsu, Chen-Chi
A Predictor-Corrector Method for Certain Class of Stiff Differential Equations
Fran ref. 13

Ref. 18. Makinson, G.J.
Stable High Order Implicit Methods for the Solution of Systems of Differential Equations
Differential Equations 1969
Fran ref. 13

Ref. 19. Calahan, D.
Numerical Solution of Linear Systems with widely separated Time Constants
IEEE Proceedings nr.55 1967
Fran ref. 13

Ref. 20. Liniger, W. & Willoughby, R.A.
Efficient Numerical Integration of Stiff Systems of Ordinary Differential Equations
Ind. and Eng. Chem. Fund. Vol.9 nr.4 1970 Science Citation Index

Ref. 21. Seinfeld, J. & Lapidus, L. & Hwang, M.
Review of Numerical Integration Techniques for Stiff Ordinary Differential Equations
Industrial and Engineering Chemical Fundamentals Vol.9 nr.2 1970
Fran ref. 13 & Science Citation Index 1970
Ref. 22. Liniger, W. & Oehl, F.
A-Stable Accurate Averaging of Multistep Methods for
Stiff Differential Equations
Ref. 23. Siruråsen, S.T.
Multistep Methods with Variable Matrix coefficients for
Systems of Ordinary Differential Equations
Rapport CTH Dep. of computer sciences 1973:4
Survey of Stiff Ordinary Differential Equations
KTH Inst. for Inf. beh. (mimeogr) 1970
Ref. 25. Bickart, T.A. & Picel, Z.
High Order Stiffly Stable Composite Multistep Methods for
Numerical Integration of Stiff Differential Equations
BIT 13:3 1973
PECE Algorithms for Solution of Stiff Systems of
Ordinary Differential Equations
Ref. 27. Klopfens, R.W.
Numerical Differential Equation Formulas for Stiff Systems
of Ordinary Differential Equations
RGA Review Vol.32 s.447 1971
Ref. 28. Jain, A.K.
Some A-Stable Methods for Stiff Ordinary Differential Equations

Ref. 29. Butcher, J.C.

Order of Numerical Methods for Ordinary Differential Equations
Från Science Citation Index 1973

Ref. 30. Jeltsch, R.

Stiff stability and its relations to A₀ and A(0)-stability
Not. am Math. 21(7):A627 1974
Från Science Citation Index 1974

Göteborg som ovan

Hans Werner
12.1 Introduction

One of the most difficult tasks in evaluation is the measurement of the long-term effects of a course of instruction. This is due to several different causes: it is often difficult to track down and question individuals who have taken part in a given programme of instruction, (this increases with length of time after the original instruction), the participants have obviously been affected during a longer time period, by a variety of external factors that may well influence their answers - it is impossible to have true pre- and post-instruction test conditions where the only variable is the instruction given. Nevertheless, it is of great value for the course organisers to learn as much as possible about the knowledge of the participants in the instruction, with regard to the objectives set, at a point of time as far removed as possible from the actual time of instruction.

Courses in "information retrieval" had been given to engineering undergraduates at Chalmers University of Technology since September 1974, and it was decided to try and develop a method which would allow a certain amount of long-term measurement, with regard to the course goals and objectives. This information would provide summative evaluation on the courses given up to that point, and, as few courses ever remain the same
over the years, even provide information for the continuous development of subsequent courses in information retrieval.

12.2 Method

It was decided to make use of the method already successfully used in the studies of user needs - the telephone interview method, based on a pre-structured questionnaire. These interviews were given to a random-sample of students, who had completed the introductory course in information retrieval, from each of five Schools of Engineering - Architecture, Civil Engineering, Electrical Engineering, Engineering Physics and Mechanical Engineering. The interviews were carried out by some of the group of people who had made the interviews in the user-study investigations. Cooperation from the students was excellent; no-one refused to take part, and there was considerable interest in both the attempt at evaluation and the course in information retrieval.

In the user-studies investigations at Chalmers University, engineering undergraduates had been asked a series of questions designed to reveal their awareness of various tools for information retrieval. Students who had taken part in the course were asked the same questions - to reveal their awareness of such aids as the card catalogue, indexes, abstracts and other bibliographic tools. In addition, students were asked if they had been aware of these aids before attending the course, and if they had difficulties in their use. Under-
graduates in the earlier user study had been asked which of six methods they would use when searching for information on a subject topic new to them. This question was also asked of the students who had taken part in the courses in information retrieval.

Students were asked a series of questions designed to show if the objectives outlined in Chapter 6 had been achieved:

a) Questions on the pattern of scientific communication
b) Questions on the type of publication to be used for different types of literature search.

Students were also asked if the course had been useful or not, and why. (For details of questionnaire, see Appendix, Ch. 12)

The interviews given, took about 20 minutes each, and the people carrying out the interviews remarked on the serious attitude and helpfulness of the students, whether they had liked the course or not.

The interviews were given at the end of the 1975 summer term. Some of the students being interviewed had attended a course in September of the previous year, as students were selected from those who had completed the course during the 1974/75 academic year. The actual numbers of students interviewed were: School of Architecture (A) 11, Civil Engineering (C) 15, Electrical Engineering (E) 12, Engineering Physics (P) 7, and Mechanical Engineering (M) 9. (This represented approximately 1 in 7 of the students who had completed the course at the time of the interview.)
12.3 Interview responses

12.3.1 Awareness of tools for information retrieval

Students were asked if the Library had a series of aids for information retrieval. Their awareness of these tools can be seen in Table I. For purposes of comparison the values obtained from the engineering undergraduates in the user-survey at Chalmers are included in the columns at the right of Table I. "73 US tot" gives the values for all engineering undergraduates and "US 3/4 yr" gives the values for 3rd and fourth year students.

<table>
<thead>
<tr>
<th>Has Chalmers Main Library?</th>
<th>A</th>
<th>C</th>
<th>E</th>
<th>P</th>
<th>M</th>
<th>73 US tot.</th>
<th>US 3/4yr</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>expressed as % of those interviewed</td>
<td></td>
</tr>
<tr>
<td>Subject catalogue</td>
<td>91</td>
<td>93</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>72</td>
<td>77</td>
</tr>
<tr>
<td>Abstracts</td>
<td>36</td>
<td>87</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>25</td>
<td>27</td>
</tr>
<tr>
<td>Indexes</td>
<td>55</td>
<td>93</td>
<td>100</td>
<td>93</td>
<td>100</td>
<td>32</td>
<td>36</td>
</tr>
<tr>
<td>Bibliographic aids</td>
<td>55</td>
<td>93</td>
<td>100</td>
<td>86</td>
<td>100</td>
<td>46</td>
<td>51</td>
</tr>
<tr>
<td>Interlibrary loan service</td>
<td>55</td>
<td>80</td>
<td>75</td>
<td>71</td>
<td>78</td>
<td>36</td>
<td>41</td>
</tr>
</tbody>
</table>

Table I. Awareness of tools for information retrieval.

Students were asked if they were aware of the existence of the subject catalogue, abstracts and indexes and the interlibrary loan service before attending the course. Their replies can be seen in Table II. In Table II and subsequent Tables, the responses of the third and fourth year students from the Schools of Civil, Electrical Engineering, Physics and Mechanical Engineering will be
grouped together and expressed as percentages. The responses from these four Schools were very similar, but differed considerably from those of the first year students of Architecture, whose results have therefore, in spite of the small numbers involved, been expressed separately to allow comparisons.

<table>
<thead>
<tr>
<th>Awareness of aids before course</th>
<th>CEPM %</th>
<th>A %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject catalogue</td>
<td>60</td>
<td>18</td>
</tr>
<tr>
<td>Abstracts/indexes</td>
<td>26</td>
<td>9</td>
</tr>
<tr>
<td>Interlibrary loans</td>
<td>28</td>
<td>18</td>
</tr>
</tbody>
</table>

Table II. Awareness of various aids for information retrieval before course.

The students aware of the card subject catalogue and the abstracts and indexes were asked if they had difficulties in using these tools. 24% of the CEPM students and 60% of the A students said that they had difficulties in using the card subject catalogue. With regard to the abstract index publications - 12% of the CEPM group, and 45% of the A group said that they had difficulties. With regard to the subject catalogue - students described their difficulties as follows:

Lack of practice - 7 students
Difficult to find the right terms to search under - 7 students
Too few cross references - 4 students
Lack of consistency - 1 student
"Peculiar" classification system - 1 student
Too large subject groups - 1 student
With regard to indexes and abstracts, difficulties were described in the following way:

Difficulty in finding a suitable search term - 5 students

Lack of practice - 4 students

Different systems in different secondary publications - 2 students

Difficulties with initials of authors - 1 student (in using Science Citation Index).

Difficulty in going from the abstract number to the abstract - 1 student.

12.3.2 Subject search methods

Students were asked which of six methods they would use in searching for material on a subject topic which was new to them. Their replies can be seen in Table III, where for purposes of comparison the methods chosen by undergraduates in the earlier user-survey are included in the right hand column.

<table>
<thead>
<tr>
<th>Method used to find information</th>
<th>CEPM</th>
<th>A</th>
<th>73US</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject catalogue</td>
<td>93</td>
<td>81</td>
<td>46</td>
</tr>
<tr>
<td>Author catalogue</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Subject bibliography</td>
<td>63</td>
<td>18</td>
<td>8</td>
</tr>
<tr>
<td>Ask member of academic staff</td>
<td>47</td>
<td>81</td>
<td>18</td>
</tr>
<tr>
<td>Ask member of library staff</td>
<td>81</td>
<td>91</td>
<td>60</td>
</tr>
<tr>
<td>Ask friend/colleague</td>
<td>34</td>
<td>45</td>
<td>6</td>
</tr>
</tbody>
</table>

Table III. Methods used to search for information on a subject topic new to the user.
12.3.3 **Channels of scientific communication**

Students were asked questions to reveal their knowledge of the channels of scientific communication. Nearly all students, from all schools, (96%) were aware that information could be conveyed by spoken or written-printed channels. With regard to the time aspect of communication, 90% of the CEPM group and 72% of the A group knew that information would be published in report form earlier than in the corresponding journal article. 67% of the CEPM group, but only 18% of the A group could name one type of primary publication, and 47% of the CEPM group, as compared with 18% of the A group, could name two types of primary publication. With regard to secondary publications, the figures were: name one type - 72% of the CEPM group and 9% of the A group; name two types - 51% of the CEPM group and 9% of the A group. 91% of the CEPM group could describe the difference between abstract and index publications, whereas the corresponding figure for the A group was 27%.

12.3.4 **Use of tools for different types of literature search**

Students were asked questions about which type of information retrieval aid they would use in carrying out different types of literature search:

a) For general orientation about a new subject topic. 77% of the CEPM group said that they would use an encyclopedia or textbook, or review article. The corresponding figure for the A group was 18%.
b) Search for factual information.
74% of the CEPM group said that they would refer to handbooks, data collections or tables. The corresponding figure for the A group was 45%.

c) A current awareness search based on a given subject topic. 30% of the CEPM group said that they would make use of a current-awareness publication of the type "current-contents". The corresponding value for the A group was 18%.

The CEPM group, but not the A group, had received a brief introduction in methods of computer-based information retrieval. In response to a question as to whether this type of information search could be carried out in Sweden, (there were at that time no facilities for such searches at Chalmers University of Technology Library) 95% were aware that possibilities for this type of search were available.

12.3.5 Usefulness of course
Students were asked whether, or not, they had found the course in information retrieval useful. 100% of the CEPM group said that they had found the course useful, compared with 64% of the A group. Of the latter group 18% had found the course useful to a certain extent and 18% not useful.

Students were also asked why they had found the course useful or not. The main reasons for usefulness given amongst the CEPM group, was "Before the course I had no idea that there were these tools which could be used
to find information" - 55% of the group made this type of answer. The other reason given was "Before I went on this course I had no idea that there was a systematic pattern for finding information - I had received help, but never got any general view". 33% of the group made comments of this kind. The A students were, on the other hand, less satisfied. 82% of the A students interviewed said that the course took place at the wrong time. (It was given just after they had completed a special tutorial and had handed this in!) 45% said that the course was too long. 45% requested visits to the main Gothenburg University Library. The students suggested that a shorter course, earlier in their first year of studies would be more useful than the present type of course.

12.4 Discussion
The responses obtained from these interviews showed that there were marked success differences in an introductory course in information retrieval, dependent on the timing of the course. When the instruction was given in the third and fourth year of the undergraduate studies, the course appeared to be far more successful than when given at the beginning of the university course. This confirms previous findings (Chapter 2) and is in agreement with other evaluation methods for the introductory course in information retrieval at Chalmers University of Technology Library. (See 16.2).

It is interesting to observe that the students who have taken part in the course on methods of information
retrieval are willing to try several methods in searching for information on a subject topic new to them. It can be seen that they are not only far more aware of the functions of such tools as the subject catalogue of the library and subject bibliographies, but they are also more willing to ask the library staff for help (cf Line and Tidmarsh, 1966). In addition, they are more ready to ask members of the academic staff and their fellow students for help in their information problems. It would appear that they have learnt that there are many ways of searching for information and that it is best to use several methods at the same time.

The students in all groups had difficulties in using the subject catalogue at Chalmers Library. This may be due to either inadequate instruction or possibly to inherent weakness in the catalogue itself. Investigations have revealed that there were a number of problems concerned with the functioning of this catalogue - amongst other things there was a totally inadequate subject term index. This had led to revision of this index, in the hope that this will help to eliminate some of the difficulties encountered. The students complained specifically about problems in finding the correct search terms and the lack of cross references. Students also commented, though to a less extent, on the difficulties of using secondary publications in which the terminology differed from abstract to abstract publications. It was felt that some of these difficulties were due to language difficulties, and further investigations will
be carried out to try and clarify this.

One of the points on which students were not very clear, after instruction, was the use of current awareness publications in the attempt to keep up to date with information on a given subject topic. This is surprising when contrasted with the findings of Hakulinen (Hakulinen, 1974) concerning the value of this type of publication for medical workers. The growth of literature in medicine shows many parallels with that of the growth of literature in the natural sciences and technology. At the time of instruction, Chalmers Library did not possess the "Current Contents" series of publications, and it can perhaps be concluded that mere description of a publication is far less adequate than actual observation and use of the material in question. It may be added that the Library at Chalmers had subsequently ordered these publications and that attempts will be made to draw the attention of students to this type of information retrieval aid.

It is often stated that the ideal method for library user instruction is individual help from the information desk, when the need arises for help in specific problems. However, many of the students commented spontaneously that one of the main advantages of the course in information retrieval was that they had managed to obtain a systematic view of the process of obtaining information. They commented that they had asked for help previously and received this, but had never managed
to grasp the reason why certain tools should be used at certain times. These comments were very interesting, because they indicate that even if libraries had the economic resources for individual service in information retrieval, it would still be useful to have a course of instruction which allows the systematic approach to information retrieval to be brought out.

The realization of the systematic pattern of scientific communication and its utilization in obtaining information, together with a totally new awareness of the resources the library had to offer in this field were the main points emphasized by the students themselves, in their comments on the instruction given. This was particularly interesting in that the main goals for the programme of user instruction at Chalmers University of Technology Library had been expressed in the following way:

After completing the user education programme the student should have obtained:

1. The ability to apply the principles of scientific communication to problems of information retrieval.

2. The ability to use the various tools available in the university library (and other libraries) in order to obtain information useful in connection with studies and later work, as and when required.

3. A sense of enjoyment in information searching.
Students commented that this course in information retrieval had been one of the most useful courses that they attended at Chalmers, they commented on the realistic type of learning situation, and the fact that they had been able to carry out the work themselves, rather than having to spend time listening to lectures.

12.5 Conclusions

It can be concluded from the responses to the interview questions, that the introductory course in information retrieval for engineering undergraduates from the Schools of Civil Engineering, Electrical Engineering, Engineering Physics and Mechanical Engineering appeared to be reasonably successful. The main goals expressed in Chapter 6, were being met, as were most of the specific objectives. However, knowledge of one particular tool - the "Current Contents" series of publications - was not being successfully taught to the students. As a result of this evaluation work, it was decided to purchase these publications for Chalmers Library (previously students had been able to borrow them from some department libraries). It was planned to hold a demonstration about "Current Contents" in the course, followed by practical use during the literature search. Use of the subject catalogue presented difficulties for many students. After examination of the catalogue, it was decided to revise the subject term index, increasing the number of terms and number of cross-references, in an attempt
to eliminate some of the difficulties experienced by students.

The course could not be regarded as satisfactory for the first year architecture students - a finding in agreement with those of Chapter 10 and 11. As a result of these evaluation findings, and those of Chapter 10 and 11, it was decided to change the timing of the course, offering it for third and fourth year students - at a point where greater motivation was likely. (See 16.2.4 and 17.2.2).

Some students commented on language difficulties, in the use of secondary publications. It was decided to study the frequency of the alleged language difficulties in subsequent courses, as this was of interest for the design of other courses of study at Chalmers University of Technology.
13.1 Introduction

The course in information retrieval for the undergraduate engineering students had been evaluated in a number of different ways - by means of studies of the opinions and attitudes of the participants (Chapter 10), by means of pre-structured interviews given to a random sample of students who had attended the courses (Chapter 11), by means of performance as judged by lists of references (Chapter 12) and as part of a long term attempt to measure the effect of library instruction on the patterns of use of Chalmers University Library (Chapter 14). In these evaluation studies, a considerable amount of information had already been collected about the way in which the undergraduate course in information retrieval functioned. However, it was felt that this information could be complemented by observational studies and discussions with students participating in the instruction and the library staff responsible for the teaching. It was hoped that these "in depth" studies of the introductory course in information retrieval at Chalmers Library would provide useful information for the development of the course.

13.1.2 Illuminative evaluation

The majority of evaluation studies on library instruction have been concerned with testing educational effects under controlled conditions - described by Parlett and
Hamilton as belonging to the "classical" or "agricultural-botany" paradigm. (Parlett and Hamilton, 1972). However in a real learning/teaching situation, the controlled conditions necessary for this type of measurement very rarely exist. As Parlett points out "So many random, unpredicted, and human factors intervene that neat experimental designs cannot contain them all". (Parlett, 1974). Illuminative (or responsive) evaluation is concerned not so much with "testing" an educational programme but with "describing and understanding" the way in which the programme works, and how participants are affected by it (See Chapter 8).

As was pointed out in Chapter 8, the evaluation situation in medical diagnosis is rather similar to that in the learning/teaching situation, and the various methods used are complementary, each method can contribute information to the total picture of the situation being examined. The advantages of a combination of methods has been pointed out by, amongst others, Franke-Wiberg and Johansson, 1975, who described the traditional test methods as "providing the bones without the meat" whereas the new methods, used alone, "provide the meat without the bones" (Franke-Wiberg & Johansson, 1975):

It was hoped that observations and discussions with participants in the user instruction programme would provide an extra dimension to the evaluation studies
already carried out. For this reason, it was decided to attempt to observe and describe the reactions of the students taking part in the course in information retrieval and to carry out tape-recorded interviews with both students and teachers, to obtain their views on the course and the learning/teaching situation involved.

13.1.3 Aims of the observational studies and explorative interviews
An attempt was made to express the aims for the observational studies and interviews:

1. How is the education programme working?
   a) Are the goals and aims expressed by the course organisers being met?
   b) Is this course appropriate for the total programme of education at Chalmers University?
   c) What is it like to participate in this course as a student/teacher?

2. Do you think that this type of course would be appropriate for other groups of students?

13.2. Methods
It was decided to carry out a series of observations on the courses held during the last period of the autumn term in 1975. These courses were eight in number - 4 for mechanical engineering students and 4 for civil engineering students. One member of the library staff, Ulla, who had a degree in social-anthropology, took
part in these courses as an observer and interviewer. At the same time, a junior member of the staff, Viveka, recorded the flow of actions during the practical information search. She wrote down which of the library tools was being used, the time taken to find a reference, the times for pauses, requests for help etc.

Interviews were held with a number of students who took part in the course. These interviews were given by Ulla, with the exception of three, which I gave myself, in order to test the questions. Interviews were held in an as informal atmosphere as possible - either in the Library café or in one of the research rooms. The interviews were tape-recorded and the tapes tended to be a little "noisy" (accompanied by the clinking of coffee cups), but it was thought that the informal atmosphere was helpful to the discussion, even if this made transcription slightly more difficult. The students were very cooperative and willing to express their opinions. It was also intended to tape-record the views of the participating librarians, but they expressed a dislike for this procedure, so the interviews were not taped, but written down. The librarians said that they preferred that I carried out these interviews myself, so that they could make any suggestions for alterations directly to me, rather than through a second person.
13.3 Description of the course and observations of student behaviour

13.3.1 Lectures

The course started with two lectures "scientific communication" and the "methods for carrying out different types of literature search". These two lectures were intended to provide a stimulus for the practical work, and to ensure that the students had a grasp of some of the terms which would inevitably occur during the practical work - terms such as "abstracts" and "indexes", "a retrospective literature search" etc. The lectures were also intended to provide the theoretical concepts of the time relationships in information retrieval, and the different ways in which information can be obtained. These two lectures were held early in the morning, starting at 8.15, for a group of about 30 students, in the library seminar room - a pleasantly decorated room with adequate air-conditioning. Students tended to drop in up to 10 minutes late, so it was best to start with a few general remarks and the dealing out of the literature required for the course - a stencil on the first two lectures - this included a lot of diagramatic material, a Guide to the use of the Library, and a Guide to the Literature in Mechanical or Civil Engineering. The first two were free, but the latter had to be paid for - 10 S.Kr. Students were asked whether they would like to have the normal 2 x 45 minutes, followed by 15 minute breaks, or 45 minutes with a 5 minute break,
then another 45 minute session plus a longer "coffee break". Without exception the latter alternative was always chosen. The second lecture ended with a tape/slide presentation on "How to find out information". This was one of the SCONUL tape/slide productions (see Chapter 9) and gave an example of an information search carried out for a mechanical engineer, on the trans-disciplinary subject of the structure of the backbone of Scutisorex Thomas (the African hero shrew), in connection with the construction of a space-suit. The students were observed to be alert and reasonably interested during these first two lectures - despite the early hour, the students remained awake, asked and answered questions and laughed in the right places. These findings were in accordance with those of Chapter 10, with regard to lectures.

13.3.2 Demonstrations

After the coffee-break, at 10.15, the demonstrations, for groups of up to 15 students, began. These started with a half-hour session on Science Citation Index, a new, and at first sight, complicated tool for information retrieval. This was demonstrated by overhead illustrations, while each student had part of the publication in front of him/her. A fictitious example was shown to illustrate how it is possible to work forwards in time from a given reference. Each student was then given a similar sample - three pages photocopied from the different parts of SCI - the Citation Index, the Source Index and the Permuterm Index - and
the group worked together, systematically, through this example. This was followed by a summing up on an overhead transparency - which showed a work flow diagram for use in searching through SCI. Students were then given about five minutes to look up citations - often those to work by their own professors, or citations dealing with specific subject topics.

Ulla observed the students during these demonstrations and she summed up "All the students appeared to be interested in this publication, which practically no-one had heard of previous to the course". The objective of the demonstration was to provide an introduction to an information tool that few students had previously been aware of. As this tool differs completely from the majority of other information retrieval tools, in that one can work "forwards" from a given reference, it requires both explanation and practical use before the user realizes exactly "how it works". The demonstration was intended to provide a short introduction to the basic ways of using the index. Subsequent observation of the students, during their practical literature search, showed that many of the students had obtained a basic idea of how SCI worked, but that they needed practical experience to really learn how to use it. Their attempts could be compared to those of other library users who try to use SCI without having attended any demonstration as to its function or working principles.
In the former cases, explanations took a much longer time. For practical purposes, this demonstration of SCI had been given at the start of each demonstration period, but I began to wonder whether it might not be better to round off the demonstrations with this tool, so as to follow the logical order of an information search.

The course then continued with demonstrations of:

a) the lay-out of the library, the use of the catalogues, and the need to fill in a requisition form in a closed library.

b) general tools for information retrieval - type Engineering Index, British Technology Index and Artikkel Indeks.

c) a selection of subject orientated search tools and GRA/GRI tools for report literature.

For these demonstrations, which took place in the main reference or catalogue hall, the students were divided into groups of not more than 6 or 7, and usually about 5. Demonstrations were given by myself and one or more of three librarians, who all worked with user information services for both internal (university) or external (industrial) users. The aims of these demonstrations were to give the students a general orientation as to where to find material and how to obtain it, and to acquaint them with some of the tools for information retrieval which they would have to use during the practical work.

Quite a number of the students admitted that they had
never been inside Chalmers Library before the course, so a general short orientation of the lay-out of the library was given, and the availability of reference books such as McGraw Hills Encyclopedia of Science and Technology, and subject-based handbooks, was pointed out. Students were also shown the small "open" section of the periodicals reading room, where some 1,500 recent issues of periodicals are available for browsing. The difference between open-stack and closed-stack libraries was explained, and it was pointed out that a request form had to be filled in, in order to obtain material. The importance of giving the correct store number or place-code was explained - because otherwise the people working in the stacks would have difficulty in finding the material required. Students were shown the "example board" hanging over the catalogues, and they were told that this showed the three most usual types of form-filling, and that if they had further difficulties they could ask at the borrowing desk for assistance. (At some point in the course, the students were taken into the store and allowed to follow the progress of a request form and the selection of material (see Fig.1.). The quick turn-round time at Chalmers Library - 3 minutes - was pointed out, compared with much longer times for the bigger university libraries (again, the importance of the store-mark for correct identification and selection of material was made clear). Students were then shown the two main catalogues - the alphabetic author catalogue and the subject catalogue. The difference between the two was
Fig. 1. Selection of material in the book-store from the special requisition form.
explained and examples of how to use the subject register for the subject catalogue was shown, always making use of an example from one of the students' search topics.

General tools for information retrieval were then demonstrated - the DK-abstract catalogue, which is in card form and tends to be confused with the library catalogues. Again, examples were taken from the students' own topics. Students in the demonstration group then sat round a table and looked at three tools: Engineering Index, British Technology Index, and Artikkel Indeks. Each student had his own monthly copy of the publication, and the use of it was described with reference to the literature guide, which included illustrated examples. It was pointed out that the guide could be used for future reference, when the details learnt on the course had, perhaps, been forgotten. Examples were then chosen, from the students' topics, and all the group tried to find references, with varying degrees of success. This method was chosen to illustrate that not all information retrieval problems can be solved easily, and that whereas one tool might be very suitable for one particular problem, for example Artikkel Indeks contains considerable material on oil-platform construction, it may be less suitable for another problem. The students were observed to be interested in the demonstrations and they took an active part in looking for examples. They often remarked on possible language problems. Engineering Index and the
British Technology Index are in English, and Artikkel Indeks is in Norwegian. Students were also shown the list of periodicals held by Chalmers Library. This list exists in both book and microfiche form, and it was interesting to observe that the majority of the students used the microfiche apparatus rather than the book list.

Demonstration of the subject-based information retrieval tools included a varying number of abstracts and indexes, depending on the subject. The use of these was explained in some detail, and the demonstrations finished with an explanation of how to use the Government Reports Announcements and Indexes.

As many of the students had not previously used the library, they said that they found the general orientation useful. The visit to the book-store revealed the resources of the Library. As one student put it "I always wondered why there were so few books in the university library as compared with the public library". (The public libraries have open-shelving). Students were interested in seeing how books were obtained from the store, but many of them commented that even though the service at Chalmers is quick, it would be better to be able to go and select really useful material at first hand. Those students who have attended the course in information retrieval know why it is important to give the correct store-mark, and the head of the book-store reported that under 1974/75 there had been fewer "faulty"
loan requests passing through into the store. This may be partly due to the effect of the courses and the easily visible "Example - board", but as several factors are involved in the number of "faulty" requests passing into the store, it would be unwise to claim that these are solely dependent on the courses given.

13.3.3 The practical information search

Ulla observed that the practical literature search was the part of the course that the students appeared to enjoy best. Students had been given pre-course information which explained the purpose of the course and the practical part, which should preferably be connected with either a subject for their undergraduate project or for some seminar etc. In spite of this information, a number of students still did not have a subject of particular interest. In some cases, after discussion, they decided to come back to a later course for the practical search, in other cases, they decided to do a background study about an area in which they had thought that they would like to do their undergraduate thesis. In this way they could find out whether much work had already been done and/or whether they found the subject interesting enough for further studies. Students with a clearly defined search topic were clearly much more motivated than those "searching in general" to learn a technique. This could be observed in the way in which they tackled the actual
practical work, the energy and enthusiasm shown by those finding information of real interest for their studies was greater than those "just carrying out a search". This could also be seen in the resulting lists, as shown in Chapter 11.

At the start of the actual practical work, as many of the librarians as possible, up to 5, were available for a short period of up to half-an-hour. The purpose of this was that no student should have to wait for too long a time-period before actually obtaining some positive result from his/her search. The librarians helped students with suggestions, where necessary, such as where to start looking for material, and helped them to find dictionaries and to define their search-question fully and clearly in the language of the abstracts and indexes. Ulla observed that "the students were very quickly at work and actually finding references".

Viveka sat with a notebook and pencil and recorded the tools that various students used and the time taken to obtain the first reference. The average time, taken by the 20 students observed during different courses, to find the first reference, was 17 minutes. However, when the times for those students who had a definite search subject were compared with those who had not selected a topic, the difference was between 13 minutes and 43 minutes. In the latter group, a great deal of initial time was spent on trying to decide exactly what
subject would be interesting for a search. Of the 20 student groups observed, (sometimes the students worked singly, sometimes in pairs, or in groups of three), 6 started by using the Library's subject catalogue, 7 made use of Engineering Index, 2 used British Technology Index, 2 used Artikkel Indeks, 2 used Science Citation Index and 1 used a subject-based abstract publication as the first tool for information searching. Thus, out of the array of tools presented to them, the students had selected, in some cases with the help of a librarian, but in many cases on their own, tools which would give them a general background orientation. After the first half hour, the students worked at different speeds, so that I was able to give most of the practical help required. Students were also helped by the Information Librarian, who answers user's questions at the enquiry desk. In addition it was possible to ask the other librarians for help, if many students needed help at the same time, but this situation rarely occurred in practice.

Many students complained of language difficulties. All three observers noted that these seemed to cause the students considerable trouble. Students had difficulty in finding adequate search-terms in English. Ulla observed "that students could not make full use of the references that they found because they did not understand what the words in the title or abstract meant". Many of the students stated spontaneously that they had a need for a course in technical English.
Students had even greater language difficulties with material in German and French. Many of the students were observed to have difficulties in understanding the details of the references that they found in the various secondary publications - they had difficulty in interpreting which part referred to the journal title, volume, etc. One was heard to exclaim "Why can't all these .... publications have the same arrangement?" However these difficulties could be explained fairly quickly by the library staff and having mastered the initial difficulties, interpretation of references did not seem to cause much trouble.

Students did not appear to work chronologically through a given publication - begin with the latest annual volume and work backwards through a few annual volumes, then finish by taking the latest monthly issues. In fact it would have been very difficult to work in that way with so many students trying to use the same secondary publications at the same time. Ulla observed that the "students worked for long periods and with evident interest in what they were doing". This was borne out by Viveka's more detailed recording of the time spent by individual students on a particular publication and the time spent between pauses. The average time spent on individual information retrieval tools was 20 mins. The average time spent "without pause" was 1 hour and 20 minutes. Students often took a short break for a cup of coffee, then continued their searching. One group showed a tendency to work
right through the lunch hour - they remained hard at work even when the library staff disappeared for lunch.

Ulla summed up her observations in the following "In general, the students seemed to be positive to the course of instruction in information retrieval. Those students who had come there regarding the course as just another compulsory course - were pleasantly surprised."

The findings that the practical information search appeared to be that part of the course which the students liked best, is in agreement with the findings from the studies of student attitudes described in Chapter 10.

13.4. Students views on the course, as revealed by explorative interviews

13.4.1 During the courses, students were asked if they were willing to have their views on the course tape-recorded. This usually took place over a cup of coffee, in an informal atmosphere. The students were extremely cooperative. No-one minded being interviewed. Some of them said that they had to rush away for a lecture or lab., but offered to come back later, if necessary. The ability to express their views varied considerably, some students muttered a few words then said Ah or Mm, others were able to give much clearer descriptions of their views on what it was like to participate in the course. The purpose of the interview was explained as clearly as possible - that is, that we wished to obtain as clear a picture as possible of what it was like to
take part in this particular course.

It was intended to make the interview as open-ended and exploratory as possible, but a rough plan of possible questions was agreed on, and these were useful to start the students talking:

1. What exactly are you doing during the practical work?
2. Does this have any connection with your other courses at Chalmers?
3. What are you using for type of material?
4. Why are you using these tools for information retrieval? Why not go and look at the journals directly?
5. Is there any way in which you could find more "recent" information?
6. Were you aware that these abstracts and indexes existed before the course?
7. Had you carried out any sort of literature search before you took part in the course?
8. What type of search are you making now?
9. Have you come across any problems in the use of the material?
10. Have there been any other problems in connection with the course?
11. Was it interesting when you began to find the references? How long did it take?
12. Do you think that you could have managed to compile a list of references without instruction? Would you have taken the same length of time?
13. What did you expect of the course?
14. Was there any part that you thought was difficult?
15. What parts did you like/dislike?
16. Is there any part that you would like to study in greater detail?
17. Have you used Chalmers University Library previously?
18. If so, in what way?
19. Would you recommend this course to other students?
20. If so, why?

The interviews were subsequently transcribed. Examples from these transcripts have been selected on the basis that they are of particular interest or that they are representative of the opinions of several students. 3 of the 23 students were interviewed by myself, the rest by Ulla. In those cases where I have carried out the interview, this is indicated by (N) after the first Interviewer (I).

13.4.2 Interview responses

Of the 23 students interviewed, 19 said that they had, at some time during their university studies, made use of the reading room at the Library. Yet only 7 claimed to have carried out any form of literature search previous to the course, and not a single student claimed experience in the use of abstracts and indexes. Few of the students, 5, said that they had borrowed material from Chalmers Library. These findings are similar, in kind, to the observations from the user studies at Chalmers
(see Chapter 2) where it was seen that the vast majority of undergraduates at Chalmers University bought most of the "set course" literature required for their studies, and that engineering undergraduates did not make a great deal of use of the Library.

13.4.3 The need for orientation

One thing that emerged from these interviews was that few of the students knew how to make use of the resources available. 10 students commented on the need for an earlier orientation in library use or described their problems in this respect:

One of the students expressed this:
S: So you come into the library and it's like a jungle, lots of books and so many of them in English

Another student expressed a typical view.
S: I had had a few things that I had had to look up (perhaps for a seminar). But I had never visited the library before now:

I: Do you think that you will come back to the library and use it this year?

S: Yes, if I have to look up things for my studies, and I suppose this ....

S: Yes. I regret that I didn't come here last year.

The jungle parallel seemed popular, as can be seen from the next interview:
S: Well you can say that when we came here, one hadn't
a clue about how to start, knew nothing, like a jungle. Now we've only just got a little view into the jungle, I mean we couldn't do a really comprehensive search ... but we can at least make a start.

Another group of students from the School of Civil Engineering said that they had never used the main University Library, but that they made use of the Library of the School of Architecture (a library with open-access).

S: We just went to the shelves and looked for what we wanted, then we looked at the book and then we went on in the same way.

Students thought that an early introduction course would have been useful:

S: The fear, if you know what I mean, of going into the library would be reduced.

Yes, that's right, I didn't dare to go in there to borrow a book.

Interviewer (N) asked "You mean you really didn't dare to go in to borrow a book?"

Student "Well you know what I mean, one didn't want to try these things, because, well you'd heard that it was such a difficult business to borrow a book there, so one tried to avoid it as long as possible and borrowed books from the public library instead."

The need for an earlier introduction or orientation to the use of the library was apparent from these and many
similar interviews. Many of the students expressed this need for earlier instruction:

S: It could have been earlier (the course) in the second year or so.

Another student said:

S: It (the course) should perhaps have been earlier, in the first or second year, so that one had the chance to learn how the library worked. I knew that the books were locked up and all that, and that you had to .... but I was used to open libraries. We fumbled in the darkness really. I have sat here and seen how much I could have got out of the library. It's a bit late now.

I: Do you think that you would have used the library if you had known more about it?

S: Yes, I think so.

I: Have you carried out a literature search previously?

S: No, but after this (course), I think that one is less afraid of coming here to search. At first when one came here, one looked at the signs up there, but they didn't help a lot.

I: Would you have liked to have an earlier course?

S: Yes, for me it would have been useful, in connection with a seminar in transportation and logistics, and now there will be several essays during the autumn, so it was very necessary.

I: Do you think that you would have used the library more if you had had this course?

S: Yes I think so, Yes I had, definitely
13.4.4 Problems in connection with the course

(a) Time-table difficulties

The interviewer asked the students about problems in connection with the course.

One obvious problem, apparent from the pre-course arrangements, as well as from the interviews, was that of time-tabling, 10 students commented on this. Most of the students preferred the concentrated type of course, but a few would have preferred a couple of hours a week over a longer period.

S: Has it never been properly time-tabled?

Another student:

S: We talked about it downstairs and the best thing would be to have a definite time in the time-table for this.

We were divided into a lot of groups .... it was the only thing to do. But it has caused problems ...

Some students had missed lectures, they had worked in pairs and taken notes for each other.

The problem of time-tabled courses had been discussed with the library staff too. All participants, both staff and students were in agreement as to the need for time-tabled hours of teaching. The courses were at present partially time-tabled, in that they were placed as "overlap" courses in the main time-table, in such a way that there were few students involved in other activities.
Another problem that was apparent in all the practical work, and came up as a discussion point in most of the interviews, was the language difficulty. 11 students commented on difficulties, whereas 5 said that they had not experienced difficulty:

I: Did you have any language difficulties?
S: Yes, we have very poor knowledge of English.
S: You can manage, by reading a sentence, then you understand approximately what it's about, one can guess the meaning. Some technical terms are common to all languages.

I: How many years did you study English at school?
S: Three years in high school, let's see, nine years altogether:

He went on to say that during his studies at university he had "lost contact" with the English that he had read at school.

The interviewer asked another group of students if they had language problems, and there was an affirmative chorus.

I: What would you like to do about it (The language difficulties)?
S: Study English, specially technical and scientific English.

I: Would you like to do that? (Question directed to another student)
S2: Yes, it ought to be part of our basic training, when we start at Chalmers.

S: I don't like languages, but it's the only way to learn, being forced to, I mean. That must be the answer. There is so much when you start your undergraduate project that you have to know, so much foreign language, and well, you are in a fix.

S2: I came back from England for a couple of weeks since. I managed fine in England with my school English. When you've been there a couple of times it's easy enough to talk to people. But it's quite a different thing to sit and read technical English. I expect that it varies from School to School here.

S1: It's not really right to have to hang on to a dictionary all the time.

I: Would you like to have some course in technical English?

All the students said that they would very much like to have a course in technical English.

---------

Another student:

S: It's always a problem when you have to read English words and texts.

I: You have language difficulties?

S: You can say that again.

I: How could you help that problem?

S: Read English for a year

---------
13.4.5 Overall view of course

With regard to the course as a whole the students were positive. Most students agreed that the part they liked best was the practical literature search. However, several students pointed out that it would have been difficult to carry out the practical work without the preceding lectures and demonstrations. Only 3 of the students thought that they would have managed to complete their literature lists, if they had not had instruction. 19 of those interviewed thought that they would not have been able to do this.

I: Would you recommend this course for other students?
S: Yes I certainly would.
S2: I have a very positive impression of it, I must say.
I: Do you think it will be of use to you in industry later?
S: Yes.
I: You will come and use the library?
S: Yes, of course it's a question of where one is working, but one thing is certain, I shall use the available libraries in a different way. I intend to try and go on from here ... learn to find out more ... and practice for myself.

Interviewer to another group of students
I: Is there anything else that you would like to say about the course?
S: We say that it's good.
S1: I expected that it would just be one of those courses to sit and endure.
S2: Yes I thought that too, just another wretched course.

SI: It seems as if all of us who have been here know what it's about and now it's rather interesting to follow up things in the literature.

Of particular interest are interviews with students who had tried to carry out literature searches prior to actually coming on the course. These are illustrated by the following four transcripts:

I: You had been here at the library before, hadn't you?
S: Yes during the summer vacation.
I: Have you finished your undergraduate research project?
S: I have done about half of it. But I wouldn't have been able to manage if the other chap (his work partner) hadn't gone on the information course earlier.
I: So your friend ...
S: He knew how the catalogue worked. I had never been to the library before.
I: So your partner helped you?
S: Yes, that's right. He helped a bit - taught me how to look up things.

Another student said that he had visited the library a month previous to the course, and tried to search on his own:

S: I didn't get anywhere.
I: You didn't get anywhere? What did you do then?
S: First I came in there and saw some books, and I thought they don't have many books. Then I found out that they were just a lot of lists that you could use to look up books. Then somebody helped me, so I found a book, and I went home and read it.
I: Did you ask at the Information Desk?
S: Mm, and she helped me to find a book.
I: Just one book?
S: Well she looked in a card catalogue, and then I looked there.
I: Was it the subject catalogue?
S: Yes that's right.

I: Didn't you borrow any more books?
S: No, it seemed so meaningless.

Another of the students had actually carried out a literature search in connection with a tutorial in transportation and logistics, he described how he used the library then:
S: Well, one went about and felt a bit lost at first. Then I asked for help and came to the card catalogues and looked in them and found a few books. But it was ... well, I got a bit out of it, but not so much really.
I: Did you use the abstracts and indexes?
S: No not at all. I didn't know that ...
I: What?
S: I hadn't any idea that they existed. Well I wasn't alert enough to ask about them either.

Another student had tried to carry out an information search during the summer months:

S: I happened to be working during the summer and I needed to carry out a literature search. I went to the Department Library - Department of Transportation and Logistics - and found that there didn't seem to be much material there. Then I went to Chalmers Main Library and found that I really didn't know how to find out about things, as the books were kept in the cellar (He meant the book-store in the tower). There seemed to be such a lot of material. I had great difficulty in using the Library.

Interviewer (N). Yes.
S: There was so much, it was then I thought, even at that stage, it was beginning to be difficult.
I: So you carried out a literature search?
S: Yes, that was the first time that I had tried to do a search - in the summer months.
I: And you found it difficult?
S: I thought that it was very difficult.
I: Do you think that it will be easier after this course?
S: Yes, definitely.
The chap who was supposed to help me, at work, during the summer, he had graduated and was working in industry. I thought that he was pretty poor at looking for information. I think that it's really important, when there is such a lot of information available on all sides, to be able to make use of it. Otherwise you can carry out a lot of meaningless work.

(During the summer) we went to look at Volvo's Library, out at Torslanda, and I thought that it was a very good library. They really try to get the information out. It isn't realistic that the chap working at the bench, can keep up to date with everything. The library staff are in a better position to see the information.

I: Do you think that you can carry out literature searching yourself?

S: Yes, with a bit of practice. It seems a bit much at first with all those books that you can use, books on the tables and all over the place.

I: You mean those abstracts and indexes?

S: Yes that's right. There are such a lot of them, and when you start to use them you find such an enormous amount of information. You feel like drowning in all the mass of information that's available. You have to learn to sort out the bits that you really want. Go lower down in the hierarchy if you know that I mean.

.......................
S: Well the best thing with this course is, I think, that you got an allround view of how it's (the literature) arranged and the time aspect of the information flow - that it takes a long time for information to reach the books and compendia etc. You get an idea of the time perspective of the whole thing. I don't think that you can ask much more of so short a course.

The students were prepared to recommend this course to other students and not only that, they asked about the possibility of giving courses for engineers already practising in industry.

S: Is there any possibility of going on a course, even after studies at Chalmers? I wondered about that on Friday. For the engineers at work (the place where he had worked during the summer) couldn't do any of this either. They didn't know that all this was available (at Chalmers Library).

13.4.6 Suggestions for improvements

There were critical views on various parts of the course and suggestions for improvements:

S: At first it seemed like a lot of things all at once ... It was when I began to work on my own that I really understood how it worked.

One comment was that there was some difficulty in understanding exactly how SCI worked. The student
would have liked an even longer demonstration.
Again the comment was that it was only possible to
really understand the publication when one worked
with it. Another comment was that too many subject-
based information tools were shown in too short a time,
giving the students a "slightly dazed" feeling:
S: Maybe they could just take two or three names
(Secondary publications) per demonstrator.

Other students said that perhaps a practical example
would have helped them particularly during the demon­
strations. However, Ulla pointed out that they were
all working on different areas, and wondered if they
would have liked to listen to examples from someone-
else's area. The students said that one could divide
up into small groups, but this would unfortunately
be an administrative impossibility.

Both Ulla and I were struck by how interested the
students were and how cooperative. Naturally it would
be impossible to fill all the wishes expressed,
particularly as some were in different directions, such
as concentrated course or spread out teaching. However,
the views expressed were very valuable for the further
development of this particular course and even the whole
programme of library instruction, and the integration
of this programme into the pattern of teaching at
Chalmers University.
Interviews with the people responsible for teaching the course

At different times a number of librarians working at Chalmers Library have helped with either the demonstrations or the practical literature searches, or both. It was intended to carry out tape-recorded interviews with three of the staff who had helped with the particular courses in question. However, the librarians preferred to have their discussions written down, rather than tape-recorded. They preferred that these interviews should be given direct by Nancy so that they could make direct suggestions for alterations etc. to the person responsible for the organisation of the course. They stressed that what they had to say "was just obvious" and that they all thought similarly about various points, but in fact, when their opinions were recorded individually, several differences emerged.

All three librarians said that they had enjoyed helping with the course on information retrieval. One of the staff liked the demonstrations and practical work equally well, another librarian said that she preferred the practical work to demonstration, as it seemed to be more meaningful and related to reality. One of the librarians pointed out that it was much pleasanter to work with students who had motivation for their practical searches, rather than those who were just learning search techniques. It was also pointed out that the size of the groups for the demonstrations was of great importance "preferably not more than 5 in a group" was one suggestion, whereas it was agreed that
the number for the practical work could be between 12 and 15 students.

The librarians were asked if helping with the courses had created problems with other aspects of their library work. As they had helped to differing extents, the answers bore relation to the amount of time spent in teaching activities. If a great deal of time is spent on teaching, it is proportionately more difficult to manage the rest of one's work, than if a little time is spent on teaching. However all three were agreed that the librarian normally working at the information desk can usually manage to devote a fair amount of time to helping with the practical work. Naturally this differs from day to day, depending on the amount of outside telephone calls and internal user queries. One of the librarians preferred to know in advance the search topics for the students, whereas one stated that it made no difference to her as she had no time to prepare the topics anyway, she treated the students just as she would treat any other library user.

One of the librarians suggested that it would be a good idea to have a special specimen teaching set of the most important abstracts and indexes, for demonstration purposes, so that all the students could see the same subject at the same time. This suggestion was put to another librarian who thought that this might be a help, but that, on the other hand, one would
require considerable extra storage space and that the material would be relatively soon outdated, and costly to renew. They had not made a great deal of use of the specially produced Guide to Literature (see 7.5.3) in their teaching, except for referring to it during the demonstrations. All three librarians said that they thought that the students appeared to enjoy the courses, and that there was an obvious need for instruction. One librarian said "It is important to teach the students not to duplicate other people's work. There are problems with members of the academic staff who have not understood the importance of this." The librarians all thought that similar courses would be useful for other student groups.

I, myself, found the courses very enjoyable from a teaching point of view. Contact with the students was very stimulating, in that it was possible to see that students who previously did not know how to use the library at all, had not only learnt how to use it, but even to enjoy looking for information. It was also fascinating to observe that with every course one had the opportunity to learn something new oneself - either how to use some information retrieval tool, or what various technical terms meant and so on. The students were often really interested in what they were doing, the information that they were trying to find out, say about noise-reduction in industry, the effect of external conditions on the work situation,
how to reduce certain kinds of water pollution, etc. and it was very pleasant to be able to help them in their search. There were many interesting discussions during the coffee breaks. The students showed a great interest in the library, they discussed how it ought to be possible to arrange for open shelving and places for group study. I found that helping the students with their search topics, which were often part of their undergraduate projects, helped to make me more aware of the work being carried on at the different departments of Chalmers University. This, in turn, was useful in deciding what information material to buy for the Library. The course also resulted in better contact with many of the academic staff, and as a result, better knowledge of the work being carried out at the university.

The concentration of the teaching to a few weeks during each study period caused problems, in that it was difficult to cope with administrative work during these periods - conferences tended to collide with teaching periods.

I referred to the "Guides to the literature ..." during the demonstrations and pointed out that they were constructed to serve as reference material when the details of the course had been forgotten. I would like to be able to find out if the guides serve this purpose for the students.
13.6 Discussion

13.6.1 The observations and interviews, described in this chapter, were carried out in order to try and find out how the introductory course in information retrieval was functioning and to provide information that could be used for any necessary course modifications - either of the course as a whole or of the separate parts.

Conclusions from the wealth of material obtained, were that the course as a whole was working very well.

The goals for the undergraduate course in information retrieval have been expressed in 6.5.2.

After completing the user education programme, the student should have obtained:

1: The ability to apply the principles of scientific communication to problems of information retrieval.

2. The ability to use the various tools available in the university library (and other libraries) in order to obtain information useful in connection with studies and later work, as and when required.

3. A sense of enjoyment in information searching.

Students definitely enjoyed participating in this course, particularly in the practical literature search. For many students the course was a pleasant surprise - they had been expecting "just another compulsory course" but they found that the work was interesting. Students were enabled to use information retrieval tools in the
production of their own lists of references and it appeared, from the way in which the tasks were tackled, and the interviews, that a good proportion of the students appeared to have a grasp of the concepts involved, e.g. the time aspect of scientific communication.

Students who had been unaware of the resources of the library, learnt how to make use of these resources - thus 22, out of 23 students interviewed, said that they had no experience in the use of abstract and index publications before taking part in the course. All of them had to use these resources in the publication of their list of references.

One can also conclude that the course fits in well with the total programme of education at Chalmers University, in that most of the students taking part, carried out an information search in connection with either a tutorial or their undergraduate research project. In addition, the course in information retrieval, with its requirements for information published in both Swedish and other languages, gave a certain amount of training in, amongst other things, technical and scientific English, a course that students wished to have.

The teachers also said that they enjoyed participating in the programme and that it provided useful stimulation in connection with other aspects of library work such as book purchasing. Naturally the course took time that would have otherwise been devoted to other activitie
Students were quite definite that they would recommend this course to other students, and there were even those who wondered if similar courses could be arranged for engineers already practising in industry.

13.6.2 Specific alterations in the course

With regard to the various parts of the course, the general introduction was regarded as being satisfactory - there were students who considered that the time spent on the lecture/demonstrations was too long, but the same students said that they found there were a lot of new terms - terms which were explained in the introduction. It was decided to retain the two introductory lectures which included the use of a tape/slide presentation "Introduction to Information Retrieval".

Several students indicated that the demonstrations included too much material, and as a result of these findings, it was decided to limit the number of subject-orientated publications to three, for each course. It was also decided to make use of specific examples such as "solar energy" or "noise reduction" for demonstration purposes, in subsequent courses.

In addition, several students reported difficulties in time- tabling, a finding in agreement with those of Chapter 10. As a result of these findings, it was decided to allocate definite time-tabled hours to the course in information retrieval. The course would start with a general introduction in the form of two lectures. This would be followed by two laboratory
periods of five hours, in which demonstrations would be followed by practical work. I decided to follow the logical order of an information search during the demonstrations and practical work - thus the first laboratory period would begin with the general demonstration, and general and specific information search tools; this would be followed by a second laboratory period devoted to instruction in the use of Science Citation Index and related publications. In this second laboratory period, use would be made of references found during the first laboratory period.

This study revealed several unexpected features. One of these was the need for some form of general orientation or introduction to the library, at the early stages of a student's university career. It had been assumed that if adequate self-instructional material was provided, students would gradually learn how to use the library. However this study revealed a very real need to explain the functioning of the closed-stack library to new university students.

Another interesting and unexpected feature was the need for help in studying technical and scientific English and even other languages. If the students cannot understand the technical terms in a foreign language, then they are unable to make use of the material stored in this form in the university library. Students were themselves very much aware of their needs in this respect.
As a result of these findings, contact was taken with the student committee for education, for the purpose of discussing some form of early orientation. Work was also started on a tape/slide presentation that could be used as an illustration for an introductory lecture or for individual self-instruction. (See 15.4.2 and Appendix, Chapter 15). It was hoped to be able to plan some general form of orientation which would reach all the 800 new students, each year. (See Chapter 17.).

Contact was also taken with the educational consultant at Chalmers University, with regard to the language difficulties. Further studies are planned, with which it is hoped to clarify the difficulties that occur, with respect to foreign languages with students from the different Schools of Engineering. These students have different amounts of set-course literature in different foreign languages, and this presumably influences their ability to use foreign language material in information retrieval situations.

The assumption is often made that the best form of library instruction can be given by the personalized service at the information desk. This is because the student asks a question about the use of some material in the library when he/she is motivated to find out about that particular point. The student is actively involved in the learning process, and is receiving tuition from an expert. However, this idealized picture takes little account of reality. The reference
librarian may be harassed by several enquiries, the telephone ringing and so on. Many students are shy, if they see that the librarian is busy, they don't like to admit that they didn't really understand what was being said. They hope that the problem will sort itself out in time - but it is even more difficult to ask a second time. The real difficulty with individual help is that it tends to provide immediate relief, but not necessarily the understanding to cope with similar situations in the future.

This was illustrated by the interviews with students who had attempted to carry out an information search before coming on the course:

"I had received help from the librarian before, but I didn't know any more for that ... about the right technique and so on." This interview was typical of a situation described by several students.

Students both in this series of interviews and the earlier pre-structured interviews, described in Chapter 11, commented that the introductory course in information retrieval had given them an overall, systematic view of scientific and technical information, which would enable them to understand how to tackle future problems of information retrieval.

No doubt a reference librarian, working under ideal conditions, would be able to convey the understanding of the pattern of scientific information to the
individual student, but it would take rather a long time to do this. So it would seem that there is a need to make use of other methods for library instruction than individual help, if we are to be able to give the present numbers of university students an understanding of the patterns of communication that make use of the library both easier and more meaningful.
14.1 Introduction

The broad aim of the programme of user instruction at Chalmers University Library was to give students an awareness of the various information resources and tools available for information retrieval, in order to enable them to obtain information, useful and stimulating for their university and subsequent studies.

In 1974, very few of the engineering undergraduates had received instruction at the library during the preceding years. On the other hand, research students had had the opportunity of attending short introductory lectures or seminars on manual and/or computer-based information retrieval during the years 1971-74. Approximately 200 postgraduate students had taken part in these seminars, which were intended to provide an introduction and stimulus to further individual study.

Summing up the situation with regard to user instruction, in 1974 there were very few of the undergraduates who had received library instruction, whereas about a fifth of the postgraduates had attended a short introduction to methods of information retrieval. Against this background, it was decided to carry out a study on the "day-to-day" use of the library - the reasons people went there, the material used, success in carrying out
literature searches and so on. This study would provide valuable information for the actual development of the programme, and, at the same time, serve as a "pre-instruction" measure of library use. Subsequent "post-instruction" studies on the day-to-day use of the library could then be carried out, thus enabling any changes in the pattern of usage to be measured. It was planned to carry out these "post-instruction" studies over a minimum period of six years, as any changes in the pattern of library use could be expected to be gradual. These "day-to-day" studies were designed to provide long-term information on any changes in the patterns of library use at Chalmers by different groups of users: undergraduates, postgraduates, academic staff, industrial engineers, etc.

It was hoped that by measuring changes in the pattern of use of the library by these various groups, that it might be possible to measure some of the effects of the programme of user instruction.

The present Chapter section is an account of the "pre-instruction" test in 1974 and the first "post-instruction" test in 1975. During 1974, 14-hour courses in information retrieval had been attended by third and fourth year students from four of the Schools of Engineering, and first year architecture students:

School of Civil Engineering - 95 undergraduates
School of Electrical Engineering - 75 undergraduates
School of Engineering Physics - 30 undergraduates
School of Mechanical Engineering - 65 undergraduates
School of Architecture - 60 undergraduates
In addition, 140 undergraduates from the first and fourth years courses of the School of Chemical Engineering had attended lectures and demonstrations on methods of information retrieval. It should be pointed out that there is a special Chemistry Library which is situated in the same building as Chalmers Main Library, and this serves the main needs of the students of Chemical Engineering. In addition, there are Section Libraries (which are larger than department libraries) for the Schools of Civil Engineering and Architecture.

14.2 Method

As it was planned to carry out the "day-to-day use" studies over a period of six years, it was necessary to make use of a relatively simple and inexpensive method which would not make too heavy demands on staff time and thereby financial resources. It was therefore planned to make use of the questionnaire method over a limited period of time, during each year.

The questionnaire was designed to give information as to the category of user, the primary (and secondary) reasons for visiting the library, the materials used primarily (and secondarily), ease of use of general library tools such as the subject catalogue and the requisition form, degree of success with regard to information searching and material obtained, and the numbers of students receiving individual help from members of the library staff. Users were also asked
about their use of the library reproduction centre - for photocopies - and their use of the study places, their views on the general lay-out of the library, their opinions on the closed stack/open stack question, and their general opinion on the library as a whole. The latter questions were somewhat peripheral to the main questions on library use, but they were included partly because this information was required in connection with the general administration of the library, and the method chosen enabled the information to be collected at a minimal extra cost. In addition, the peripheral information collected in this way functioned as a redundancy check - that is questions largely unaffected by user instruction - such as opinions on general lay-out of the library - would presumably show a similar distribution from year to year, if other conditions had remained constant. The questionnaire was purposely kept reasonably short, in order to encourage as many users as possible to complete it. Average time for the completion of the questionnaire was 6 minutes.

The study was planned to register use of the library during three days of a typical mid-term week, that is not during a typical beginning of term period, nor during a pre-examination period. The days selected were: Tuesday, Wednesday and Thursday - mid-week days, as the borrowing and return of material tends to vary considerably at the beginning and end of the week.

Questionnaires were given to every user entering the
library, and the purpose of the study was explained briefly (the questionnaire also contained a short written explanation). Users were asked to leave the completed questionnaire at the distribution table, situated at the main entrance to the library, when they finally left the building. In cases of difficulty, explanation and help could be provided by the people distributing the questionnaires. Very few difficulties arose in the completion of the form. Actual problems were: three research students whose command of Swedish was not sufficient to allow them to complete all the questions - rapid translation into English gave an adequate solution. A few users made remarks of the type "I'm just a messenger/secretary - I don't really use the library" or "This is my first visit here" - it was explained that it was necessary to obtain as complete a picture as possible for a limited time and therefore every person's visit was of interest. Nearly all of these "doubtful" responders managed to complete the questionnaire. The response rate was very high - 98% in 1974 (average of 4 refusals per day) and 96% in 1975 (average of 11 refusals per day). This high response rate was probably due to a number of factors - members of the library staff sat at the main entrance and collected the completed questionnaires - users were not merely asked to leave them - explanations were given as to the purpose of the study, and the completion of the questionnaire took a short length of time. An interesting, and unexpected, side-effect was the number of people who, on handing in their
questionnaires, stopped to give their opinions on the functioning of the library. It was suggested that additional comments could be made on the completed forms (but that was often regarded as too time-consuming). The actual remarks ranged over a very wide range of topics and tended to be in opposite directions on the same point; thus one user would comment very unfavourably on the hours of opening and another would ask what was wrong with the present opening hours. One general trend, however, was, particularly during the first study in 1974, the number of users who expressed mild surprise and approval over the fact that the library staff bothered to ask the opinions of the users about services provided.

The completed questionnaires were analyzed manually and the "average day" response to the questions was obtained by taking an average of the responses over the three days. Responses from day to day were remarkably similar in both 1974 and 1975.

14.3 Results
14.3.1 Categories of users

Distribution of users according to category are shown in Table I.

In the questionnaire there was no special response place for students from Gothenburg University; they marked the category "other". However, it became apparent that there were quite a number of students from Gothenburg
<table>
<thead>
<tr>
<th>USER TYPE</th>
<th>1974</th>
<th>1975</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering undergraduate</td>
<td>147</td>
<td>185</td>
</tr>
<tr>
<td>Postgraduates</td>
<td>22</td>
<td>24</td>
</tr>
<tr>
<td>Academic staff</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Industrial engineers</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>Gothenburg university students</td>
<td>19</td>
<td>17</td>
</tr>
<tr>
<td>High school pupils</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>&quot;others&quot;</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>TOTAL</td>
<td>224</td>
<td>256</td>
</tr>
<tr>
<td>Refusals</td>
<td>4</td>
<td>11</td>
</tr>
</tbody>
</table>

Table I. Distribution of users according to category

University, who used Chalmers University Library each day, so they were grouped together for purposes of analysis. Chalmers University Library serves as academic library for a number of departments in the natural sciences faculty of Gothenburg University, Astronomy, Chemistry, Mathematics and Physics. See 1.4.2). The remaining users who came under the "other" section included secretaries, messengers from industrial concerns such as Volvo, students from the Swedish College of Librarianship in Borås, pensioners, etc.

It can be seen that there was an increase in the average number of users per day by nearly 40 – from 228 to 267. This was due to an increase of 38 – from 147 to 185 – in the engineering undergraduates.
14.3.2 Distribution of undergraduates according to School of Engineering

Distribution of the engineering undergraduates according to School of Engineering is shown in Table II:

<table>
<thead>
<tr>
<th>SCHOOL OF ENGINEERING</th>
<th>1974</th>
<th>1975</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architecture</td>
<td>0</td>
<td>17</td>
</tr>
<tr>
<td>Chemical Engineering</td>
<td>16</td>
<td>18</td>
</tr>
<tr>
<td>Civil Engineering</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>46</td>
<td>48</td>
</tr>
<tr>
<td>Engineering Physics</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>55</td>
<td>69</td>
</tr>
</tbody>
</table>

Table II. Distribution of engineering undergraduates according to School of Engineering

The distribution of engineering undergraduates reflects, to a certain extent, differences in size of the Schools of Engineering. The increase in the number of students of architecture, using the Main Library, was due to the fact that the study took place during a week in which introductory courses in information retrieval were being given to this group. During the academic year 1974/75, a total of 33 courses were given for undergraduate students - the courses had become part of the normal pattern of use of the Library.

14.3.3 Reasons for use of Chalmers University Library

The primary reasons for use of Chalmers Library were examined, and the results are shown in Table III.
In Table III, and subsequent tables, the categories of users have been represented by numbers, for reasons of space. These numbers represent:

1 .................. Total users
2 .................. Engineering undergraduates
3 .................. Postgraduates
4 .................. Academic staff
5 .................. Industrial engineers
6 .................. Undergraduates - Gothenburg University
7 .................. "Others"

The category "Others" in Table III, and subsequent tables, even includes the few high-school pupil users of Chalmers Library. This inclusion was made as there were so few users in this category - 4 in 1974 and 2 in 1975.

The "secondary reasons" for use of the library are shown in Table IV.

As can be seen from Table III, the main reason for the use of the library is for reading "set" or "course" literature. This reflects on the needs of the predominant user group - the engineering undergraduates. Between 22% (1974) and 31% (1975), of the total, used the library for some kind of literature or information search. About 10% of the users said that their main reason for visiting the library was to "do something else" - that is something not already mentioned in the
<table>
<thead>
<tr>
<th>CATEGORY OF USER</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>REASON FOR USE</td>
<td>74</td>
<td>75</td>
<td>74</td>
<td>75</td>
<td>74</td>
<td>75</td>
<td>74</td>
</tr>
<tr>
<td>Read &quot;set&quot; lit.</td>
<td>95</td>
<td>97</td>
<td>85</td>
<td>86</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Borrow &quot;set&quot; lit.</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Read &quot;non-set&quot; lit.</td>
<td>15</td>
<td>23</td>
<td>9</td>
<td>16</td>
<td>1</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>Borrow &quot;non-set&quot; lit.</td>
<td>9</td>
<td>13</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Lit. search UG thesis</td>
<td>10</td>
<td>18</td>
<td>9</td>
<td>17</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Lit. search (research project)</td>
<td>22</td>
<td>21</td>
<td>3</td>
<td>3</td>
<td>11</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>Lit. search</td>
<td>7</td>
<td>24</td>
<td>4</td>
<td>18</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Return material</td>
<td>20</td>
<td>17</td>
<td>5</td>
<td>8</td>
<td>5</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Photocopying</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Essay writing</td>
<td>6</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Social reasons</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Visit café</td>
<td>8</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Do something else</td>
<td>21</td>
<td>22</td>
<td>10</td>
<td>16</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Table III. Primary reason for use of the library.

<table>
<thead>
<tr>
<th>CATEGORY OF USER</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>REASON FOR USE</td>
<td>74</td>
<td>75</td>
<td>74</td>
<td>75</td>
<td>74</td>
<td>75</td>
<td>74</td>
</tr>
<tr>
<td>Read &quot;set&quot; lit.</td>
<td>7</td>
<td>7</td>
<td>6</td>
<td>6</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Borrow &quot;set&quot; lit.</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Read &quot;non-set&quot; lit.</td>
<td>20</td>
<td>21</td>
<td>17</td>
<td>16</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Borrow &quot;non-set&quot; lit.</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Lit. search UG thesis</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Lit. search (research project)</td>
<td>3</td>
<td>7</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>Lit. search</td>
<td>4</td>
<td>6</td>
<td>1</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Return material</td>
<td>7</td>
<td>7</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Photocopying</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Essay writing</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Social reasons</td>
<td>5</td>
<td>7</td>
<td>5</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Visit café</td>
<td>34</td>
<td>49</td>
<td>25</td>
<td>45</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Do something else</td>
<td>8</td>
<td>8</td>
<td>5</td>
<td>6</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>No &quot;second&quot; reason</td>
<td>124</td>
<td>130</td>
<td>82</td>
<td>86</td>
<td>10</td>
<td>14</td>
<td>3</td>
</tr>
</tbody>
</table>

Table IV. Secondary reason for use of the library.
questionnaire. Although not asked to specify this reason for use, a number of users indicated on the questionnaire what they had done. These included "use of the telex apparatus" (the Library has a telex apparatus that can be used by members of the University), "writing up laboratory notes", "working on mathematical exercises".

As can be seen from Table III, the most marked changes in the "primary reasons" for library use are increases in:

- Reading of "non-set" literature ...... 15 - 23
- Information search in connection with undergraduate thesis ............. 10 - 18
- Literature search ...................... 7 - 24

These changes in pattern of use are largely dependent on changes in the patterns of use of the engineering undergraduates. Patterns of use of the other categories are very similar in 1974 and 1975. With regard to the "secondary reasons" for library use - Table IV - it can be seen that about half of the users come to the library for one specific purpose - 55% in 1974 and 51% in 1975. Of the remainder, the main secondary reason is a visit to the Library Café - 15% in 1974 and 19% in 1975.

14.3.4 Use of library materials and services

Use of library materials and services are shown in Table V - "materials used first and foremost" and Table VI "materials used secondarily":
<table>
<thead>
<tr>
<th>CATEGORY OF USER</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MATERIAL USED</strong></td>
<td>74</td>
<td>75</td>
<td>74</td>
<td>75</td>
<td>74</td>
<td>75</td>
<td>74</td>
</tr>
<tr>
<td>Journals/periodicals</td>
<td>42</td>
<td>46</td>
<td>23</td>
<td>10</td>
<td>4</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>&quot;Course&quot; lit.</td>
<td>54</td>
<td>60</td>
<td>57</td>
<td>6</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Books (other than course lit.)</td>
<td>10</td>
<td>15</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Reference material</td>
<td>6</td>
<td>9</td>
<td>4</td>
<td>7</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Bibliographic aids</td>
<td>9</td>
<td>29</td>
<td>20</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Theses</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Micro-material</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Popular magazines</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Something else</td>
<td>6</td>
<td>8</td>
<td>4</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Nothing (e.g. bought own material)</td>
<td>94</td>
<td>87</td>
<td>66</td>
<td>5</td>
<td>8</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Table V. Materials used first and foremost.

<table>
<thead>
<tr>
<th>CATEGORY OF USER</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MATERIAL USED</strong></td>
<td>74</td>
<td>75</td>
<td>74</td>
<td>75</td>
<td>74</td>
<td>75</td>
<td>74</td>
</tr>
<tr>
<td>Journals/periodicals</td>
<td>18</td>
<td>21</td>
<td>16</td>
<td>12</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>&quot;Course&quot; lit.</td>
<td>6</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Books (other than course lit.)</td>
<td>8</td>
<td>6</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Reference material</td>
<td>6</td>
<td>11</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Bibliographic aids</td>
<td>5</td>
<td>10</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Thesis</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Micro-material</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Popular magazines</td>
<td>9</td>
<td>7</td>
<td>5</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Something else</td>
<td>4</td>
<td>6</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Nothing (e.g. brought own material)</td>
<td>167</td>
<td>189</td>
<td>108</td>
<td>135</td>
<td>16</td>
<td>18</td>
<td>4</td>
</tr>
</tbody>
</table>

Table VI. Materials used secondarily.
From Tables V and VI, it can be seen that "Journals/periodicals" and "Set" literature are the most frequently used types of material, whereas certain types of material, such as microfilm, microfiche and theses, are hardly used at all.

The most marked changes in the use of materials between 1974 and 1975 are in the use of bibliographic aids (indexes, abstracts and other tools for information retrieval) from 9 - 29 (primary use) and from 5 - 10 (secondary use). There were also slight increases in the use of reference material such as dictionaries, handbooks and encyclopedias.

.14.3.5 Use of specific library tools

Questions were asked about the use of specific library tools: the alphabetic author catalogue, the subject catalogue, the TLS DK catalogue, the list of journals and periodicals for Chalmers Library and bibliographic materials from the shelves in the main catalogue hall of the library. Responses can be seen in Table VII:

<table>
<thead>
<tr>
<th>CATEGORY OF USER</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIBRARY TOOL</td>
<td>74</td>
<td>75</td>
<td>74</td>
<td>75</td>
<td>74</td>
<td>75</td>
<td>74</td>
</tr>
<tr>
<td>Author catalogue</td>
<td>22</td>
<td>40</td>
<td>9</td>
<td>22</td>
<td>6</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Subject catalogue</td>
<td>14</td>
<td>28</td>
<td>8</td>
<td>18</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>DK catalogue</td>
<td>5</td>
<td>13</td>
<td>3</td>
<td>8</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>List of journals</td>
<td>18</td>
<td>27</td>
<td>5</td>
<td>13</td>
<td>8</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Bibliographic aids</td>
<td>12</td>
<td>35</td>
<td>7</td>
<td>23</td>
<td>4</td>
<td>7</td>
<td>0</td>
</tr>
</tbody>
</table>

Table VII. Use of various library tools.
It can be seen that between 1974 and 1975, there was an increase in the use of various tools for information retrieval: author catalogue, subject catalogue, DK abstract catalogue, the Chalmers Library list of journals and periodicals, and bibliographic aids.

In the case of one of these tools - the subject catalogue users were asked their opinions on the ease/difficulty of use. Responses can be seen in Table VIII.

<table>
<thead>
<tr>
<th>CATEGORY OF USER</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>EASE OF USE</td>
<td>74</td>
<td>75</td>
<td>74</td>
<td>75</td>
<td>74</td>
<td>75</td>
<td>74</td>
</tr>
<tr>
<td>Very difficult</td>
<td>5</td>
<td>6</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Difficult</td>
<td>16</td>
<td>11</td>
<td>11</td>
<td>8</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Rather difficult</td>
<td>36</td>
<td>32</td>
<td>24</td>
<td>26</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Rather easy</td>
<td>38</td>
<td>54</td>
<td>26</td>
<td>39</td>
<td>8</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Easy</td>
<td>20</td>
<td>28</td>
<td>9</td>
<td>21</td>
<td>3</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Don't use</td>
<td>109</td>
<td>125</td>
<td>73</td>
<td>86</td>
<td>3</td>
<td>9</td>
<td>2</td>
</tr>
</tbody>
</table>

Table VIII. Ease/difficulty of use of subject catalogue.

A large number of library users make no use of the subject catalogue - 49% - in both 1974 and 1975. As can be seen from Table VIII, there has been a shift in opinion, as to ease of use, between 1974 and 1975. This seems to be due to changes in the views of the engineering undergraduates.

14.3.6 Degree of success with regard to information searching

The degree of success with regard to information searching was studied - see Table IX:
Table IX: Degree of success in information searching.

It can be seen from Table IX, that 21% (1974) and 25% (1975), of the users reported on their degree of success in carrying out information searches. This compares with the values of 17% (1974) and 25% (1975) for those who stated that their primary reason for library use was to carry out an information search. 83% of both 1974 and 1975 groups stated that their degrees of success were very good, good or rather good.

14.3.7 Degree of success in obtaining desired material

The degree of success in obtaining desired material—books and journals—was examined. These questions reflect on the general service of the library (material available, accession policy, etc.) and the results, which are peripheral to the present evaluation, will be presented in a subsequent article. It can be briefly stated, however, that 56% (1974) and 61% (1975) of the users who wished to borrow books, obtained all, or nearly all, of the material they wished to have. The corresponding figures for journals and periodicals were 76% and 73%.
14.3.8 Helpfulness of the library staff

The users were asked their opinions on the helpfulness of the library staff - see Table X.

<table>
<thead>
<tr>
<th>CATEGORY OF USER</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>HELPFULNESS</td>
<td>74</td>
<td>75</td>
<td>74</td>
<td>75</td>
<td>74</td>
<td>75</td>
<td>74</td>
</tr>
<tr>
<td>Very helpful</td>
<td>50</td>
<td>55</td>
<td>21</td>
<td>32</td>
<td>11</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>Helpful</td>
<td>31</td>
<td>28</td>
<td>19</td>
<td>18</td>
<td>7</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Rather helpful</td>
<td>7</td>
<td>9</td>
<td>6</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Not very helpful</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Not helpful at all</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Not applicable</td>
<td>135</td>
<td>162</td>
<td>100</td>
<td>128</td>
<td>4</td>
<td>10</td>
<td>3</td>
</tr>
</tbody>
</table>

Table X. Opinions on the helpfulness of the library staff.

Most of the users who asked for help regarded the library staff as very helpful or helpful. It was interesting to note that approximately the same numbers of library users 89 (40%) in 1974 and 94 (37%) in 1975, had had occasion to note the helpfulness, or otherwise, of the staff.

14.3.9 The external arrangement of the library

Users were asked their opinions on the general lay-out of the library. Responses were briefly:

LAY OUT was: 1974 1975
Very good ............ 22 22
Good .................. 115 122
Rather good ........... 72 89
No opinion ............ 15 23
Of greater interest, from the library orientation point of view, were the users' opinions on the position of the Reprocentre - situated on the lowest floor of the library building, at a considerable distance from the collections. In 1974, there was a rather small notice about the position of the Reprocentre. This notice was placed rather inconspicuously amongst other notices, on top of the circulation desk. During 1973, a series of clearly lettered signs (in red to distinguish from other signs) were put up. These showed the way to the Reprocentre from various parts of the library.

<table>
<thead>
<tr>
<th>CATEGORY OF USER</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>POSITION OF REPROCENTRE</td>
<td>74</td>
<td>75</td>
<td>74</td>
<td>75</td>
<td>74</td>
<td>75</td>
<td>74</td>
</tr>
<tr>
<td>Very good</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Good</td>
<td>11</td>
<td>20</td>
<td>8</td>
<td>14</td>
<td>1</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Rather good</td>
<td>16</td>
<td>21</td>
<td>10</td>
<td>17</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Poor</td>
<td>26</td>
<td>46</td>
<td>16</td>
<td>33</td>
<td>4</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Very poor</td>
<td>15</td>
<td>18</td>
<td>10</td>
<td>13</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Don't use</td>
<td>152</td>
<td>147</td>
<td>101</td>
<td>105</td>
<td>14</td>
<td>13</td>
<td>4</td>
</tr>
</tbody>
</table>

Table XI. Opinions of users on position of Reprocentre.

It can be seen from Table XI, that more people made use of the Reprocentre in 1975 (109) than in 1974 (71). Of these users, approximately the same proportion - 58% in 1974 and 59% in 1975 - considered the position of the Reprocentre to be "poor" or "very poor".

Users were also asked their opinions as to the use of open-stacks, as opposed to closed-stacks, for the storage of books and periodicals in the library.
The answers to this question are interesting because accessibility of information resources is closely linked to method of storage. The opinions expressed can be seen in Table XII:

<table>
<thead>
<tr>
<th>CATEGORY OF USER</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPEN STACK STORAGE</td>
<td>74</td>
<td>75</td>
<td>74</td>
<td>75</td>
<td>74</td>
<td>75</td>
<td>74</td>
</tr>
<tr>
<td>Very desirable</td>
<td>37</td>
<td>57</td>
<td>19</td>
<td>41</td>
<td>7</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Desirable</td>
<td>71</td>
<td>79</td>
<td>51</td>
<td>58</td>
<td>8</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Hardly necessary</td>
<td>43</td>
<td>34</td>
<td>28</td>
<td>25</td>
<td>3</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Unnecessary</td>
<td>20</td>
<td>25</td>
<td>13</td>
<td>20</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>No opinion</td>
<td>53</td>
<td>61</td>
<td>36</td>
<td>41</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Table XII. Opinions of users on use of open-stack storage.

In 1974, 48% of the users thought that open-stack storage was "very desirable" or "desirable". This figure had increased to 53% in 1975. The corresponding figures for engineering undergraduates were 48% and 54% and for the group postgraduates + academic staff - 71% and 68%.

14.3.10 Ease of use of requisition forms

In a closed stack library, material must be requested by means of a requisition form, completion of which depends on interpretation of information from the various library catalogues, which in themselves give information of the storage shelf of the material in question. Faulty completion of the requisition form leads to delays in obtaining the material required. During 1974/75, a number of changes were made in the requisition form at Chalmers University Library, in order to try and simplify completion of the form. In addition, a large sign, with examples of the three most common types of
requisition, was placed above the author catalogues. This resulted in an improvement in the completion of the forms, as observed by the staff working in the stacks, who said that fewer faulty requests occurred. Users were asked to give their opinions on the ease of completion of the forms, and the results can be seen in Table XIII:

<table>
<thead>
<tr>
<th>CATEGORY OF USER</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPLETION OF REQUISITION FORM</td>
<td>74</td>
<td>75</td>
<td>74</td>
<td>75</td>
<td>74</td>
<td>75</td>
<td>74</td>
</tr>
<tr>
<td>Very difficult</td>
<td>9</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Difficult</td>
<td>13</td>
<td>18</td>
<td>11</td>
<td>16</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Rather difficult</td>
<td>36</td>
<td>40</td>
<td>27</td>
<td>32</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Rather easy</td>
<td>77</td>
<td>100</td>
<td>53</td>
<td>74</td>
<td>10</td>
<td>13</td>
<td>5</td>
</tr>
<tr>
<td>Easy</td>
<td>37</td>
<td>39</td>
<td>19</td>
<td>24</td>
<td>7</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>No opinion</td>
<td>52</td>
<td>52</td>
<td>31</td>
<td>34</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Table XIII. Opinions of users as to ease/difficulty in completing requisition form.

In 1974 and 1975 about 25% of the users expressed some degree of difficulty in the completion of the requisition form. 51% of the users in 1975, and 54% of the users in 1975, stated that they found the form "rather easy" or "easy" to complete.

14.3.11 Satisfaction with Chalmers Library

With regard to opening hours, 81% of the total users regarded these as being adequate in 1974, and 78% in 1975. With regard to the availability of study places, 97%
(1974) and 96% (1975), of those users who wish to work there, found a place "always" or "nearly always".

Students were asked to give their overall opinion of Chalmers Library, and these are shown in Table XIV:

<table>
<thead>
<tr>
<th>CATEGORY OF USER</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>OVERALL OPINION OF CHALMERS LIBRARY</td>
<td>74</td>
<td>75</td>
<td>74</td>
<td>75</td>
<td>74</td>
<td>75</td>
<td>74</td>
</tr>
<tr>
<td>Very good</td>
<td>50</td>
<td>57</td>
<td>27</td>
<td>37</td>
<td>7</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Good</td>
<td>138</td>
<td>143</td>
<td>93</td>
<td>106</td>
<td>12</td>
<td>14</td>
<td>3</td>
</tr>
<tr>
<td>Rather good</td>
<td>36</td>
<td>51</td>
<td>27</td>
<td>40</td>
<td>3</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Poor</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Very poor</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Table XIV. Overall opinions of the users at Chalmers Library.

As can be seen from Table XIV, the overall opinion about Chalmers Library was that it was "very good" - 22% 1974 and 22% 1975, or "good" - 62% and 56%. A number of users in the 1975 study specifically criticised the closed-access storage of material.

14.4 Discussion

The main difference with regard to Chalmers Library between 1973/74 and 1974/75 was the introduction of part of the proposed system of library instruction - namely the "introduction to information retrieval" courses for the engineering undergraduates. One cannot, after so
short a period as one year, draw widespread conclusions as to the long-term effects of library instruction on the pattern of use of Chalmers Library. Nevertheless the present studies, carried out in 1974 and 1975, do show changes in the pattern of library use, and these changes can reasonably be attributed to effects of the new courses of library instruction. This is borne out by the fact that the observable changes in usage patterns are to be seen in the case of the engineering undergraduates, whereas the other user groups: postgraduates, academic staff, industrial engineers, Gothenburg University undergraduates and "others" show little change in library use.

Thus it was seen that, for the periods of the day-to-day use studies, the number of engineering undergraduate had increased about 40. This might in itself have been due to external factors, rather than an effect of library instruction. However, when the reasons for library use were examined, it was seen that the values for such work as "reading course literature" stayed constant (85) and (86), whereas the main changes could be observed for the numbers of students working on various kinds of information retrieval project (16) to (36). There was also a slight increase in the number of students reading "non-set" literature.

With regard to material being used, a marked change was seen in the number of students making use of tools for
information retrieval, from 9 to 29 for primary use, and from 5 to 10 for secondary use. There were also slight increases in the use of reference material, such as dictionaries, encyclopedias and handbooks. Increases in the use of specific tools for information retrieval: author catalogue, subject catalogue, DK-abstract catalogue and bibliographic aids such as abstracts and indexes, were also noted.

These results would suggest that the increase in numbers of engineering undergraduates in 1975 was due to an increase in students visiting the library in connection with an information search of some kind, and thereby making use of some of the aids for information retrieval available to them in the library.

With regard to the ease of use of specific library tools, it could be seen that there had been a shift of opinion in the direction that the subject catalogue was thought to be easier to use in 1975 than in 1974. This change in opinion of the engineering undergraduates could be explained by the fact that instruction had been given in the use of the subject catalogue during the courses in information retrieval. However, in the case of another tool - the loan requisition form - in spite of instruction given (a) to the engineering undergraduates during their courses and (b) to all users in the form of a large sign hanging over the catalogue, there was very little change in the users opinion of ease of use (51% to 54%). On the other hand the library staff had noted that there were fewer faulty requisitions being passed to the stacks. This apparent contradiction may be due
to the fact that many users regard filling in a requisition form as an unnecessary waste of time. They want to have quick access to material that they think might be of interest to them. (This was borne out by both written comments and verbal remarks about this aspect of service).

This reaction to completion of the requisition form can be linked to the question of open or closed access. More than half of the users thought that open access, and increased accessibility, were "desirable" or "very desirable". It is significant that the values for the most qualified of the users – the postgraduates and academic staff are considerably higher – 71% (1974) and 68% (1975).

Accessibility is also connected with the time during which the material is available. In 1974, 19%, and in 1975, 22%, of the total user group regarded the hours of opening as being inadequate. The corresponding figures for the postgraduate students were 23% and 29%.

With regard to one particular service offered by the library - the photocopying service - orientation as to existence and whereabouts of the Reprocentre had been arranged during 1974/75. This resulted in a greater use of the Reprocentre, as seen by the results of these studies, and this was confirmed by the yearly statistics of copies taken: 148,000 in 1973/74 and 162,000 in 1974/75.
Users were asked to state their degree of success in literature searching. Little proportional change in assessment of success could be seen between the groups during the two years studies - 1974 and 1975.

Users were also asked to state their opinions about the helpfulness of the library staff. As is usual, in response to this type of question, most of the users regarded the library staff as "very helpful" or "helpful". It was, however, interesting to observe that the number of users helped by the staff per day remained approximately constant (88) and (94) in spite of the increase in the number of users (approximately 40). This would suggest that if the number of users is increased in the university libraries, it is necessary to either increase the number of library staff, if all users are to receive individual instruction, or to rationalize by providing group instruction for the various user categories who require most help.

14.5 Conclusions

It appears that there has been certain changes in the pattern of use of Chalmers University of Technology Library, one year after the introduction of a course of instruction in methods of information retrieval for engineering undergraduates. These changes are to be seen in the usage patterns of the engineering students, whereas use by other groups - postgraduates, academic staff, industrial engineers, Gothenburg University undergraduates and "others" had remained similar between the
the two studies.

It has been shown that Chalmers engineering undergraduates made greater use of the complex information retrieval tools and information resources available, within their University Library, in 1975, than in 1974. This can be attributed to the library instruction which a number of that user group have received.

A method has been developed which will enable changes in the patterns of library use to be measured over a number of years. It is hoped that this will provide information on the long-term changes in the pattern of library use in response to a programme of library orientation and instruction.
15.1 Introduction

It had been decided, for reasons described in Chapter 7 (7.4.) to make use of self-instructional material for library orientation at Chalmers Library. This material took the form of a 2-page handout for new students, a 16-page Library Guide, clearly marked signs, and a simple colour-coding system. It was hoped that these measures would provide adequate information on WHAT material was available, WHEN it was available, WHERE the material was to be found and HOW to obtain it.

It was hoped that the use of self-instructional material would provide this orientation on a once-for-all basis, rather than by activities such as guided tours, which make heavy demands on library staff time.

During 1974/75 the printed handouts and library guides were produced (see 7.4.3) and clearly lettered signs were made to indicate the whereabouts of services - e.g. Reprocentre, or material - e.g. dictionaries. An example board, showing the three most common ways to fill in the requisition form, was put up, and a simple colour-coding scheme, based on the colours used by the different School of Engineering, was constructed for reference literature - handbooks and encyclopedias, and for information retrieval tools such as abstracts and indexes. In order to see if this orientation material
enabled users to find their way about the library and locate material, observational studies were carried out before and after the material was put up.

15.2 Method

15.2.1 A series of practical exercises were carried out by two groups, before and after the orientation material was put up. In the first case the group consisted of 19 students from the second year at a Gothenburg Senior Technical High School. In the second case, first-year engineering students from Chalmers University, carried out the same studies during their initial month at the university. These students were sent to the Library to carry out their "nothing jobs" (all new students are given a task to carry out during their initiation month) 8 students were supposed to come from the Schools of Civil Engineering, Electrical Engineering, Engineering Physics and Mechanical Engineering and the School of Architecture. However the actual attendance was the following:

- School of Civil Engineering - 3 students
- School of Electrical Engineering - 8 students
- School of Mechanical Engineering - 3 students

15.2.2 Practical exercises

A series of practical exercises was drawn up:

1) Fetch a volume of "Engineering Index"

2) Fetch a number of one of the following:
3) Fill in a loan requisition form for the following:

Falkendal, Stellan
Transienta förlopp i värmeväxlare
Göteborg 1967

4) Fill in a requisition form for a report or book which describes electrically driven cars.

5) Is Chalmers Library open until 13.00 on Saturdays?

6) Fetch a volume of "Svensk Uppslagsbok"

7) Fetch "Teknikens hvornår skete det" (A handbook)

8) Does Chalmers Library possess the following?
   (a) Kanaltunnel. Stockholm 1974
   (b) Henningsen, Poul, Belysningens konst.
       Stockholm 1946

9) Write out the names of 5 works on water-pollution

10) How many works has Chalmers Library on lubrication and friction?

11) How many works has Chalmers Library on radioactive activity?

The students were told the purpose of the exercise. As they completed each item, they brought the material to a member of the library staff sitting at a table used as the collecting point. The number of the practical exercise was ticked off and the student proceeded to the next question.

Students were asked to try to complete the exercises
without asking the library staff for help. (This instruction was given as situations may arise when users have to rely on orientation material - for example when staff are helping other users, or in the evenings when there are only a few staff present).

The students were timed and their way of tackling the various exercises observed. After the completion of the tasks, discussions were held.

The high school students who took part in the test, worked in two groups starting at different times.

The undergraduates had received the initial 2-page handout for new students. They were given the Library Guide, and asked to read it before starting on the exercises. The students from the School of Electrical Engineering started on their tasks at the same time, whereas the students from the Schools of Civil and Mechanical Engineering arrived at different times and worked individually.

15.2.3 Observations

The high school student groups appeared to work with considerable speed and enthusiasm, the average time for completion of the tasks was 49 minutes. When the loan requisition forms were examined, it was found that only 4 out of 40 were correctly completed. During their work, it was seen that the speed of the group appeared to depend on the speed of the fastest person in the group. Even though students were supposed to work individually,
they could easily see where other students looked for material, thereby obtaining tips as to how to work.

The students from the School of Electrical Engineering (working in a group) carried out the tasks more quickly than the students working separately. Total time for the engineering students averaged 46 minutes. This can be compared with 66 minutes for the students who worked singly. 16 out of 28 requisition forms were correctly completed.

Observations of the undergraduates showed that they seemed to have no difficulty in locating material in the main catalogue hall or in other parts of the library, such as the reading rooms. They did have problems in deciding which of the three catalogues to use. In particular they appeared to confuse the Subject Catalogue with the DK-abstract Catalogue. Nor did they easily find the subject index for the subject catalogue. 2 of the cases of incorrectly filled in loan requisitions made use of the UDK classification (from the DK-abstract catalogue) and 3 gave the Library of Congress Classification Mark instead of the location mark.

15.2.4 Discussions with students

The high school students said that they had received training in the use of their school library and that this had been useful to them in dealing with another library environment. They criticised the Subject Catalogue and said that it was difficult to find the right headings to search under, and that the number of items
under the search terms was too many.

The undergraduates commented on the fact that it seemed strange to use a library with closed-access collections. They asked if they could go into the store and look at the books. They made the suggestion that some form of instruction in the use of the library would be useful for new students. Perhaps groups could be shown round the library they said. I asked them how many students there should be in each group and they said "oh about 8". I pointed out that this would result in over a hundred such groups for each first year student batch.

15.3. Discussion

15.3.1 The observations described in this Chapter have been carried out on too few students to allow quantitative conclusions to be drawn. However, some indications have been obtained which are of interest for the development of the orientation part of the programme of user education at Chalmers University of Technology Library. Students appeared to work faster at this practical exercise when working in groups. Speed of performance tended to depend on the fastest worker in the group. In order to carry out a quantitative evaluation of the effect of orientation material on the speed of performance, it would, therefore, be necessary to carry out a series of individual measurements.
Location of material (WHERE) appeared to present no great difficulty to either group - students or undergraduates. Likewise, knowledge of WHEN the library was open seemed to be easy to obtain. The chief difficulties were concerned with finding out WHAT the Library possessed for material - i.e. which catalogue to use, and HOW to request this material. The undergraduates were noticeably better than the high school students with regard to filling in the loan requisition forms correctly. However they commented that the filling in of a form to get a book was unfamiliar.

One can conclude, from the discussions with the students, that it is necessary to provide some form of general introduction to the closed access library that will reduce the feeling of strangeness and difficulty experienced by many users. This is in agreement with the findings described in Chapter 13. Clear signposting helps the user with regard to location of material and how to fill in requisition forms (see 14.4.1). Clear signposting alone, however is not enough to provide adequate library orientation.

15.3.2 Factors affecting the learning process
As has been pointed out by Hills in 1974 (Hills 1974 b), there are four main factors that influence learning in practical situations:
1. Motivation
2. Understanding
3. Activity
4. Feedback
The work so far carried out, at Chalmers Library, on the orientation part of the user education programme, provides orientation material which explains where material is kept, when it is available and how to obtain it. This orientation material is available whenever a student wishes to use it - at a point of high motivation. The need to use the library, for example to borrow or read material, results in activity. Feedback is provided in the form of material obtained or not.

The material so far provided does not, however, provide new users with an adequate explanation as to why they should use certain catalogues, or fill in a requisition form in order to obtain material. As was seen in Chapter 13, students expressed a fear of "making fools of themselves" in the library (13.4.3). Many of the students had no idea that Chalmers Library was a closed-access library, nor did they understand how such a library works. This was also apparent in the case of the engineering undergraduates who tried to do the practical exercises - they did not know that they must use certain catalogues to see what material the Library possessed.

In order to cope with this need to provide elementary information on how the closed-stack library at Chalmers functions, a tape/slide presentation of the library has been made. This describes the library and the material it contains, and explains that the main part of this material is kept in a closed-access book store, and that in order to obtain material, it is necessary to fill in
a loan requisition form on which the store location number is correctly filled. It is hoped to use this tape/slide production in two ways - as part of a general introductory lecture about the Chalmers Library to be given to the new students in their first month at the university, and as self-instructional material available in the entrance hall at the main library during the first weeks of the academic year. (For the text of this tape/slide production see Appendix).

15.3.3 Motivation to use the library

Orientation material is at present available when the students come to the library and need to use it - that is when they are motivated to use it. However this does not deal with the even more important question of providing students with motivation to come to the library and make use of the resources collected there. As has been seen in Chapter 2, undergraduates at Chalmers make little use of the reading-room facilities for optional study, nor do they borrow a great deal of the material required for their university studies. They have thus little motivation to visit the library. If they do not visit the library they have no chance to become aware of the information resources available there.

Motivation to visit the library can be provided in a number of ways - by arousing curiosity and interest, for example by providing handouts and Library Guides,
or by introductory lectures, or by stressing the availability of other services such as the café. Motivation to visit the library can be provided in this way, and this may result in the students gradually becoming aware of the resources available there, but this may not necessarily result in motivation to use the library.

Motivation to use the library must be closely connected to student needs with regard to the courses being studied at the university. For this reason, a start has been made, in the problem of library orientation, by discussing the ways in which motivation to use the library could be increased, with the student representatives. During the first year at Chalmers many of the students, particularly those in the large Schools of Engineering - Electrical and Mechanical Engineering - work in traditional large group lecture environments, with compulsory laboratory work. A considerable amount of time is spent on theoretical introductory studies such as mathematics. Against this background, students suggested that first-year students could work in small groups, on practical projects, where they would have to look up a certain amount of information. This would enable students to get to know a number of their fellow students, provide study motivation in the form of a practical engineering problem, and provide the students with motivation to use the library to look up information. It is hoped to be able to start pilot projects along these lines in coming years. Students at the School
of Architecture, at Chalmers University, take part in project-based courses from the first year at university, since 1974/75. This has resulted in increased use of the Architecture Section Library, by first year students, when compared with use by students prior to 1974/75. At the Danish University Centre at Roskilde, where much of the teaching is project-based, it has also been noted that students make use of the university library to obtain information on their projects. It is hoped to start a special project-linked course, which will include library orientation, for first-year architecture students (See 16.2.4 and 17.2.2).

15.4 Conclusions

It can be concluded that the orientation material provided was of help to students in learning how to locate library material and how to obtain it. However the material so far provided does not, alone, supply adequate library orientation for new users. It is necessary to give an explanation of the working of a closed-stack library for new students. This will be done by means of both self-instructional tape/slide presentations and by an introductory lecture.

In addition, it is hoped to start a pilot-project for groups of first-year students, where the students will work on a practical problem that will involve the search for information in the library. This will provide motivation for the use of the library as an integrated part of the course of study.
Chapter 16

SUMMARY OF THE EVALUATION STUDIES

16.1 Introduction
As was pointed out in Chapter 8 (8.3.1), it was decided to evaluate the programme of user education at Chalmers University of Technology Library in a number of ways; in order to obtain a "triangulation" effect - giving as full a picture as possible of the developing programme. In this Chapter a summary will be given of the evaluation results obtained in Chapters 10 - 15, and these will be related to each other in order to produce the triangulation mentioned above.

16.2 Evaluation of the introductory course in information retrieval for undergraduates

16.2.1 The part of the user education programme which had received highest priority was the introductory course in information retrieval for undergraduates. As a result, there was a corresponding concentration on the evaluation of this course. This was carried out by means of a questionnaire on student attitudes (described in Chapter 10), by means of achievement measurements (Chapter 11), by means of pre-structured interviews intended to provide information on the realization of specific objectives (Chapter 12), and by means of descriptive observational studies and interviews with participants (Chapter 13). In addition, changing patterns of library use at Chalmers University of Technology Library were studied (Chapter 14) and, as
priority had been given to the undergraduate course during the first year of development, changes in the pattern of library use provided correlating information on the effects of this course.

16.2.2 Realization of the main goals for the programme of user education

The main goals for the programme of user education at Chalmers Library have been expressed, as follows (see 6.5.2):

After completing the user education programme, the student should have obtained:

1. The ability to apply the principles of scientific communication to problems of information retrieval.
2. The ability to use the various tools available in the university library (and other libraries) in order to obtain information useful in connection with studies and later work, as and when required.
3. A sense of enjoyment in information searching.

1. The first of these goals is concerned with enabling the student to realize why to use a particular information channel or particular tool in a given situation. Students pointed out spontaneously in connection with the telephone interviews (12.3.5) that one of the advantages of the course in information retrieval was that they obtained a systematic view of the process of obtaining information. Some students commented that they had asked for help previously, and obtained this, but had never managed to grasp why certain tools should be used in information searching.
This was also brought out in the student interviews described in Chapter 13 (13.4.5), where a number of students who had carried out literature searches prior to attending the course were able to compare and contrast their experience, with regard to information searching, before and after the instruction given.

It has often been assumed (and stated) that the best form of library instruction is by personalized service at the information desk. This was not confirmed by the student interviews. Students described how they had previously received help with their immediate problems in information searching. They went on to say that they had not understood the reason for using particular information retrieval tools or search strategies, and that they were therefore unable to cope with similar information retrieval problems in the future. These interviews revealed that at least some of the students had obtained a systematic view of scientific communication, and that they had managed to apply this in a practical literature search.

2. With regard to the second goal for the programme, it was shown in Chapter 11, that nearly all the students who submitted lists of references in connection with the introductory course in information retrieval had managed to use the various tools available in the university library to carry out a successful information search. This was also confirmed by the observational studies described in Chapter 13 (13.3.3), where it was seen that
the students managed to successfully use tools such as abstracts and indexes in order to obtain references of interest in connection with their studies.

In Chapter 14, it was shown that the undergraduates at Chalmers Library appeared to be making greater use of tools for information retrieval such as abstracts and indexes (14.3.4) in 1975 than in 1974, and it was suggested that this might be a result of the courses in information retrieval that had been held during the academic year 1974/75.

3. The observational studies, described in Chapter 13, provided evidence that the third goal - a sense of enjoyment in information searching - was being realized by students participating in the course. In particular, students appeared to enjoy carrying out the literature search (13.6.1). This was also borne out by the attitudes of students to the instruction; as shown by the questionnaire responses (Chapter 10), the majority of 3rd and 4th year engineering students were positive to the course as a whole (10.3.2), and to the practical literature search in particular (10.3.7). However, the first year students of architecture were far less positive to the course as a whole (10.3.2) and also to the practical search (10.3.7).

16.2.3 The realization of specific objectives
The specific objectives for the introductory course in information retrieval were formulated in 6.5.5. An evaluation of the realization of these specific
objectives was studied, in particular, by means of the pre-structured interview technique described in Chapter 12. Realization of these specific objectives will be described in the same order as they are listed in 6.5.5:

1. With regard to the concept of the time pattern for information flow - 90% of the students from the Schools of Civil Engineering, Electrical Engineering, Engineering Physics and Mechanical Engineering (CEPM group), knew that information would be published earlier in report form than in the corresponding journal article, whereas 72% of the students interviewed from the School of Architecture (A group) were aware of this time pattern (12.3.3).

2. 96% of the students interviewed were aware that information could be conveyed by written and spoken channels (12.3.3).

3. With regard to different types of information search - (12.3.4).

(a) For general orientation about a new subject topic. 77% of the CEPM group said that they would use an encyclopedia or textbook, or review article, the corresponding figure for the A group was 18%.

(b) Search for factual information.
74% of the CEPM group said that they would refer to handbooks, data collections or tables. The corresponding figure for the A group was 45%.

(c) A current awareness search based on a given subject topic.
30% of the CEPM group said that they would make
use of a current-awareness publication of the type "current-contents". The corresponding value for the A group was 18%.

This showed that students were aware of different types of search, and, with the exception of the current awareness search, the tools to use to find information.

4. The awareness of specific tools for information retrieval was also seen in 12.3.1, where it was shown that a higher percentage of all the student groups who had taken the introductory course in information retrieval were aware of tools for information retrieval, than students who had not taken such a course. The use of several of these tools for specific types of search has already been referred to under 3. In the lists of references presented by the students (11.2.1), the secondary and primary sources used for obtaining these references were indicated (see Chapter 11 Appendix). These lists provided clear evidence that the students had used a variety of information retrieval aids in their search for information. Further evidence of the use of the various tools for information retrieval was provided by the observational studies described in Chapter 13 (13.3.3).

5. Chapter 11 described the lists of references presented by the students as a result of their information searches. Examples of these lists are given in the Appendix of that Chapter.
16.2.4 Conclusions

It can be concluded that the introductory course in information retrieval for undergraduates is functioning very well for the students from the Schools of Civil Engineering, Electrical Engineering, Engineering Physics and Mechanical Engineering. However, this 14 hour introductory course does not appear to be a very satisfactory form of library instruction for the first year students from the School of Architecture.

The relative failure of the introductory course in information retrieval for first year students from the School of Architecture raises a series of interesting questions. Was the failure due to the timing of the course - first year as opposed to third year for students from the Schools of Civil Engineering, Electrical Engineering, Engineering Physics and Mechanical Engineering? Was the failure of the course due to the different information needs in relation to the subject of architecture as compared with the engineering subjects? Were the information needs of students with project-linked studies different to those of students following the traditional 'lecture and laboratory' courses at Chalmers? (See 7.7.2). Alternatively was the failure of the course due to a combination of these factors?

The original reason for holding the 14 hour introductory course for first year students of architecture was in response to a direct request from student and staff
representatives of the Education Board of the School of Architecture (See 7.7.2). These representatives had emphasized the supposed need of first year students of architecture for a relatively long introductory course in information retrieval, in relation to the form of teaching in the School of Architecture - project education. However, as a result of the evaluation studies described in Chapters 10 to 13, it could be seen that the present 14 hour course was not satisfactory for these first year students.

After discussions with students and members of the academic and library staffs, I decided to alter the library education programme for students from the School of Architecture:

An introductory course of three hours will be given for first year students during the fourth study period. These students have received a short introduction (about one hour) in the use of their special Section Library, which has open access. In addition, they are familiar with the use of the open-access public libraries. (2.3.5). The objectives of the proposed course for first year students are concerned with providing orientation in the use of the closed-access university libraries - Chalmers Main Library and the Gothenburg University Library (See 6.5.4) and with an introduction to the pattern of information flow from producer to receiver and the use of one index and one abstract publication for the retrieval of material that will be of use during the early study
projects. A description of the proposed course will be given in 17.2.2.

The course previously given to the first year students, will be offered as a non-compulsory course for third and fourth year students. The present third and fourth year students have not received a project-based university education, from the first year, as do the present students. Therefore, the course will be offered to them in much the same form as for the engineering undergraduates. Evaluation studies will be carried out, and these should provide information as to whether a course in information retrieval, similar to that given to third and fourth year engineering students, is suitable for third and fourth year students of architecture. This will show whether the information needs for the different subjects are similar, at the same point of time, or whether the information needs, and consequent courses in information retrieval, are different in the subject areas engineering and architecture.

It is hoped that evaluation studies of the proposed library orientation/instruction course, to be given to first year architecture students, will provide information on the suitability of this type of short course as an introduction for students with project-linked patterns of university education. It will be interesting to compare evaluation studies for first-year library introductory courses, for students of architecture, with
those for the proposed project-linked library instruction courses for first year students in Mechanical Engineering (See 17.2.1). It is hoped that such comparisons will provide further information on the possible subject-linked information needs of students, thus enabling the better design of courses on how to obtain the material required.

16.3 Library orientation

Preliminary observational studies of the self-instructional material provided for library orientation have been carried out (See Chapter 15). From these preliminary studies it was concluded that the orientation material so far provided was of help to students; but that it did not, alone, supply adequate orientation for new library users. (15.4). The need for library orientation was confirmed by the interviews with student participants in the course on information retrieval (13.4.3). As a result of these findings further work will be done on the development of orientation material and courses for new users (See 17.2.1).
17.1 Summary of the results

17.1.1 Background studies

This study has described the development of a programme of user education at Chalmers University of Technology Library, Gothenburg, Sweden. Chalmers Library is built as a traditional Swedish closed-access university library, with the information material mainly stored in a seven story book-tower. The Library serves an undergraduate population of 3,500, together with approximately 500 postgraduates from Chalmers University of Technology. At the same time, it acts as university library for students from the departments of Astronomy, Chemistry, Mathematics and Physics at Gothenburg University. In addition, Chalmers Library functions as central library of technology for technical and industrial organisations throughout Sweden - in particular for the west coast region.

Chapter 2 gave an account of a background user study at Chalmers University of Technology Library. It was shown that very few (6%) of the undergraduates used the library as a place for optional studies and that the majority (92%) bought most of the literature for their studies. Postgraduates made greater use of the library for optional studies (17%) and borrowed more material for their work. (2.3.1 & 2.3.3.)
As so few of the undergraduates made use of Chalmers Library for traditional purposes of study or for borrowing material in connection with their studies, it was asked how much did they know of the information resources available at their university library? In section 2.3.5, it was shown that while 71% of the undergraduates were aware that the library possessed a subject catalogue, only 25% were aware of the existence of abstracts, 32% of the existence of indexes and 46% of other bibliographic aids, and 36% had heard of interlibrary loan services. Of the postgraduates, 88% knew of the subject catalogue, 71% were aware of the existence of abstracts, 66% of indexes, 66% of other bibliographic aids, and 80% had heard of interlibrary loans. Of the undergraduates and postgraduates who knew of the existence of the subject catalogue, approximately half said that they either did not use it or experienced difficulties in its use. These results showed that many students were not aware of the resources for information retrieval available at Chalmers Library.

As little organised instruction of undergraduates had been available, there were few students who had received instruction in library use. With reservations due to the small size of the sample, it appears that the students who have received instruction have greater knowledge of the tools for information retrieval than
students who have not received such instruction. It could also be tentatively concluded that courses on information retrieval would be more effective if not given at the start of university studies but at a point more near the time when the undergraduates require to carry out information searches in connection with their university studies.

For purposes of comparison, a similar pilot survey of user patterns was carried out at the Biomedical Section of Gothenburg University Library. (Chapter 3.) This is also a specialized university library, but differs from Chalmers Library in that a considerable portion of the collection is available on open shelves. The medical undergraduates stated that 21% used the library for optional study and 75% stated that they bought "practically all" the literature required for their studies. Corresponding values for postgraduates were 24% and 6%. With regard to awareness of tools for information retrieval, 64% of the undergraduates knew that the library possessed a subject catalogue, 51% that there were abstracts available, 57% that there were indexes and 36% that there were other bibliographic aids, 37% had heard of interlibrary loans. Fewer of the medical undergraduates were aware of the subject catalogue than the students at Chalmers University, and this may be due to the fact that the user in an open library
tends to go directly to the shelves for material. Very few of the medical undergraduates had received instruction in library use, but 43% of the postgraduates had received this training - both groups appeared to have greater awareness of the tools for information retrieval, than the corresponding groups who had not received instruction. The need for library instruction was apparent, and 30 out of the 114 undergraduates and 9 out of 41 postgraduates specifically stated that they felt a need for more courses in library use and methods of information retrieval. With reservations due to the small size of the sample, it appears that courses in information retrieval are more effective during a later part of the course, rather than in the first term at university.

The two surveys, described in Chapter 2 and 3, had shown the need to attract more students into the libraries and the need for instruction in the use of the resources available there. Each year, at Chalmers University Library, 800,000 kronor, out of a budget of 3,000,000 kronor, are spent on information material. If this material is to be of use to students, they will have to come into the library, and learn how to use the various tools available.

A study was made of existing user instruction in British and Scandinavian university libraries, in order to obtain information on the organization and
timing of courses, the methods used for instruction, and the evaluation work carried out. This study is reported in Chapter 4. The information collected was of great value in the planning and organisation of the programme of user instruction at Chalmers Library. Amongst other things, the use of tape/slide material for library instruction was noted in the British university libraries. This material, produced under the SCONUL tape/slide project, appeared to be particularly suitable for certain forms of user instruction and this led to experimental use and evaluation of some of this material, for the teaching of Swedish library users. (See Chapter 9.) It was also noted that, while the importance of evaluation was often pointed out, few systematic evaluation studies of a programme of user instruction had been carried out. I decided that it was necessary to carry out detailed evaluation of the library education programme at Chalmers University Library.

17.1.2 The formulation of goals and objectives and the choice of teaching methods

Having carried out the background studies described in Chapters 2 to 5, an attempt was made to study the needs of the student library user, as seen by the students, members of the academic staff, members of the library staff, the administrative staff and practising industrial engineers. (6.4.) It was seen that there were differences in the needs of the
student library user as perceived by these various groups. (6.4.8.) The goals for any programme of library education must be in accordance with the goals expressed by the students and academic staff. As Watkins pointed out "It is now and always will be the classroom and its ideals which, by and large, determine the activity at our loan desk. (Watkins, 1970.)"

I made an attempt to formulate goals and objectives for the programme of user education at Chalmers Library, in which the views expressed by the various groups were integrated, as far as possible. The main goals were expressed as follows: (6.5.2)

After completing the user education programme, the student should have obtained:
1. The ability to apply the principles of scientific communication to problems of information retrieval.
2. The ability to use the various tools available in the university library (and other libraries) in order to obtain information useful in connection with studies and later work, as and when required.
3. A sense of enjoyment in information searching.

A three-stage programme was drawn up:
1. Orientation for new users
2. An introductory course in information retrieval for undergraduates
3. An advanced course in information retrieval for postgraduates.

Specific objectives were then formulated for each of these parts (6.5.3-6.5.5). Attention was then given to the choice of teaching methods and media, and to questions of course content and timing for the three parts of the programme (7.3-7.4). In the practical planning of the user instruction, a decision had to be made as to priorities. It was shown in a study of the day-to-day use of Chalmers Library (See Chapter 14) that the engineering undergraduates were by far the largest category of users, so it was decided to start by concentrating on courses for the undergraduates. The students had themselves indicated that they wanted to be able to find information in connection with their undergraduate research project. Therefore priority was given to an introductory course in methods of information retrieval for third and fourth year students. At the same time, work was started on self-guiding methods of orientation which would help all new users.

The basic proposal for a fourteen hours course in information retrieval was presented to the six Education Boards of the different Schools of Engineering. This led to discussions about timing and organisation and resulted in six variants of
the basic course. Each School of Engineering was given a course designed to meet the specific needs of the students from that School.

Teaching began in the autumn of 1974, and at the same time orientation material - a Guide to the use of the Library and other self-guiding material - was distributed. During 1974/75 a total of 33 undergraduate courses was held. A start was also made with the postgraduate courses and one course was given for practising engineers.

17.1.3 Evaluation studies
It was decided to evaluate the introductory course in information retrieval in a number of different ways, in order to obtain as full a picture as possible of how the course functioned. It was hoped that this evaluation would provide information that could be used in the formative development of the course. The introductory course was evaluated by means of studies of student attitudes to the course as a whole and to course content, instructional material, teaching methods - lectures, demonstrations and practical exercises, and to the organisation of the course. The introductory course was also evaluated by means of performance - in the form of lists of references obtained during the literature search. This provided information on the product of the course in information retrieval. Further evaluation was
carried out by means of pre-structured interviews, designed to provide information as to how well specific objectives, such as awareness of tools for information retrieval, had been fulfilled. Descriptive evaluation and interviews were also used to provide an insight on the functioning of the course. These evaluation studies are reported in Chapters 10 to 13, and summed up in Chapter 16.

It has been concluded that the introductory course in information retrieval for undergraduates, is, after several modifications, functioning very well. The material used for the self-instructional orientation has also been evaluated to some extent. (See Chapter 15 and the interviews in Chapter 13.) The self-instructional material so far provided does not, alone, provide adequate library orientation for new users. As a result of the evaluations carried out, there are plans for further development of library orientation at Chalmers Library - see section 17.2.

17.2 Further work to be done at Chalmers Library

17.2.1 Library orientation

Interviews and discussions with students revealed that there was considerable need for orientation - see section 13.4.3 and Chapter 15.
"So you come into the library and it's like a jungle, lots of books..."

The self-instructional material so far provided gives some help, but more work is required to give the engineering undergraduates adequate orientation in the use of Chalmers Library.

A tape/slide prototype has been made (Ch.15, Appendix), and this will be used in connection with a short introductory lecture about how to use a closed-access library. This lecture will be given to new undergraduates during the first few weeks of term. The tape/slide guide to the use of the library will also be used as self-instructional material, arranged, in the entrance to the library, so that it can be started by any user.

As was seen in Chapter 2, most of the students have had access to a school library and used the public library, before coming to university, so they have a certain amount of knowledge about how an open library works. Therefore the tape/slide guide to the use of Chalmers Library has been designed to emphasize the points that may seem strange to the students - the absence of books on open shelves, the need to fill in a loan-requisition form with the correct store-mark etc.
It was stated in 15.5.1 that it was hoped to start a pilot project for first year students from the two largest Schools of Engineering - Mechanical and Electrical Engineering, in which first year students would work in small groups and make use of the library for a project in connection with their other studies. This suggestion was put to representatives from the Education Boards of these two Schools of Engineering. The suggestion was received very positively and has resulted in a definite proposal for a trial project involving about 30 voluntary first year students of mechanical engineering. These will work in groups of four or five, each led by a member of the teaching staff, who will devote five hours teaching time to this work. The member of staff will work in close cooperation with members of the library staff who will also devote five hours teaching time to each of the groups concerned. The students will be asked to write a review article on a topic of general interest in connection with their studies. They will receive training in how to use the library to look up information, in critical assessment of the information obtained, and presentation of this in a logical and readable form. An application for a grant to cover the costs of the teaching will be made to the fund for educational development. In the case of the School of Electrical Engineering, it is hoped to be able to link this project work to an introductory course held in the second half of the first term.
These projects will give the first year students a motivation to use the library, in connection with their studies. The pilot scheme will provide a good opportunity for integration of library instruction with other university studies, and give the library staff a chance to work in close cooperation with members of the teaching staff.

17.2.2 Introductory course for students of architecture

The 14-hour introduction to information retrieval course was shown, in Chapter 10-12, to be not very satisfactory as a form of instruction for first year students of architecture. As a result, this course will be offered for students in the third and fourth years and a special introduction course for the first year architecture students has been planned, which will be given to 60 students, during the second half of the summer term 1976 (See 16.2.4). These students will have received a short introduction (about one hour) in the use of their special Section Library which has open access. They will be given an introduction into the use of the closed-access main library, and the use of two secondary publications - Swedish Newspaper Articles and Swedish Periodical Articles, plus the use of the UDK abstract catalogue. The Library of Congress Classification System will be explained in relation to the UDC system used at the Architecture Section Library. This instruction will last for two hours and it is hoped to link it with one of the projects undertaken in the first year.
In addition, through cooperation with the Gothenburg University Library, students will receive a one hour orientation in how to use the Gothenburg University Library, with the Swedish SAB classification scheme. It is hoped that this course will give the students the ability to use the three libraries that may contain material which will be useful for their project-orientated study course. In addition, it is hoped that the students will be enabled to use secondary publications which will help them to find Swedish material for use in connection with their studies.

17.2.3 Instruction in the use of computer-based information retrieval methods

Taking advantage of the fact that the Library at Chalmers University has received terminal equipment plus a grant for telephone costs etc., it is hoped to start regular computer-based information retrieval services during 1976, in collaboration with the Library of the Royal Institute of Technology, Stockholm (Epos-Vira system) with the Medical Information Centre at the Caroline Institute of Medicine, Stockholm (Medlars, Medline, Biological Abstracts, Chemical Abstracts & Psychological Abstracts), and with the ESA computer data-bases from Frascati, Rome, via the Royal Institute of Technology, Stockholm. In connection with the development of this computer-based information project, with both off-line and interactive on-line searches, it is hoped to study
methods for teaching the users how to carry out information searching in order to obtain optimal results. In particular, studies will be made of the man-machine interface, at the terminal, in connection with interactive literature searching. It is planned to link courses in computer-based information retrieval to the courses already established as part of the programme of library instruction.

17.2.4 Courses for industrial engineers

As a result of the work on the development of a programme of user education at Chalmers University of Technology Library, a grant was given to the Chalmers University Library from SINFDOK (The Swedish Council for Scientific Information and Documentation), for the provision of courses in information retrieval for practising industrial engineers. One such course has been held (autumn 1975) and further courses are planned for 1976. The course that was held in 1975 was given for the Swedish Institute of Production Engineering Research. The course consisted of a one-day seminar in the use of manual methods for information retrieval in the field of mechanical engineering. The librarian from the Institute noticed a definite change in information searching methods, amongst the engineers who had participated in the course. A further course has been requested by the Head of the Institute, and this will take place in autumn 1976. The Swedish
Association of Metal Working Industries has approached Chalmers Library with a request for cooperation in the development of courses for industrial firms—courses to be held locally in various parts of Sweden. It is hoped that it will be possible to achieve cooperation between the staff at Chalmers Library and the staff at industrial libraries, in the provision of courses for industrial engineers.

17.3 Changes in library practise

17.3.1 One of the effects of the programme of user education at Chalmers University of Technology Library has been to increase the contact between the students and academic staff at Chalmers University and the library staff. This increased contact has lead to increased awareness of the needs of the users, for example with regard to accessibility of material, and acquisition of new material (See 12.4). This, in turn, has resulted in suggestions for changes in library practice:

17.3.2 Accessibility

Accessibility of information stored in the library depends partly on knowledge of what to look for and how to obtain it (provided by education of the library user) and the physical accessibility of the material—open or closed collections of literature, and the hours in which material is available.
In connection with the courses in information retrieval, it became more and more apparent that the students would have liked to have had free access to the information on open-shelves. (See 13.4.3.) Chalmers University Library is built as a closed-access library, with literature stored in a book-tower, to which the borrowers have no access. However, during 1976, reorganisation of the chemistry collection has been carried out - the most recent material is available, on open-shelves in the Chemistry Library (see Chapter 1, 1.4.2) and the older material previously kept in closed-stacks, has been made available on open-shelves on the ground floor of the book-tower. Students follow a green spoor line marked on the floor, from the Chemistry Library down two flights of stairs, through the post- and packaging department, to the lowest floor of the book tower. This floor is unstaffed, so much work has been spent on self-guiding signs for directing students to the material they require. In addition, they can use the internal communication system to call for help, to the main Chemistry Library. In spite of the inconvenience of the buildings - collections housed at considerable distance from each other - and the lack of staff in the book-tower, both students and staff from the chemistry departments have been very enthusiastic about this experiment.
As a result of the experiment with the chemistry collection, it is hoped to extend the temporary opening of the book-tower, so that material is made available on open shelves for students from other Schools of Engineering. A start will be made on this during the summer of 1976.

Opening the book-tower can only be regarded as a temporary solution to the problem of availability of material. The study conditions in the closed-tower environment are far from ideal, and plans have been drawn up for the extension of the library with an open and flexible building providing for the integration of open-shelved material and study places.

With the closed-access system, students cannot go and take out the material that they wish to borrow themselves. They have to fill in a loan requisition form, and this is often regarded as being "such a difficult business" (see 13.4.3). At the present time, it is not possible to obtain material after 16.15, as there are only two members of staff working during the evenings. (In practice, the evening staff have often taken out material for the students.) This means that students who finish their studies at 17.00, cannot obtain literature until the next day. The closed collection is not available for use during the evenings. During the interviews students commented on this problem. At present, a committee of the
library staff has been formed to consider whether it would be possible to provide additional service during the evenings — material to be taken out of the stacks, and a limited amount of bibliographic help for library users. Should this be possible, it would increase the availability of the information (bought for over 750,000 kronor annually) by one third per year.

If periodical volumes and numbers are lent out, this means that they are unavailable for other users. During the information retrieval courses, it has been observed that students often come to a stop in their searches because material is out on loan. One way of getting round this problem is to increase the copying service and allow periodical articles to be obtained in the form of photocopies, rather than lending out recent numbers of periodicals. (The most recent material is that in highest demand.) This solution is being considered.

17.3.3 Facilities for the use of audio-visual media

As a result of the use of audio-visual material in user education programme (see 7.3.5; 9.4.3 and 13.3.1), library staff became interested in the use of non-print media in education. Contact with the educational consultant and various members of the academic staff at Chalmers University showed
that interesting experimental work making use of new media had been carried out during the last few years. For example, an "audio-visual learning studio" had been set up at the School of Civil Engineering. In this studio, it was possible to combine the use of various media, and to present up to 6 tape/slide sequences in combination. These could be either teacher-controlled (via remote-control radio steering), automatic-controlled (via pre-pulses) or student-controlled (individual learning stations). Programmed instruction, making use of audio-visual material or computer terminals, was also available. At the School of Architecture a "visualization studio" was opened in 1976, in which it was hoped to be able to present a three-dimensional "overview" of environments in which new buildings were planned. Use was made of the visualization studio in the planning of the extension of the Library (see 17.3.2). During the seventies there has been increasing attention given to the possibilities of language studies for engineers. A number of undergraduates choose an optional course in English studies. During this course extensive use is made of the language. laboratory facilities possessed by the English Department at Gothenburg University. This laboratory is, however, situated at some distance from Chalmers University.
These developments, together with experience gained from the tape/slide lending bank (see 17.4.5) have resulted in a growing realization that the Library must provide facilities for the use of audio-visual media and for the storage of such material as tape/slides, films, audio-tapes etc.

A start has been made, in the provision of facilities, by the construction of a well-equipped seminar room, for 30 people. This room has a separate audio-visual unit where equipment for showing tape/slides, films, video-tapes is available. Projection occurs through a glass window. Simultaneous use of up to three units is possible. This seminar room will be used for, amongst other things, the training of university teachers, during 1976/77.

During the reorganization of the material stored in the book-tower (see 17.3.2) one area of the Library, previously used for the storage of a number of periodicals - the gallery in the reading room - will be refitted. It is hoped to provide individual learning carrels where students will be able to listen to tapes (for language studies) or listen/watch audio-visual tape/slide presentations.

These examples show how the user education programme, with resultant increase in contact between the university teaching staff and the library, has
indirectly affected library practice with regard to non-print media. The role of the library with regard to this type of material is, as has been pointed out by Enright, closely dependent on their use within the education programme of the university - it is "essential at the present time for librarians to be fully aware of the problems and possibilities of new media, and to examine them carefully in relation to the role and functions of each particular library" (Enright, 1972).

17.3.4 Information on library resources

During the talks with academic staff on the needs of the student user of the library (6.4.3), it became apparent that many of them were unaware of the resources possessed by the library. This leads to duplication of resources and to non-use of material that costs a considerable sum of money. As a result of this, it was decided to start a project for the computer-based production of a list of the approximately 5,000 periodicals held by the library. This could be used for the generation of a series of subject-orientated lists of holdings, for distribution to the various departments at Chalmers University. The Library has received a grant of 100,000 kronor for this work.
In addition, studies are taking place as to the feasibility of reproducing the subject catalogue in micro-form for distribution to the university departments. With the advent of central cataloguing in the Swedish LIBRIS System (Library Information System), it will be possible to obtain micro-products of the material catalogued. Distribution of this information to the university departments could result in less duplication of material and consequent saving of the total resources of the university.

17.3.5 Improvement in library tools

In the study of user needs described in Chapter 2, and in the study of the daily use of Chalmers Library in Chapter 14, it was seen that many students did not use the subject catalogue, and many reported difficulties in its use (2.3.5 & 14.3.5). During the information searches carried out by the students, it was possible to see how many students had difficulty in finding appropriate search terms. Therefore, during the summer of 1975, a revision of the subject-index to the subject catalogue was carried out, in which the number of search terms was considerably increased, together with the cross-references.
The author catalogue had, previous to 1975, existed in one unbroken suite. However, the system for cataloguing had been changed in 1966. This combination of two systems in the same catalogue appeared to be confusing for the library users — in particular new users, so the author catalogue was split up during the summer of 1974, into a part "up to 1966" and a part "1966 onwards". Signs explaining the use of these different systems were then put up over the appropriate catalogues.

17.3.6 Improvement in library services

It was noted in the survey of the daily use of the library, described in Chapter 14, that many users were unaware that the Library had a reprocentre for photocopying. In 1974 there was a rather small notice placed inconspicuously amongst other notices on the top of the circulation desk, giving directions to the Reprocentre. This notice was replaced, during 1975, by a series of clearly lettered signs (in red) showing the way to the Reprocentre from various parts of the library. This may have been a contributory factor to the fact that more people made use of the centre during 1975 than in 1974 (14.3.9).

As a result of the courses in information retrieval, more students needed to work in the main reference hall. Extra work places were provided (18) by the
reorganisation of the catalogues and rearrangement of space.

Group rooms have been provided for students, on the second floor of the library and it is planned to increase the number of study places in the reading rooms by reorganising the space on the reference gallery above the main study area.

As was noted in section 7.8, there was a modification of the general borrowing regulations for Chalmers University of Technology Library, in connection with the production of a Guide to the Use of Chalmers Library. Rules were made easier - students from Chalmers University could borrow by showing their student legitimation and other borrowers had to show an official identity card.

17.4 The development of user instruction at other university libraries

17.4.1 It is hoped that the development of user instruction at Chalmers University of Technology Library will stimulate the development of user instruction at other libraries. From the start, there has been considerable interest in the various aspects of the user instruction programme. This may be partly due to descriptions of the work in progress at a number of meetings and conferences:
17.4.2 Meetings and Conferences

1974


Fjällbrant, N., & Westberg, S., "Användarundersökning vid Chalmers tekniska högskolas bibliotek" (User instruction at Chalmers University of Technology Library), West Swedish Section of the Technical Literature Society, Gothenburg, October 1974.
1975


Fjällbrant, N., & Westberg, S., "Erfarenheter från användarundervisning vid CTHB". (Experience of user instruction at Chalmers University of Technology Library.) Annual Meeting of the Technical Literature Society, Borås, 3rd-4th June, 1975,

Fjällbrant, N., "Chalmers Tekniska Högskola satsar på brukeropplaering". (Chalmers University of Technology supports user instruction.) Seminar on user instruction arranged by the Norwegian Documentation Group and the State College of Librarianship, Oslo, 17th - 19th October 1975.

1976
Fjällbrant, N., & Westberg, S., "Användarutbildning vid CTH." (User instruction at Chalmers University of Technology.) Meeting of the Pharmaceutical


Coming meetings:


Many of these meetings have given rise to discussions on user instruction, and been very valuable from the point of view of personal contacts with people interested in and working on the development of user instruction. The meetings have enabled an exchange of ideas and experience between the various people taking part.
17.4.3 Teaching in Library Schools

Partly as a result of the development of the programme of user instruction at Chalmers Library, the subject "Education of the library user" has been introduced into the curriculum of the Swedish College of Librarianship, Borås, from the academic year 1973/74. The instruction given consists of a six-hours course for research librarian trainees, in aspects of user instruction - the need for instruction, teaching methods and media, and forms of evaluation. The development of the programme of user education at Chalmers University Library is used as an example for the course. At the present time there are discussions as to whether the course can be extended to include more hours.

Courses on education of the library user have also been given as part of the postgraduate librarian instruction at the Danish Library College, Copenhagen, since 1974. Again there have been suggestions that this part of the course should be increased.

Both these courses are characterized by lively discussion of the need for user instruction in various types of libraries and the ways in which this can be achieved.
17.4.4 Compendia production and distribution

The compendia, produced in connection with the course in information retrieval at Chalmers Library (7.4.2), have been widely distributed to a number of libraries, both in Sweden and in other countries. Copies of the compendia were automatically distributed to Swedish academic libraries. In addition, 434 copies have been sold to various libraries - academic, industrial and public - within Sweden, and 84 copies have been sold to libraries in other countries. These figures can be compared with the 600 copies sold in connection with courses at Chalmers Library.

17.4.5 Bank of tape/slide material

During 1975 a bank of tape/slide material, primarily that produced under the SCONUL tape/slide project (9.3.1), has been set up at Chalmers University Library. This material was available for loan to other libraries throughout Scandinavia. This material was lent out during the period 1974 to March 1976 a total of 63 times - 41 loans to Swedish University Libraries and 22 to libraries in other countries. Those tape/slides most frequently loaned were "Introduction to Information Retrieval", "Guide to the Medical Literature" and "Guide to Chemical Abstracts". It is hoped that these short term loans have stimulated other libraries to buy and use tape/slide material.
17.4.6 **Educational development project**

As a result of the development of the programme of user education at Chalmers University of Technology Library, a grant of 10,000 Kronor was provided by the Office of the Chancellor of the Swedish Universities, in June 1975, for an educational development project involving 15 university libraries. This project was set up in order to stimulate the development of user instruction in Swedish university libraries.

As part of this project, a round-table conference on library user education was held, in Gothenburg, in November 1975. This meeting was attended by some 30 representatives from 15 libraries. It was hoped that the meeting would provide an initial stimulus and encourage the development of user education in a number of university libraries.

One result of the meeting has been the collection of material produced in connection with library user education. This material is available for use by other libraries in the development of further teaching material. One example of such cooperation is a Guide to the Use of Örebro University Library, which has been modelled on the Guide to the Use of Chalmers Library.

The next stage of the project will be a survey on user education in Swedish academic libraries in order to assess the development of this aspect of library work.
The survey will be similar to that carried out by Fjällbrant in 1973 (Fjällbrant, 1974), in order to allow comparisons to be made and an assessment of change during the last three years.

17.4.7 Scandinavian Round Table Conference on User Instruction

A grant of 30,000 kronor has been obtained from the Nordic Cultural Foundation for the arrangement of a Scandinavian round-table conference on library user education, at Gothenburg, during November 1976. This will enable representatives from the Scandinavian countries to have the opportunity for discussion of the present situation with regard to library user education in Scandinavia, and give them the possibility of planning for future development. It is hoped that this will provide the basis for cooperation in this aspect of library service.

17.5 Main points of the study

The study describes the development of a programme of library user education at Chalmers University of Technology Library. It was shown that there was a need for instruction in the use of the library and its resources. The needs of student library users, as seen by students, academic staff, library staff, administrative staff and engineers, were studied. These views were used in the formulation of goals and objectives for the programme of user education. A three stage programme was drawn up:
1. Orientation for new users
2. An introductory course in information retrieval for undergraduates
3. An advanced course in information retrieval for postgraduates

Teaching methods and media were chosen for the various parts of the programme. Priority was given to the development of the introductory course in information retrieval for undergraduates and to library orientation, as these would reach the largest group of potential library users.

The undergraduate course was evaluated in a number of ways, as part of the formative process development, and in order to provide information on the product of the instruction. Modifications were made in the undergraduate course, and these have resulted in a model which now functions very well.

It has been shown that, by taking account of student needs, a successful course of library instruction, integrated into the general pattern of university studies, can be developed. This course is now attended by practically all the undergraduate students at the university.

Much work remains to be done, however, in for example library orientation, the development of instruction
in computer-based information retrieval, and the further development of courses for industrial engineers.

Perhaps the most important point arising from this work is that library user education is not an isolated function at the library. It needs to be integrated into the general pattern of studies at the university, as has been shown above. User education also needs to be closely integrated into other functions and activities at the library. It provides the opportunity for increased contact between members of the library staff and user groups such as students and members of the academic staff. This increased contact can lead to increased awareness of the needs of the users. This, in turn, can lead to changes in other service functions at the library, in order to meet these needs. At Chalmers University Library, the programme of user instruction has had a marked effect on many aspects of library work.

User instruction at one library is not isolated from practice at other libraries. Through discussions and cooperation, it is possible that the development of a programme of education at one library will affect the development of instruction at other libraries.
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Chapter 2. Appendix 1.

EDUCATIONAL DEVELOPMENT PROJECT

I. University studies

1. To which section do you belong?

<table>
<thead>
<tr>
<th>Section</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<th>6</th>
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<tbody>
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<td>E.</td>
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<td></td>
<td>1 Electrical Engineering</td>
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<td>2 Mechanical Engineering</td>
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<td>3 Engineering Physics</td>
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<td>V.</td>
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<td>4 Civil Engineering</td>
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<td>K.</td>
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<td>5 Chemical Engineering</td>
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<tr>
<td>A.</td>
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<td></td>
<td>6 Architecture</td>
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</tbody>
</table>

2. To which faculty do you belong?

- Natural Sciences
- Social Sciences
- Liberal Arts
- Medical/Dental

<table>
<thead>
<tr>
<th>Faculty</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<tbody>
<tr>
<td>Natural Sciences</td>
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<td>1</td>
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<tr>
<td>Social Sciences</td>
<td></td>
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<td>2</td>
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<tr>
<td>Liberal Arts</td>
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<td>3</td>
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<tr>
<td>Medical/Dental</td>
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<td>4</td>
</tr>
</tbody>
</table>

3. What subject are you studying?

------------------------------------------
------------------------------------------

13. Which course are you taking?
(for example Basic Course A)

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<table>
<thead>
<tr>
<th>14 How many terms (including the present one) have you studied at Chalmers/Gothenburg University?</th>
</tr>
</thead>
<tbody>
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<td>□ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 □ 8 □ 9 □ 10</td>
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<tr>
<td>Over 10</td>
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<th>15 Age</th>
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<td>Under 20 years</td>
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<td>□</td>
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<td>20-25 years</td>
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<td>□</td>
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<td>25-30 &quot;</td>
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<td>□</td>
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<td>30-35 &quot;</td>
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<tr>
<td>□</td>
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<tr>
<td>Over 35 &quot;</td>
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<td>□</td>
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</table>

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<tr>
<th>16 Sex</th>
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<tbody>
<tr>
<td>male</td>
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<tr>
<td>□</td>
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<tr>
<td>female</td>
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<td>□</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>17 Do you study full-time or part-time?</th>
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<tbody>
<tr>
<td>full-time</td>
</tr>
<tr>
<td>□</td>
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<tr>
<td>part-time</td>
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<tr>
<td>□</td>
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</tbody>
</table>
18. How many time-tabled (or compulsory) hours of study do you have, on an average, per week, during the term?

- less than 10
- 10-15
- 15-20
- over 20

19. Where do you carry out your optional studies?

- home
- university department institution
- university library
- the departmental library
- the public library
- some other place

If some "other place", please state where

..............................
..............................

II. Family and accommodation

21. Have you children who require looking after at home?

1  

2

yes no

22. If "yes", do you have someone to look after the children?

1  

2

yes no

23. Where do you live?

- student hostel/flat
24 How far is it from where you live to the University/Chalmers Library?

- less than 1 km
- 1-2 km
- 3-5 km
- 5-10 km
- more than 10 km

III Sources for obtaining literature

31 How much of the literature that you require for your studies do you buy?

- practically all
- about half
- practically none

32 If you borrow the literature that you require for your studies, which of the following libraries do you use?

<table>
<thead>
<tr>
<th>Chalmers Main Library</th>
<th>Departmental Library</th>
<th>Chemistry Library</th>
<th>University Library Research Room</th>
<th>Bio-medical Library Reading Room</th>
<th>Public Library</th>
<th>&quot;Other&quot; Library</th>
</tr>
</thead>
</table>
How many hours a week, on an average, during term time, do you use these libraries?

<table>
<thead>
<tr>
<th></th>
<th>Chalmers Main Library</th>
<th>Departmental Library</th>
<th>Chemistry Library</th>
<th>University Library Research Room</th>
<th>University Library Reading Room</th>
<th>Bio-medical Library</th>
<th>Public Library</th>
<th>Other Library</th>
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<tbody>
<tr>
<td>33</td>
<td>over 40</td>
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<td>34</td>
<td>31-40</td>
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<td>35</td>
<td>21-30</td>
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<td>36</td>
<td>11-20</td>
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<td>37</td>
<td>6-10</td>
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<td>38</td>
<td>5 or less</td>
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</tbody>
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1  2  3  4  5  6  7  8

How many days a week, on an average, during term time do you use these libraries?

<table>
<thead>
<tr>
<th></th>
<th>Chalmers Main Library</th>
<th>Departmental Library</th>
<th>Chemistry Library</th>
<th>University Library Research Room</th>
<th>University Library Reading Room</th>
<th>Bio-medical Library</th>
<th>Public Library</th>
<th>Other Library</th>
</tr>
</thead>
<tbody>
<tr>
<td>39</td>
<td>6 days/week</td>
<td></td>
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<tr>
<td>40</td>
<td>4-5 days/week</td>
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<tr>
<td>41</td>
<td>1 day/week</td>
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<tr>
<td>42</td>
<td>once a fortnight</td>
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<tr>
<td>43</td>
<td>once a month</td>
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<tr>
<td>44</td>
<td>less than once a month</td>
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</tbody>
</table>

1  2  3  4  5  6  7  8

45 Are the hours of opening at Chalmers / University Library sufficient for your needs?  yes  no

46 When you wish to work at Chalmers / University Library, is there room?

- always
- nearly always
- sometimes
- never
- do not work there

1  2  3  4  5
<table>
<thead>
<tr>
<th>Question</th>
<th>Very Often</th>
<th>Often</th>
<th>Seldom</th>
<th>Never</th>
<th>Do Not Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>How often, during the past year, have you wished to borrow a textbook or journal article (recommended course literature) for your studies and found that this was not immediately available?</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>How often, during the past year, have you wished to borrow a textbook or journal article (other than recommended course literature) for your studies and found that this was not immediately available?</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>How often, during the past year, have you wished to use the library's reference collection for social reasons - for example, meeting friends</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>How often, during the past year, have you wished to carry out literature searches and make use of the reference collection for your own material</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

How do you use Chalmers / University Library?
IV User instruction

50 Did you receive any instruction in how to use a library, at school?

1 2
yes [ ] no [ ]

51 Was there a library at your school (grammar school, etc.)?

1 2
yes [ ] no [ ]

If 'yes,' did you use the school library for study purposes or for recreational reading?

mostly for studies [ ]
mostly for recreation reading [ ]
equally for studies and recreational reading [ ]

53 Did you use a public library before you started your university studies?

yes [ ] no [ ]

If 'yes,' mostly for studies [ ]
mostly for recreational reading [ ]
equally for studies and recreational reading [ ]

54 Has Chalmers/University Library a subject catalogue?

yes [ ]
no [ ]
do not know [ ]

55 If 'yes,' have you any difficulties in using the subject catalogue?

yes [ ]
no [ ]
do not use it [ ]
Has Chalmers / University Library

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>56</td>
<td>abstracts</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>57</td>
<td>indexes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>58</td>
<td>other bibliographic aids</td>
<td></td>
<td></td>
</tr>
<tr>
<td>59</td>
<td>If there are abstracts, indexes and/or bibliographic aids, have you received any instruction in how to use these?</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>Have you experienced any difficulties in their use?</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If you have experienced difficulties, please try to describe them

.................................................
.................................................
.................................................

61 | If you want to obtain information within a new field of studies, would you use the subject catalogue |   |   |   |
|   | "" author "" |   |   |   |
|   | "" subject bibliography "" |   |   |   |
|   | ask a member of the academic staff |   |   |   |
ask a member of the library staff □ 5
   " " friend or colleague □ 6

62 Are there people at Chalmers / University Library who can help you to find material?
   yes □ 1
   no □ 2
   do not know □ 3

63 Do you find it difficult to ask the library staff for help?
   yes □ 1
   no □ 2

If "yes", why?
.................................................
.................................................

64 Have you ever asked for help?
   yes □ 1
   no □ 2

65 Do you think that the library staff are in general:
   always very helpful □ 1
   helpful but often busy □ 2
   not particularly helpful □ 3
   never helpful □ 4
   do not know

66 Have you heard of "interlibrary loans"?
   yes □ 1
   no □ 2
What are they?

67 Have you used these?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>yes</td>
<td>1</td>
</tr>
<tr>
<td>no</td>
<td>2</td>
</tr>
</tbody>
</table>

68 Have you received any form of written or verbal training in how to use Chalmers / University Library?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>yes</td>
<td>1</td>
</tr>
<tr>
<td>no</td>
<td>2</td>
</tr>
</tbody>
</table>

69 If "yes", when did you receive this training?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>during the first two weeks of your first term</td>
<td>1</td>
</tr>
<tr>
<td>later during the first term</td>
<td>2</td>
</tr>
<tr>
<td>during the second term</td>
<td>3</td>
</tr>
<tr>
<td>later</td>
<td>4</td>
</tr>
</tbody>
</table>

70 What form did the training take?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>written instruction</td>
<td>1</td>
</tr>
<tr>
<td>verbal instruction by academic staff</td>
<td>2</td>
</tr>
<tr>
<td>&quot; &quot; &quot; library &quot;</td>
<td>3</td>
</tr>
<tr>
<td>some other form</td>
<td>4</td>
</tr>
</tbody>
</table>

If some "other form", please describe this:

<p>| | |</p>
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</tr>
</tbody>
</table>
Did you find the instruction useful?  

- Yes [ ] 1  
- No [ ] 2  

If "no," why?  

Is there anything in particular that you think is bad at Chalmers / University Library?  

Is there anything in particular that you think is especially good at Chalmers / University Library?
PEDAGOGISKT UTVECKLINGSPROJEKT

av
Nancy Fjällbrant

I Din studiesituation

1 Vilken sektion tillhör Du?

   E  □  1
   M  □  2
   F  □  3
   V  □  4
   K  □  5
   A  □  6

2 Vilken fakultet tillhör Du?

   naturvetenskaplig □  1
   samhällsvetenskaplig □  2
   filosofisk      □  3
   medicinsk      □  4

3 Vilket ämne studerar Du?

   .....................................................
   .....................................................

13 Vilken kurs

   (ange exempelvis Grk. A)
   .....................................................

14 Hur många terminer (inkl. denna har Du
   studerat vid Chalmers/Universitetet?)

   □  1
   □  2
   □  3
<p>| | | | | | | | | | |</p>
<table>
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<tbody>
<tr>
<td>15 Ålder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 20 år</td>
<td>□</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-25 år</td>
<td>□</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25-30 &quot;</td>
<td>□</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30-35 &quot;</td>
<td>□</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Över 35 år</td>
<td>□</td>
<td>5</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 Kön</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>manlig</td>
<td>□</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>kvinnlig</td>
<td>□</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 Studerar Du på heltid</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>heltid</td>
<td>□</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>deltid</td>
<td>□</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 Hur många schemabundna (eller i övrigt obligatoriska) undervisningstimmar har Du pr vecka i genomsnitt under terminen?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mindre än 10</td>
<td>□</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-15</td>
<td>□</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-20</td>
<td>□</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>över 20</td>
<td>□</td>
<td>4</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
19 Vart förlägger Du Dina icke schemabundna studier?

Till

- hemmet □ 1
- institutionen □ 2
- universitetsbiblioteket □ 3
- institutions- el. filialbiblioteket □ 4
- stadsbiblioteket □ 5
- annan plats □ 5

Om "annan plats", var god ange:

om icke universitetsbiblioteket, vad för en annan plats?

................................................

................................................

II Din familje- och bostads situation

21 Har Du hemmavarande barn som kräver tillsyn?

□ 1 □ 2

ja nej

22 Om "ja", finns tillgång till bartillsyn?

□ 1 □ 2

ja nej

23 Hur ber Du?

- studentbostad □ 1
- föräldrarahem □ 2
- egen lägenhet □ 3
- inackorderingsrum □ 4
- annat sätt □ 5
24 Hur långt är avståndet från bostaden till universitetsbiblioteket?

- mindre än 1 km
- 1-2 km
- 3-5 "
- 5-10 "
- mer än 10 km

III En litteratursööjning

31 Hur mycket köper Du av den litteratur Du behöver för Dina studier?

- praktiskt taget allt
- ungefär hälften
- praktiskt taget inget

32 Om Du lånan den litteratur Du behöver för Dina studier, vilka av dessa bibliotek använder Du?

<table>
<thead>
<tr>
<th>Chalmers huvudbibliotek</th>
<th>Institutionbibliotek</th>
<th>Kemibibliotek</th>
<th>Universitetsbibliotek</th>
<th>Biomedbibliotek</th>
<th>Stadsbibliotek</th>
<th>Annat bibliotek</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

Hur många timmar per vecka i genomsnitt under terminen använder Du dessa bibliotek?

<table>
<thead>
<tr>
<th>uväder</th>
<th>5-10</th>
<th>31-40</th>
<th>21-30</th>
<th>11-20</th>
<th>6-10</th>
<th>5 eller mindre</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

A 15
**Hur många dagar per vecka i genomsnitt under terminen använder Du dessa bibliotek?**

<table>
<thead>
<tr>
<th></th>
<th>Chalmers huvudbibliotek</th>
<th>Institutionbibliotek</th>
<th>Kemibibliotek</th>
<th>Universitetsbibliotek</th>
<th>Biomed. bibliotek</th>
<th>Stadsbibliotek</th>
<th>annat bibliotek</th>
</tr>
</thead>
<tbody>
<tr>
<td>39 6 dagar/vecka</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40 4-5 dag./vecka</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>41 1 gång./vecka</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42 varannan vecka</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>43 1 gång/månad</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>44 mindre än 1 gång/månad</td>
<td></td>
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<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
</table>

45 **Ånser Du att Chalmersbibliotekets öppenhållande är tillräckligt för Dina behov?**

<table>
<thead>
<tr>
<th></th>
<th>ja</th>
<th>nej</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

46 **När Du vill arbeta på universitetsbiblioteket, finnas det då en plats?**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>alltid</td>
</tr>
<tr>
<td></td>
<td>nästan alltid</td>
</tr>
<tr>
<td></td>
<td>ibland</td>
</tr>
<tr>
<td></td>
<td>aldrig</td>
</tr>
<tr>
<td></td>
<td>arbetar ej där</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
</table>

47 **Hur använder Du Fig. av Chalmersbiblioteket Universitetsbiblioteket för att låna hem böcker?**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>som studieplats för läsning av:</td>
</tr>
<tr>
<td></td>
<td>a) egna kursböcker</td>
</tr>
<tr>
<td></td>
<td>b) bibliotekets kursbokssamling</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</tr>
</thead>
</table>

48 **Uppsettskrivning**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>för att få hjälp med litteratur o. d.</td>
</tr>
<tr>
<td></td>
<td>av sociala skäl - t. e. för att träffa kamrater?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
</table>
48 Hur ofta under det gångna året har Du velat låna en kursbok eller tidskriftsuppsats för Dina studier och funnit att dessa ej var tillgängliga?

- mycket ofta [ ]
- ganska ofta [ ]
- sällan [ ]
- aldrig [ ]
- vet ej [ ]

49 Hur ofta under det gångna året har Du velat låna en bok eller tidskriftsuppsats (annat än kurslitteratur) för Dina studier och funnit att denna bok eller uppsats ej var tillgänglig?

- mycket ofta [ ]
- ganska ofta [ ]
- sällan [ ]
- aldrig [ ]
- vet ej [ ]

IV Biblioteksundervisning

50 Fick Du någon undervisning i biblioteksteknik i skolan?

- ja [ ]
- nej [ ]

51 Fanns ett bibliotek i Din gymnasieskola (gymnasium, fackskola, yrkesskola)?

- ja [ ]
- nej [ ]

Om ja, använde Du skolbiblioteket för Dina studier eller för förströelseläsning?

- mest för studier [ ]
- mest för förströelse [ ]
- ungefär lika mycket för studier och förströelse [ ]
53 Använda Du Stadsbiblioteket (eller dess filial), Folkbiblioteket eller Kommunbiblioteket innan Du började läsa på Universitetet?

Om ja,

mest för studier 1

mest för förståelseläsning 2

ungefär lika mycket för studier och förståelse 3

54 Har Chalmers tekniska högskolas bibliotek en ämneskatalog?

Ja 1

Nej 2

Vet ej 3

55 Om "Ja", har Du några svårigheter att använda ämneskatalogen?

Ja 1

Nej 2

använder den ej 3

Om Du har svårigheter, beskriv dessa:

..................................................................

..................................................................

Har Chalmers tekniska högskolas bibliotek
Universitetsbiblioteket

56 abstract-publikationer

ja 1 2 3

nej

vet ej

57 indexing-publikationer

ja 1 2 3

nej

vet ej

58 andra bibliografiska hjälpmedel

ja 1 2 3

nej

vet ej

59 om det finns abstract, index eller andra bibliografiska hjälpmedel, har Du fått någon undervisning i användandet av dessa?

ja 1

nej 2

vet ej 3
60 Har Du några svårigheter i användandet av dessa?

ja □ 1
nej □ 2

Om svårigheter finns, v. g. ange dessa

.................................................................
.................................................................
.................................................................

61 Om Du vill ha material inom ett ämnedområde, som är nytt för Dig, skulle Du använda ämneskatalogen

□ □ □ □ □ 1
□ □ □ □ □ 2
□ □ □ □ □ 3
□ □ □ □ □ 4
□ □ □ □ □ 5
□ □ □ □ □ 6

62 Finns det bibliotekspersonal på Universitetsbiblioteket som kan hjälpa Dig att hitta böcker?

ja □ 1
nej □ 2
vet ej □ 3

63 Tycker Du att det är svårt att be bibliotekspersonalen om hjälp?

ja □ 1
nej □ 2

Om "ja", varför?

.................................................................
.................................................................

64 Har Du någon gång bott om hjälp?

ja □ 1
nej □ 2
65 Tycker Du att bibliotekspersonalen i allmänhet är
alltid mycket hjälpsam
hjälpsam men ofta upptagen
inte särskilt hjälpsam
aldrig hjälpsam
vet ej

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>

66 Har Du hört talas om "interurbanlån"?
ja □ □ 1
nej □ □ 2

Vad är det?

67 Har Du använt detta?
ja □ □ 1
nej □ □ 2

68 Har Du fått någon form av skriftlig eller
muntlig utbildning i hur man använder
Universitetsbiblioteket?
Chalmers bibliotek
ja □ □ 1
nej □ □ 2

69 Om "ja", när fick Du sådan undervisning?
Under de första två veckorna av
första terminen
senare under första terminen
under andra terminen
senare

I vilken form skedde undervisningen?

69 Om "ja", när fick Du sådan undervisning?
Under de första två veckorna av
första terminen
senare under första terminen
under andra terminen
senare

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
</table>

70 skriftlig handledning
muntlig undervisning av lärare
"" bibliotekarie
annan form

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
</table>
Om i annan form, v. g. beskriv den


71 Tycker Du att undervisningen var nyttig? ja □ 1
nej □ 2

Om "nej", varför?


72 Finns det några förhållanden på Chalmers bibliotek, som Du tycker är dåliga?


73 Finns det något som Du tycker är speciellt bra på Chalmers bibliotek? Universitetsbiblioteket?
Chapter 4. Appendix 1.

Survey of library orientation and instruction programmes in the United Kingdom

1) Does your library have one or more members of staff who have an information or educational function

yes  ...........
no  ...........

2) If "yes" how many ?

1  ...........
2  ...........
3  ...........
more than 3  ...........

If "more than 3" please state how many ...........

3) Are there courses in library orientation/library instruction at your library ?

yes  ...........
no  ...........

4) If you have courses in library orientation/library instruction, what types are they ?

a) library orientation for new students (guided tour of the library) ............... 

b) introduction to bibliography for undergraduates ............... 

c) bibliographic instruction for postgraduates ............... 

d) other ............... 

If "other" please specify  

.................................................. 
..................................................
..................................................
..................................................
..................................................
..................................................

5) Who organizes and teaches the courses in library orientation/instruction ?

e.g. Information officer solely responsible for teaching, assistant librarian, etc.

Please state title of post 

.................................................. 
..................................................
6) For which departments/faculties does your library give courses in library orientation/library instruction? Please specify, and mark the appropriate column - for courses for undergraduates (U), postgraduates (P)

<table>
<thead>
<tr>
<th></th>
<th>U</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

7) If you have courses in library orientation/instruction are these optional compulsory

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>optional</td>
<td></td>
</tr>
<tr>
<td>compulsory</td>
<td></td>
</tr>
</tbody>
</table>

8) What methods are used at your library for teaching groups

- conducted tour
- self-guided tour
- lecture
- slide/tape presentations
- tapes and cassettes
- closed-circuit television
- film or video strips
- films
- practical bibliographic tests
- other

If "other" please specify

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>


9) What media are used in your library for the teaching of individuals

- slide/tape presentations
- tapes and cassettes
- film strips
- programmed machines
- printed subject bibliographies
- printed handbooks or guides (e.g. on personal record keeping)
- other

If "other" please specify

10) Has there been any attempt to evaluate the success or failure of specific courses in library orientation/instruction

- yes
- no

11) Is there any further information, such as, for example, an unpublished report or article concerning the duties of the information officer and/or courses in library instruction, at your university? Please specify
Chapter 4. Appendix 2.

(Swedish version of Appendix 1)

Biblioteksorientering och bibliografisk undervisning för biblioteksnyttjarna vid skandinaviska forskningsbibliotek

En undersökning

1) Finns det på biblioteket en eller flera anställda som handhar informations- och undervisningsfrågor

   (sätt x)

   ja ............
   nej ............

2) Om "ja", hur många?

   1 ............
   2 ............
   3 ............

   fler än 3 ............

Om "fler än 3", hur många?

3) Om "ja" hur stor del av deras arbetstid ägnas åt denna verksamhet?

4) Finns det kurser i biblioteksorientering och/eller introduktion till bibliografierna?

ja ............
nej ............

5) Om det finns sådana kurser, av vilken typ är dessa?

<table>
<thead>
<tr>
<th>Typ av kurs</th>
<th>Antalet deltagare</th>
<th>Kurslängd i timmar</th>
</tr>
</thead>
<tbody>
<tr>
<td>(sätt x i vederb. ruta)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) visning av biblioteket för nya studerande</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) bibliografisk introduktion upp till motsvarande fil.kand./civ. ing.nivå</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) undervisning i bibliografi för doktorander</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d) annan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>om &quot;annan&quot;, var god ange</td>
<td></td>
<td></td>
</tr>
<tr>
<td>........................................</td>
<td></td>
<td></td>
</tr>
<tr>
<td>........................................</td>
<td></td>
<td></td>
</tr>
<tr>
<td>........................................</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6) Vem organiserar och undervisar i kurserna i biblioteksorientering/introduktion till bibliografiern?
t.ex. informationsbibliotekarie, biblioteksassistent, dokumentalist, informatiker; var god ange tjänstebeteckningen

7) För vilka institutioner/fakulteter ger Ert bibliotek kurser i biblioteksorientering/introduktion till bibliografier? Var god ange och sätt kryss för undervisningsnivå "upp till fil.kand./civ.ing." (u), "över fil.kand./civ.ing." (ö)

<table>
<thead>
<tr>
<th>Institutioner/fakulteter</th>
<th>u</th>
<th>ö</th>
</tr>
</thead>
</table>

8) Om Ni har kurser i biblioteksorientering/introduktion till bibliografier, är dessa

- frivilliga? 
- obligatoriska?

9) Vilka metoder används vid Ert bibliotek för undervisning av lätttagargrupper?

- visning med handledare
- visning utan handledare
- föreläsning
- presentation med dia-bilder och ljudband
- presentation med kassettspelare
- intern TV
- bildband eller video
- film
- bibliografiska övningsuppgifter
- övrigt

om "övrigt", var god ange
10) Vilka media används vid Ert bibliotek vid undervisning av individuella låntagare?

presentation med dia-bilder och ljudband

presentation med kasset-bandspelare

bildband eller video

programmerad undervisning

stencilerade ämnesbibliografier

stencilerade vägledningar

övrigt

Om "övrigt", var god ange

.....................................................

.....................................................

.....................................................

11) Har Ni gjort några försök att uppskatta värdet av kurser i biblioteksorientering/introduktion till bibliografier?

ja ............

nej ............

12) Antal studerande vid högskolan (inkl. doktorander)

............... 

13) Litteraturbestånd

hyllmeter volymer 

............... ............

14) Finns det något ytterligare, t.ex. en opublicerad rapport eller artikel som behandlar informationstjänster och/eller kurser i biblioteksorientering/introduktion till bibliografier i Ert bibliotek?

Var god ange

.....................................................

.....................................................

.....................................................

.....................................................

Tack för Er samarbetsvilja och hjälp
Chapter 9. Appendix 1.

DIAGNOSTIC TEST

Name........................................................................................................... Group/Individual

PLEASE READ THESE NOTES BEFORE ANSWERING THE QUESTIONNAIRE:

(i) In some questions you are asked for brief comments, in the remainder you are asked to choose from a number of alternatives. Please tick the box which is most appropriate.

(ii) Tick only ONE box for each question (except questions 1–3).

(iii) Add any comments you wish at any point.

1. *(Note: In this question please tick one box for (a), one box for (b), etc.)*

You were able to stop the tape whenever you wanted to. Did you stop it?

<table>
<thead>
<tr>
<th>Frequentl</th>
<th>Occasionally</th>
<th>Hardly ever</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) to make notes</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>(b) to stop and think about what had been said</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>(c) to have a short break</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>(d) other reason (please specify)</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>
2. What was your opinion of the pace at which information was presented in the beginning, middle and end sections of the presentation? (Tick one box for each section).

<table>
<thead>
<tr>
<th></th>
<th>Beginning</th>
<th>Middle</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Slow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Just Right</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fast</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very Fast</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Did you find the presentation during the beginning, middle and end sections (tick one box for each section)

<table>
<thead>
<tr>
<th></th>
<th>Beginning</th>
<th>Middle</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very boring</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boring</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No feelings either way</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interesting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very interesting</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Was the presentation

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Too long</td>
<td></td>
</tr>
<tr>
<td>Long</td>
<td></td>
</tr>
<tr>
<td>Just right</td>
<td></td>
</tr>
<tr>
<td>Short</td>
<td></td>
</tr>
<tr>
<td>Too short</td>
<td></td>
</tr>
</tbody>
</table>
5. Did you enjoy the presentation?
   Not at all
   A little
   Fairly
   Much
   Very much

6. Did you find the equipment used distracting?
   Yes
   No
   If yes, please comment

7. Generally speaking, how good a way of learning this subject do you think this was?
   A very good way
   A fairly good way
   No feelings either way
   Not a very good way
   A very bad way

8. What about the academic level of the presentation?
   Was it
   Too easy
   Easy
   About right
   Difficult
   Too difficult
9. Which of these alternatives would you prefer?

- Viewing the presentation individually
- Viewing the presentation in a group

Please comment on:

10. The quality of the visual material

11. The appropriateness of the visual material to the commentary

12. The voice(s) used in the presentation (e.g. clarity, listenability, speed of delivery, interest, etc.)

13. Are there any other general comments you wish to add?

(Swedish version of Appendix 1)

FRÅGEFORMULÄR 1 (6)

Namn ........................................
Tillhör grupp ............................

VAR VÄNLIG LÄS DESSA ANTECKNINGAR INNAN DU BESVARAR FRÅGEFORMULÄRET


Tack för din medverkan!
1 Vad anser du om den hastighet med vilken informationen gavs i början, mitten och slutet av bandet?

(Markera endast med ett kryss i de tre kategorierna början, mitten och slutet.)

<table>
<thead>
<tr>
<th>Mycket långsam</th>
<th>Mitten av bandet</th>
<th>Slutet av bandet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Långsam</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lagom</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snabb</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alltför snabb</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2 Besvara dessa frågor genom att ange en markering i någon av rutorna under a, en markering för b osv.

Om det var möjligt att stoppa bandet, skulle du då göra detta för att ...

<table>
<thead>
<tr>
<th>a) anteckna</th>
<th>ofta</th>
<th>ibland</th>
<th>sällan</th>
<th>aldrig</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>b) fundera över innehållet</th>
<th>ofta</th>
<th>ibland</th>
<th>sällan</th>
<th>aldrig</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>c) ta en paus</th>
<th>ofta</th>
<th>ibland</th>
<th>sällan</th>
<th>aldrig</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>d) jag skulle stoppa bandet av annan anledning</th>
<th>ofta</th>
<th>ibland</th>
<th>sällan</th>
<th>aldrig</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

I så fall av vilken anledning ..........................

..................................................................

..................................................................
3 Vad anser du om presentationen av innehållet i början, mitten och slutet av bandet?

(Markera endast med ett kryss i de tre kategorierna början, mitten och slutet.)

<table>
<thead>
<tr>
<th>Början av bandet</th>
<th>Mitten av bandet</th>
<th>Slutet av bandet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mycket tråkig</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tråkig</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Likgiltig</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intressant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mycket intressant</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4 Hur var presentationen?

<table>
<thead>
<tr>
<th>Alltför lång</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lång</td>
</tr>
<tr>
<td>Lagom</td>
</tr>
<tr>
<td>Kort</td>
</tr>
<tr>
<td>Alltför kort</td>
</tr>
</tbody>
</table>
5 Tyckte du om presentationen?

Inte alls
Lite
Något
Mycket
Väldigt mycket

6 Distraherades du av apparaterna?

Ja
Nej

Om ja, på vilket sätt distraherades du?

..............................................................

..............................................................

..............................................................

7 Helt allmänt vad tycker du om denna inlärningsmetod då det gäller detta ämne?

Mycket bra
Ganska bra
Vet ej
Inte särskilt bra
Inte alls
8 Vad anser du om den innehållsmässiga "svårighetsgraden" på presentationen? (Försök att bortse ifrån engelsk-språkliga problem)

- För lätt
- Lätt
- Lagom
- Svår
- Mycket svår

9 Tycker du att presentationen skulle vara lättare om den gjordes på svenska?

- Ja
- Nej
- Spelar ingen roll

10 Vilket av följande alternativ skulle du föredra?

- Att se presentationen enskilt
- Att se presentationen i grupp

Var god ge synpunkter: ..........................................................
..........................................................
..........................................................
..........................................................
11 Hur passade det visuella materialet till kommentaren?

12 Vad anser du om rösten (rösterna) som användes vid presentationen med avseende på klarhet, hastighet, förståelighet osv.

13 Finns det några andra allmänna kommentarer du vill tillägga?

1. Referat Referens
2. Referat Referens
3. Referat Referens
4. Referat Referens
5. Referat Referens
6. Referat Referens

15 N-DEMETHYLSTREPTOMYCIN. I. MICROBIOLOGICAL FORMATION AND ISOLATION.
ACSARA, 22, S. 65, 1649-54

The addition of the METHYLATION INHIBITORS,
68359 Sulfadialazine (2000 ppm) or
67210 DL-Ethionine (1-4 g/l.), to growing cultures of Streptomyces griseus
57921 decreased the production of

57921 Streptomycin.

15-1 19622674 N-Demethylstreptomycin, isolated from the cultures to which
DL-Ethionine had been added, had an ANTIMICROBIAL ACTIVITY about 10% of
that of

Streptomycin.

E15CH3CH2CH2NH2CO2H

68359

RING INDEX 189

Power Supply
NST factor aids design of Mable AC power systems; T. A. Fingen
(ANBAC Industries Inc, Santa Ana, Calif); Instrum Technol v 17
n 3 Mar 1970 p 53-6; Operational problems with electrical control
equipment are often traced to voltage fluctuations in a-c power
lines. The author presents a method for classifying these fluctua­tions as noise, spikes, and transients, and derive an overall
weighted measure of power line disturbance. With the help of this
NST coefficient, the severity of the problem is defined and the
proper power conditioning device can be selected to elimin­ate the
fluctuations.

Continuous, high frequency recording on direct, print-out paper;
T. E. Wolk (Honeywell Inc, Denver, Colo); SPIE 14th Annu Tech
Symp Proc 2, Photo-optical Instrumentation Applications and
Theory, held Aug 11-14 1969, San Francisco, Calif p 159-66; 50658

Readout Systems. See Speed Indicators.
Recording. See also Materials Testing Apparatus; Medical Equip­ment and Supplies—Electronic; Metal Analysis—Spectrographic;
Neutrons—Measurement; Plasma—Measurement; Polarimeters.

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68359

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Symp Proc 2, Photo-optical Instrumentation Applications and
Theory, held Aug 11-14 1969, San Francisco, Calif p 159-66; 50658
The relative amounts of stearic acid in the babies' ethanalamine and newborn babies. ANN MED EX F HOLL FERN 4(Suppl 10): 1-46, 1966. — Values are given for total lipids and related compounds in maternal and cord sera. In comparison to normal adult serum the total lipids and triglycerides were high in maternal serum and low in cord serum. The composition of cord serum lipids appeared similar to that of normal adults. The most variable lipid in both sera was triglycerides, whereas the relative amounts of different phosphatides were very constant. Mother-child correlation studies revealed a significant positive correlation at the 5% level only in the concentrations of triglycerides. A significant positive correlation existed between mothers' triglycerides and ethanalamine phosphatides; this was the case in the babies too. The composition of fatty acids in maternal serum total lipids is given. The greatest differences observed between the total fatty acids in maternal and cord sera were in their relative amounts of 18: 2, 20: 4 and 18: 0 acids; the babies had a low figure for 18: 2 and high values for 20: 4 and 18: 0. No significant correlation could be seen between the mother and her baby in the relative amounts of different fatty acids derived from total lipids. The fatty acid analyses from different lipid classes showed in each class significant differences between mothers and babies in the relative amounts of many corresponding fatty acids. The most marked differences were seen in lecithin and also in cholesteral esters.

No significant correlation could be seen between mother and baby in the amounts of corresponding fatty acids in these lipid classes. The fatty acid composition of triglycerides was rather similar in both maternal and cord sera. No significant correlation between mothers' and babies' corresponding fatty acids could be seen in this lipid class. The compositions of free fatty acids in mothers' and babies' sera also resembled each other. In this lipid class a significant positive correlation between mothers and babies was seen in the amounts of 18: 2. In ethanalamine phosphatides high amounts of 20: 4 and 22: 6 acids were found in both maternal and cord sera. In this lipid class as also in all the other classes the babies' values for 20: 4 were always higher than those of the mothers. The relative amounts of stearic acid in the babies' ethanalamine phosphatides followed those in the corresponding lipid class of the mothers. The fatty acids in lecithin were composed mainly of saturated acids. They formed about 80% of the fatty acids in both maternal and cord serum lecithin, and the ratio of palmi tic to stearic acid was higher in babies' than in mothers' lysolecithin. The unsaturated fatty acids in this lipid class were similar in both serum types. The triglycerides of maternal serum revealed very low figures for 18: 2 in comparison to figures reported from other countries. This might be a reflection of the high proportion of milk fat in the Finnish diet. The high content of 20: 3 in cord serum lipids suggests that newborn children might be suffering from a relative deficiency of essential fatty acids. The principal lipids as well as their fatty acid compositions were determined from the placenta of one of the babies analyzed. The presence of cardiolipin was revealed qualitatively on thin-layer chromatography. The analyses of fatty acid compositions revealed rather high amounts of 20: 3 and 20: 4 even in free fatty acids and triglycerides. — Author.

Forgerys, Manuscripts

Forgerys, Numismatic

Forgerys, Iron

Formality

The angular distribution of fast (5.5MeV) photneutrons from V, Cr, Mn, Br, Mo, Ru, Rh, Pa, Sb, La, Pr, Pd and Ph have been measured at bremsstrahlung energies of above 22 MeV. The angular distributions expand and confirm previous studies. The variations of anisotropy with neutron occupation number, and in particular they confirm the peaking of the anisotropy at the time of f and of subshells.
2. Vilken information lämnas i ett referat som inte lämnas i en referens?

3. Vilka av nedanstående referat är indikativa respektive informativa (ev. ingetdera)? Stryck under rätt alternativ!

<table>
<thead>
<tr>
<th></th>
<th>Informativ</th>
<th>Indikativ</th>
<th>Ingetdera</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
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<td></td>
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<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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40288. KARP, M., ROGOFF and WELLCOME MED. RES. INSTR., BELLEVUE HOSP., PETAH-TIKVA, ISRAEL), M. LURIE, and Z. YONG. Nephrotic syndrome in the course of treatment of Wilson's disease with DL-penicillamine. ARCH DIS CHILDHOOD 41(220): 684-687. Nos. 1966: A case is reported of a Jewish-Yemenite girl of 9 years, with the hepatic type of Wilson's disease, who died of nephrotic syndrome while being treated with DL-penicillamine. A description is given of the findings in the kidney, which consisted of severe tubular damage.

---

FISH: Poisoning: Sea: Pollution: Phosphorus

Marine pollution case study: 'red' herrings of the current. Fish News Int. 9 (Nov 70) p.28+.

44770w. High-temperature gas cooling for fast breeders. Dalle Donne, Mario; Eisemann, E.; Thurner, F.; Wittk, K. (Kernforschungszentrum Karlsruhe, Karlsruhe, Ger.). Kern-technik 1969, 11(2), 99-104 (Ger Eng). The Karlsruhe Centre is looking at gas outlet temps. above 700°, and He is the favored gas because it has lower pressure loss than CO₂ does, it can be used with carbide fuels, and the natural gas sources in the Netherlands can supply sufficient He for a major program. The major disadvantage of He is that it is relatively difficult to store. Three types of fuel are being considered: (1) (U,Pu)O₂ or (U,Pu)C fuel in a V alloy cladding; (2) (U,Pu)C particles in a Cr matrix; (3) ceramic-coated particles. Alloys of V, Ti, Nb, and Si are being developed because of low creep and embrittlement. An alloy with 96% V, 3% Ti, and 1% Si after 21,000 hrs. at 800° shows the same stress rupture strength as an alloy with 10% Nb and improves the breeding ratio from 1.31 to 1.32. The fissile Pu inventory is 2800 kg. for a reactor of 1000 Mw., and the system-linear doubling time is 11 years. Carbide fuel would reduce the fissile Pu inventory to 1800 kg. A new type of cermet has been developed by isotropic compression of metal-coated 10² particles with a gas at ≤1600⁰ and pressures ≥800 atm., 21-25°, Mo Cr, or V is used. To increase the gas outlet temp. from the 720° obtainable with metallic fuels to the more desirable 900°, calcens have been performed for a fuel consisting of particles with a 1.4-mm. diam. kernel of (U,Pu)C and a 13.5-μ coating (2 layers of graphite and one of SiC) contained in a graphite matrix. The present pyrolytic graphite cannot withstand the very high fast fluence (10⁸ ñ cm.⁻¹) required: SiC seems much better (10⁻² pressure at 1200° and 10⁸ fast ñ cm.⁻¹), but it is very brittle. Development of coated particles should improve the stability of graphite and 2nd decrease the brittleness of SiC. The He pressure is 120 atm. Prestressed concrete is considered to make a better vessel than steel. Safety aspects are discussed.

5. Vilken del av en referatstidskrift skulle Du använda först vid en litteratursökning?

6. Om Du ställs inför en ny referentidskrift, hur skulle Du bekanta Dig med innehåll och användningssätt?

8. Varför är en specifik referattidskrift mer användbar än en allmän referattidskrift för en ämnesspecialiserad litteratursökning?

9. Vad betyder KWIC?

10. För vilket ändamål är referattidskrifter värdelösa i litteratursökning?

11. För 6 veckor sedan fanns en viss tidskriftsartikel som behandlade metall-korrosion. Vilka källor kunde man använda för att leta rätt på titlen och tidskriften?

Chapter 12. Appendix 1.

EVALUATION OF AN INTRODUCTORY COURSE IN INFORMATION RETRIEVAL FOR UNDERGRADUATE ENGINEERING STUDENTS.

1. To which School of Engineering do you belong
   - Electrical engineering
   - Mechanical engineering
   - Engineering Physics
   - Civil engineering
   - Architecture

2. Which is your year of study

3. Has Chalmers Library a subject catalogue
   - Yes
   - No
   - Don't know

4. If "yes", did you know that before the course
   - Yes
   - No

5. If "yes", have you any difficulties in using the subject catalogue
   - Yes
   - No

If you have difficulties, please describe them


6. Had you difficulty in using the subject catalogue before the course

Yes
No

7. Has Chalmers Library:
   abstracts
      Yes
      No
      Don't know

   indexes
      Yes
      No
      Don't know

   other bibliographic aids
      Yes
      No
      Don't know

8. If "yes", did you know that before the course

Yes
No

9. If "yes", do you have any difficulties in using these

Yes
No

10. If you have difficulties, please describe them

..............................................................
..............................................................
..............................................................
11. Had you difficulties in using these information tools before the course.

- Yes
- No

12. Have you heard of "inter-library" loans?

- Yes
- No

13. What are they

- [Space for answer]

14. Have you used these?

- Yes
- No

15. Had you heard about "inter-library loans" before the course?

- Yes
- No

16. If you want to obtain information within a new field of studies, would you use:

   - the subject catalogue
   - the author catalogue
   - bibliographic tools (abstracts, indexes etc.)
   - ask a member of the library staff
   - ask a member of the academic staff
   - ask a friend of colleague
17. Communication of information can take place in different ways. Name two of these.

18. Name three different types of primary publication

19. Name two different types of secondary publication

20. What information does an 'abstract' publication contain in addition to that contained in an 'index' publication

21. Which is usually published first after a completed research project - a report or a journal article

22. What kind of publication can be used to obtain a general orientation about a given subject?

23. Give an example of a type of publication which can be used for current awareness scanning within a given subject area

24. Give an example of a type of publication that can be used to obtain specific 'facts' on various subjects
25. Can computer-based information retrieval be carried out in Sweden

26. Did you find the course useful

Yes [ ]
No [ ]

27. Why?

..........................................................
..........................................................
..........................................................
UTVÄRDERING I SAMBAND MED TEKNOLOGUTBILDNING VID CTHB

1. Vilken sektion tillhör Du?
   E
   M
   F
   V
   K
   A

2. Vilken årskurs tillhör Du? ........................................

3. Har Chalmers tekniska högskolas bibliotek en ämneskatalog?
   Ja
   Nej
   Vet ej

4. Om "Ja", visste Du detta före kursen? Ja
   Nej

5. Om "Ja", har Du några svårigheter att använda ämneskatalogen?
   Ja
   Nej

Om Du har svårigheter, v.g. beskriv dessa

6. Hade Du svårigheter att använda ämneskatalogen före kursen?
   Ja
   Nej
7. Har Chalmers tekniska högskolas bibliotek abstract-publikationer
   
   Ja ☐
   Nej ☐
   Vet ej ☐

   indexing -publikationer

   Ja ☐
   Nej ☐
   Vet ej ☐

   andra bibliografiska hjälpmedel

   Ja ☐
   Nej ☐
   Vet ej ☐

8. Om "Ja", visste Du detta före kursen?

   Ja ☐
   Nej ☐

9. Om "Ja", har Du några svårigheter att använda dessa?

   Ja ☐
   Nej ☐

10. Om svårigheter finns, v.g. beskriv dessa

    .............................................................................

    .............................................................................

    .............................................................................

11. Hade Du svårigheter att använda dessa före kursen?

    Ja ☐
    Nej ☐
12. Har Du hört talas om "interurbanlån"?

Ja  [ ]  
Nej [ ]

13. Vad är det?

________________________________________________________

________________________________________________________

________________________________________________________

14. Har Du använt detta?

Ja [ ]
Nej [ ]

15. Hade Du hört talas om interurbanlån före kursen

Ja [ ]
Nej [ ]

16. Om Du vill ha material inom ett ämnedområde som är nytt för Dig, skulle Du använda

ämneskatalogen [ ]
författarkatalogen [ ]
bibliografiska hjälpmedel (abstracts, indexes) [ ]
fråga bibliotekspersonalen [ ]
fråga läraren [ ]
fråga en kamrat/kollega [ ]


________________________________________________________

________________________________________________________
18. Namnge tre olika typer av primärpublikationer

19. Namnge två olika typer av sekundärpublikationer

20. Vad innehåller en 'abstract' -referatpublikation utöver det som finns i en 'index' -referenspublikation?

21. Vilken kommer normalt tidigast efter avslutat forskningsarbete 'rapporten' eller 'tidskriftsartikeln'?

22. Informationssökning kan ta olika former beroende på söksituationen. Namn tre olika typer av litteratursökning.

23. Vilken typ av publikation kan man använda för att skaffa orienterande information om ett nytt ämne?


25. Ge exempel på en typ av publikation som kan användas för faktauppgifter.
26. Är det möjligt att utföra datorbaserad informationssökning i Sverige?

27. Tycker Du att undervisningen var nyttig?   
Ja [ ]   
Nej [ ]

28. Om "nej" varför?

29. Finns det några förhållanden på CTHB som Du tycker är dåliga

30. Finns det något som Du tycker är speciellt bra på CTHB?
We need your help! Can you spare a few minutes to answer the following questions before you leave the library? Your answers can help us to improve our service. Please read the alternative answers for each question and mark the most appropriate answer with across. Thank you for your help!
1. I am:

<table>
<thead>
<tr>
<th>Option</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate</td>
<td>1</td>
</tr>
<tr>
<td>Postgraduate</td>
<td>2</td>
</tr>
<tr>
<td>Lecturer</td>
<td>3</td>
</tr>
<tr>
<td>Professor</td>
<td>4</td>
</tr>
<tr>
<td>Student (from high school)</td>
<td>5</td>
</tr>
<tr>
<td>Industrial employee</td>
<td>6</td>
</tr>
<tr>
<td>'Other'</td>
<td>7</td>
</tr>
</tbody>
</table>

If 'other' please specify ...........................................

2. Which School of Engineering do you belong to?

<table>
<thead>
<tr>
<th>Option</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>E (Electrical)</td>
<td>1</td>
</tr>
<tr>
<td>M (Mechanical)</td>
<td>2</td>
</tr>
<tr>
<td>P (Physics)</td>
<td>3</td>
</tr>
<tr>
<td>C (Civil)</td>
<td>4</td>
</tr>
<tr>
<td>Ch (Chemical)</td>
<td>5</td>
</tr>
<tr>
<td>A (Architecture)</td>
<td>6</td>
</tr>
</tbody>
</table>

Question not applicable

3. How many terms (including the present one) have you studied at Chalmers ...........................................

Question not applicable

4. Age (in years)....................................................
5. **Today I used Chalmers Main Library first and foremost for:**

- Reading set course material (Book, compendia etc.)
- Borrowing set course material
- Reading non-set course material (Books, periodicals etc.)
- Borrowing non-set course material
- Literature search for undergraduate thesis
- Literature search in connection with a research project
- Return material (Books, periodicals, etc.)
- Photocopying of material
- Essay or article writing
- For social reasons - e.g. to meet friends
- To visit the café
- To do 'something else'

6. **Today I used Chalmers Main Library for the secondary purpose of:**

- Reading set course material (Book, compendia etc.)
- Borrowing set course material
- Reading non-set course material (Books periodicals etc.)
- Borrowing non-set course material
- Literature search for undergraduate theses
- Literature search in connection with a research project
- 'Literature-project'
- Return material (Books, periodicals etc.)
- Photocopying of material
- Essay or article writing
- For social reasons - e.g. to meet friends
- To visit the café
- To do 'something else'

I had no 'secondary purpose
7. **Today I used, first and foremost:**
- Journals/periodicals
- Set "course" material
- Books (other than course literature)
- Reference material (dictionaries, handbooks, encyclopedias)
- Bibliographic aids (indexes, abstracts etc.)
- Theses
- Microfilm or microfiche material
- Recreational literature - popular magazines
- Something else
- Nothing (for example brought own material)

8. **Today I used as secondary material:**
- Journals/periodicals
- Set "course" material
- Books (other than course literature)
- Reference material (dictionaries, handbooks, encyclopedias)
- Bibliographic aids (indexes, abstracts etc.)
- Theses
- Microfilm or microfiche material
- Recreational literature - popular magazines
- Something else
- Nothing (for example brought own material)

9. **Today I used:**
- The alphabetic author catalogue.
  (Card catalogue in reference hall)

10. **Subject card catalogue**
11. **Today** I used:

- DK catalogue (abstract catalogue) in reference hall
- List of journals
- Bibliographic aids - on the shelves in the reference hall

What do you think of the subject catalogue? Is it:

- Very difficult to use  1
- Difficult to use  2
- Rather difficult to use  3
- Rather easy to use  4
- Easy to use  5
- Don't use  0

12. **Today** my success with regard to literature searching was:

- Very good (found everything)  1
- Good (found nearly everything)  2
- Rather good (found something)  3
- Poor (found few items)  4
- Very poor (found nothing)  5
- Question non-applicable  0

13. **Today** I obtained, of the books I wanted to borrow:

- Everything  1
- Nearly everything  2
- Something  3
- Not much  4
- Nothing  5
- Question non-applicable  0
14. Today I obtained, of the periodicals I wanted to borrow:

<table>
<thead>
<tr>
<th>Option</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Everything</td>
<td>1</td>
</tr>
<tr>
<td>Nearly everything</td>
<td>2</td>
</tr>
<tr>
<td>Something</td>
<td>3</td>
</tr>
<tr>
<td>Not much</td>
<td>4</td>
</tr>
<tr>
<td>Nothing</td>
<td>5</td>
</tr>
<tr>
<td>Question non-applicable</td>
<td>0</td>
</tr>
</tbody>
</table>

15. The library staff were today:

<table>
<thead>
<tr>
<th>Option</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very helpful</td>
<td>1</td>
</tr>
<tr>
<td>Helpful</td>
<td>2</td>
</tr>
<tr>
<td>Rather helpful</td>
<td>3</td>
</tr>
<tr>
<td>Not particularly helpful</td>
<td>4</td>
</tr>
<tr>
<td>Not helpful at all</td>
<td>5</td>
</tr>
<tr>
<td>Question non-applicable</td>
<td>0</td>
</tr>
</tbody>
</table>

16. Do you think the lay-out of Chalmers Main Library is:

<table>
<thead>
<tr>
<th>Option</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very good</td>
<td>1</td>
</tr>
<tr>
<td>Good</td>
<td>2</td>
</tr>
<tr>
<td>Rather good</td>
<td>3</td>
</tr>
<tr>
<td>Poor</td>
<td>4</td>
</tr>
<tr>
<td>Very poor</td>
<td>5</td>
</tr>
</tbody>
</table>

17. The reprocentre (for photocopies) is situated in the cellar. Do you think the position of the reprocentre is:

<table>
<thead>
<tr>
<th>Option</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very good</td>
<td>1</td>
</tr>
<tr>
<td>Good</td>
<td>2</td>
</tr>
<tr>
<td>Rather good</td>
<td>3</td>
</tr>
<tr>
<td>Poor</td>
<td>4</td>
</tr>
<tr>
<td>Very poor</td>
<td>5</td>
</tr>
<tr>
<td>Don't use</td>
<td>0</td>
</tr>
</tbody>
</table>
18. At Chalmers Main Library the main part of the literature is stored in a closed-access book-store. Do you think that open-access to literature would be:

<table>
<thead>
<tr>
<th>Option</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very desireable</td>
<td>1</td>
</tr>
<tr>
<td>Desireable</td>
<td>2</td>
</tr>
<tr>
<td>Hardly necessary</td>
<td>3</td>
</tr>
<tr>
<td>Unnecessary</td>
<td>4</td>
</tr>
<tr>
<td>No opinion</td>
<td>5</td>
</tr>
</tbody>
</table>

19. What do you think of the present loan-request form?

<table>
<thead>
<tr>
<th>Option</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very difficult to complete</td>
<td>1</td>
</tr>
<tr>
<td>Difficult to complete</td>
<td>2</td>
</tr>
<tr>
<td>Rather difficult to complete</td>
<td>3</td>
</tr>
<tr>
<td>Rather easy to complete</td>
<td>4</td>
</tr>
<tr>
<td>Easy to complete</td>
<td>5</td>
</tr>
</tbody>
</table>

20. Do you think that the hours of opening for Chalmers Main Library are adequate for your needs?

<table>
<thead>
<tr>
<th>Option</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
</tr>
</tbody>
</table>

21. When you wish to work at Chalmers Main Library, do you find a place:

<table>
<thead>
<tr>
<th>Option</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always</td>
<td>1</td>
</tr>
<tr>
<td>Nearly always</td>
<td>2</td>
</tr>
<tr>
<td>Sometimes</td>
<td>3</td>
</tr>
<tr>
<td>Never</td>
<td>4</td>
</tr>
<tr>
<td>Don't work there</td>
<td>0</td>
</tr>
</tbody>
</table>
22. What is your total impression of Chalmers Main Library?

Very good
Good
Rather good
Poor
Very poor

Thank you!
Vi behöver Din hjälp! Kan Du avvara ett par minuter att svara på nedanstående frågor innan Du lämnar biblioteket? Dina svar kan hjälpa oss att förbättra vår service. Läs de olika alternativen för varje fråga och kryssa för det lämpligaste svaret. Tack för hjälpen!
OBS! Punkterna 1-5 ifylles ej.

1. Kortnummer

2-5 Identifikationsnummer

6. Jag är:
   Teknolog 1 □
   Doktorand 2 □
   Lektor 3 □
   Professor 4 □
   Gymnasieelev 5 □
   Industrialställd 6 □
   Annan kategori 7 □

Om 7 var god ange vilken ____________________________

7-8. Vilken sektion tillhör Du?
   E 1 □
   M 2 □
   F 3 □
   V 4 □
   K 5 □
   A 6 □
   Frågan ej aktuell 0 □

9-10. Hur många terminer (inkl. denna) har Du studerat eller varit anställd vid Chalmers?
   _________
   Frågan ej aktuell □

11-12. Ålder. (år) _________
13-14. **Idag använde jag CTHs huvudbibliotek först och främst för att:**

<table>
<thead>
<tr>
<th>Nr</th>
<th>Alternativ</th>
<th>Markering</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Läsa kurslitteratur (Böcker, kompendier, o.s.v.)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Låna kurslitteratur</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Läsa icke kurslitteratur (Böcker, tidskrifter, o.s.v.)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Låna icke kurslitteratur</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Litteratursökning för examensarbete</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Litteratursökning i samband med ett forskningsprojekt</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Litteratur-uppgift</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Återlämna lånat material (Tidskrifter, böcker, o.s.v.)</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Fotokopiering av material</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Uppsatsskrivning</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Av sociala skäl - t.ex. för att träffa kamrater</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Besöka kaféet</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Övrigt</td>
<td></td>
</tr>
</tbody>
</table>

15-16. **Idag använde jag CTHs huvudbiblioteket i andra hand för att:**

<table>
<thead>
<tr>
<th>Nr</th>
<th>Alternativ</th>
<th>Markering</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Läsa kurslitteratur (Böcker, kompendier, o.s.v.)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Låna kurslitteratur</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Läsa icke kurslitteratur (Böcker, tidskrifter, o.s.v.)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Låna icke kurslitteratur</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Litteratursökning för examensarbete</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Litteratursökning i samband med ett forskningsprojekt</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Litteratur-uppgift</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Återlämna lånat material (Tidskrifter, böcker, o.s.v.)</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Fotokopiering av material</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Uppsatsskrivning</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Av sociala skäl - t.ex. för att träffa kamrater</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Besöka kaféet</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Övrigt</td>
<td></td>
</tr>
</tbody>
</table>

Jag hade ingen "andra-hands-orsak" att besöka CTHs huvudbibliotek
17-18. **Idag använde jag först och främst:**

<table>
<thead>
<tr>
<th>Material</th>
<th>Nummer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tidskrifter eller andra periodica</td>
<td>1</td>
</tr>
<tr>
<td>Kursböcker (eller kompendier)</td>
<td>2</td>
</tr>
<tr>
<td>Böcker (annat än kurslitteratur)</td>
<td>3</td>
</tr>
<tr>
<td>Referensmaterial (ordböcker, handböcker, uppslagsböcker)</td>
<td>4</td>
</tr>
<tr>
<td>Bibliografiska hjälpmedel (Referatpublikationer &quot;abstracts,&quot; referenspublikationer &quot;indexes&quot;, bibliografier)</td>
<td>5</td>
</tr>
<tr>
<td>Avhandlingar</td>
<td>6</td>
</tr>
<tr>
<td>Microfilm eller microfiche-material</td>
<td>7</td>
</tr>
<tr>
<td>Förströelseliteratur - populärtidskrifter</td>
<td>8</td>
</tr>
<tr>
<td>Annat</td>
<td>9</td>
</tr>
<tr>
<td>Inget (t.ex. tog dit eget material)</td>
<td>0</td>
</tr>
</tbody>
</table>

19-20. **Idag använde jag i andra hand:**

<table>
<thead>
<tr>
<th>Material</th>
<th>Nummer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tidskrifter eller andra periodica</td>
<td>1</td>
</tr>
<tr>
<td>Kursböcker (eller kompendier)</td>
<td>2</td>
</tr>
<tr>
<td>Böcker (annat än kurslitteratur)</td>
<td>3</td>
</tr>
<tr>
<td>Referensmaterial (ordböcker, handböcker, uppslagsböcker)</td>
<td>4</td>
</tr>
<tr>
<td>Bibliografiska hjälpmedel (Referatpublikationer &quot;abstracts,&quot; referenspublikationer &quot;indexes&quot;, bibliografier)</td>
<td>5</td>
</tr>
<tr>
<td>Avhandlingar</td>
<td>6</td>
</tr>
<tr>
<td>Microfilm eller microfiche-material</td>
<td>7</td>
</tr>
<tr>
<td>Förströelseliteratur - populärtidskrifter</td>
<td>8</td>
</tr>
<tr>
<td>Annat</td>
<td>9</td>
</tr>
<tr>
<td>Inget</td>
<td>0</td>
</tr>
</tbody>
</table>

21. **Idag använde jag:**

- Alfabetiska författarkatalogen i kortlådor i utläningshallen (Uppslagsord: författarnamn m.m.)

22. **Ämneskatalogen i kortlådor i utläningshallen**

(Uppslagsord: ämnesord)
23. **Idag** använde jag:

- TLS referatkartotek i kortlådor i utlåningshallen

24. Förteckningen över tidskrifter - till höger om utlåningsdisken

25. Bibliografiska hjälpmedel - på bokhylorna i utlånings-hallen

26. Vad anser Du om ämneskatalogen? Är den:

- Mycket svår att använda
- Svår att använda
- Ganska svår att använda
- Ganska lätt att använda
- Lätt att använda
- Jag använder den inte

27. **Idag** var mitt resultat beträffande litteratursökning:

- Mycket bra (hittat allting)
- Bra (hittat det mesta)
- Ganska bra (hittade några saker)
- Dåligt (hittade få saker)
- Mycket dåligt (hittade ingenting)
- Frågan ej aktuell

28. **Idag** fick jag av de böcker jag ville låna:

- Allting
- Nästan allting
- Något
- Inte mycket
- Ingenting
- Frågan ej aktuell
29. **Idag fick jag av de tidskrifter eller andra periodica jag ville låna:**

<table>
<thead>
<tr>
<th>Alternativ</th>
<th>Svar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allting</td>
<td>1</td>
</tr>
<tr>
<td>Nästan allting</td>
<td>2</td>
</tr>
<tr>
<td>Något</td>
<td>3</td>
</tr>
<tr>
<td>Inte mycket</td>
<td>4</td>
</tr>
<tr>
<td>Ingenting</td>
<td>5</td>
</tr>
<tr>
<td>Frågan ej aktuell</td>
<td>0</td>
</tr>
</tbody>
</table>

30. **Bibliotekspersonalen var idag:**

<table>
<thead>
<tr>
<th>Alternativ</th>
<th>Svar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mycket hjälpsam</td>
<td>1</td>
</tr>
<tr>
<td>Hjälpsam</td>
<td>2</td>
</tr>
<tr>
<td>Ganska hjälpsam</td>
<td>3</td>
</tr>
<tr>
<td>Inte särskilt hjälpsam</td>
<td>4</td>
</tr>
<tr>
<td>Inte hjälpsam alls</td>
<td>5</td>
</tr>
<tr>
<td>Frågan ej aktuell</td>
<td>0</td>
</tr>
</tbody>
</table>

31. **Tycker Du att lokaldisposition vid Chalmers huvudbibliotek är:**

<table>
<thead>
<tr>
<th>Alternativ</th>
<th>Svar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mycket bra</td>
<td>1</td>
</tr>
<tr>
<td>Bra</td>
<td>2</td>
</tr>
<tr>
<td>Ganska bra</td>
<td>3</td>
</tr>
<tr>
<td>Dålig</td>
<td>4</td>
</tr>
<tr>
<td>Mycket dålig</td>
<td>5</td>
</tr>
</tbody>
</table>

32. **Reprocentralen (för fotokopiering) finns i bottenplanet. Tycker Du att reprocentralens placering är:**

<table>
<thead>
<tr>
<th>Alternativ</th>
<th>Svar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mycket bra</td>
<td>1</td>
</tr>
<tr>
<td>Bra</td>
<td>2</td>
</tr>
<tr>
<td>Ganska bra</td>
<td>3</td>
</tr>
<tr>
<td>Dålig</td>
<td>4</td>
</tr>
<tr>
<td>Mycket dålig</td>
<td>5</td>
</tr>
<tr>
<td>Använder ej</td>
<td>0</td>
</tr>
</tbody>
</table>
33. Vid Chalmers huvudbibliotek är huvuddelen av litteraturen förvarad i bokmagasin. Anser Du det önskvärt att en större del av litteraturen är tillgänglig på öppna hyllor för låntagarens direktanvändning?

- Mycket önskvärt
- Önskvärt
- Knappast behövligt
- Icke behövligt
- Vet ej

34. Vad tycker Du om den nuvarande lånebeställningsblanketten?

- Mycket svårt att fylla i
- Svår att fylla i
- Ganska svårt att fylla i
- Ganska lätt att fylla i
- Lätt att fylla i

35. Anser Du att Chalmers huvudbiblioteksöppethållande är tillräckligt för Dina behov?

- Ja
- Nej

36. När Du vill arbeta på Chalmers huvudbibliotek, finns det då en plats?

- Alltid
- Nästan alltid
- Ibland
- Aldrig
- Arbetar ej där

37. Vad är Ditt helhetsintryck av Chalmers huvudbibliotek?

- Mycket bra
- Bra
- Ganska bra
- Dåligt
- Mycket dåligt
Do you know that there is a Library at Chalmers
where you can read "Yachting News"
and 4,800 other periodicals?

The Library is open during term time from 9.00 to 20.00 on
weekdays, and from 9.00 to 12.00 on Saturdays.

If you study Chemical Engineering, there is a special
Chemistry Library on the first floor.

You can borrow textbooks and compendia...

Periodicals and other books.

At Chalmers Main Library, the greater part of the collection
is stored in a closed-access book store.

Therefore you have to fill in a special loan requisition form,
which you leave at the circulation desk.

The requisition form is then sent to the store, and your loan
material is selected.
The service is quick at Chalmers Library! Average time - 3 minutes per loan.

How can I find out what to borrow, if I can't look at the books?

If you know the name of the author, you can look in the alphabetic author catalogue,

where the cards are arranged alphabetically under the authors' surnames.

If you want to borrow books about a special subject, use the subject catalogue,

where the cards are arranged under different subject headings.

On each catalogue card, there is location mark, or store number, for the book.

You must write this store number on your loan requisition form... otherwise the people who work in the book store won't be able to find the material that you want.

Sometimes you may want to read a book that Chalmers Library does not possess. You can request this material from another library, as an interlibrary loan.
When you have obtained your books, you maybe want to read in peace and quiet. Then you can work in one of the Reading Rooms.

In the main reading room, there are handbooks and encyclopedias available for use. It is easy to find what you want - look at the signs.

Or you can sit comfortably in the periodicals reading room and read the journals.

Sometimes you may want to take a photocopy of something that you have read. Follow the red signs to the Library's Reprocentre.

Sometimes you may be hungry and thirsty, after all that reading - visit the café on the first floor.

You may want to work with a group of students - make use of one of the "group rooms" available on the first floor of the Library. Ask about this at the Information Desk.

The Information Desk? Yes, that's where you can receive help for all the questions that you want to ask.

WELCOME

This was a first orientation about Chalmers Library, take a Guide to the Use of the Library, and read about the service and resources available at your Library.
Chapter 7. Appendix
Detta kan biblioteket erbjuda Dig!

LÅN AV TIDSKRIFTER
Närmare 5.000 tidskrifter och andra periodica (t.ex. årsböcker) finns inom olika fackområden. De senaste numren av ca. 1.500 tidskrifter finns utlagda i en särskild tidskriftsläsesal.

LÅN AV BÖCKER
Över 30.000 böcker inom olika fackområden finns tillgängliga för lån.

KURSBOKSAMLING
Ett exemplar av de i studiehandboken specificerade kursböckerna och kompendierna finns tillgängligt för läsning på biblioteket.
REFERENSLITTERATUR
Referenslitteraturen omfattar såväl allmänna- som speciella uppslagsböcker, handböcker, databöcker och tabellverk. Dessa är märkta ”R” och finns tillgängliga i huvudbibliotekets läsesal eller i Kemiska biblioteket.

LÅN FRÅN ANDRA BIBLIOTEK (INTERURBANLÅN)
Äger inte biblioteket den tidskrift eller bok Du behöver, kan den i allmänhet lånas in från annat bibliotek. I de flesta fall är dessa interurbanlån kostnadsfria.

MICROFICHE OCH MICROFILM
Många rapporter, avhandlingar, m.m. produceras numera i ”micro”-form. Möjligheter att läsa microfiche och microfilm finns i ett särskilt rum i andra våningen mittemot Kemiska biblioteket.
HJÄLPMEDEL FÖR INFORMATIONSSÖKNING

Litteraturvägledningar
Tidskriftsförteckningar
Rapportförteckningar
Bibliografier
Referens- och referatpublikationer
Förteckningar över pågående forskningsprojekt m.m.
Dessa är placerade i kataloghallen.

LITTERATURSÖKNINGSSERVICE

Handledning i litteratursökning ges av bibliotekets personal. Biblioteket erbjuder dessutom, i samarbete med IVA, en kvalificerad litteratursökningsservice. Uppdrag förmedlas till fackexperter som utför sökningen till en kostnad av 40 till 60 kr. per timme. Fråga vid informationsdisken.

DATORBASERAD INFORMATIONSSÖKNING

Biblioteket har ännu inte erhållit resurser för direkt sökning av datorbaserad information men förmedlar upplysning om den datorbaserade informationsökning som bedrivs vid Kungl. Tekniska Högskolans bibliotek i Stockholm. Fråga vid informationsdisken.
RUM FÖR GRUPPARBETE

RUM FÖR FORSKARE
Det finns avskilda arbetsplatser för forskare. Vill Du använda någon av dessa, fråga vid informationsdisken.

TELEX
Bibliotekets telexapparat, som är den enda inom högskolans område, är tillgänglig för samtliga avdelningar och institutioner inom Chalmers.

KOPIERING
Vid bibliotekets reprocentral – i bottenplanet – sker kopiering av material till låga priser. Även microfichematerial kopieras.

KAFÉ
En trappa upp från entréhallen finns ett kafé, som under terminerna serverar smörgåsar, kaffe, te, läskedrycker m.m.
Plan – huvudbiblioteket

Tjänsterum

Tj. Rum

Inom expedition

Information

Reproatdelning

till höger, 1 tr. ner

Telex Rum

Tidskriftsläsesal

Huvudläsesal

Referenslitteratur

FÖRELÄSNINGSSAL

KEMIBIBLIOTEK, KAFÉ 1 tr. upp

"RÖKRUTA"

Låneexpedition

Kataloghall

Entréhall

Entreprenor

6
Plan – kataloghallen
Plan – andra våningen
Vem får använda Chalmers bibliotek?

CHALMERS BIBLIOTEKET ÄR TILLGÄNGLIGT FÖR ALLA SOM ÖNSKAR BEGAGNA SIG AV DESS TJÄNSTER

Hemlån

Som villkor för hemlån gäller följande: Studerande vid Chalmers får låna hem böcker och tidskrifter mot uppvisande av gällande studentlegitimation.

Övriga låntagare får ut material till hemlån mot uppvisande av de nya typer av identitetskort, som accepteras av bankerna och postverket.

För låntagare som saknar giltig legitimation gäller särskilda bestämmelser om borgensförbindelse för litteraturlån.
Söker Du en speciell tidskrift och vill veta, om den finns i bibliotekets samlingar, rådfrågar Du en tidskriftsförteckning som heter
"TIDSKRIFTER I CHALMERS BIBLIOTEK"
där namnen på bibliotekets ca 5,000 tidskrifter står upptagna i alfabetisk ordning. Denna förteckning finns i flera exemplar i kataloghallen.

Finner Du inte den sökta tidskriften i denna förteckning, letar Du i andra tidskriftsförteckningar, t.ex. "LIST-TECH"
som är en lista över löpande utländska tekniska tidskrifter i svenska forsknings- och företagsbibliotek. Denna lista finns i flera exemplar i kataloghallen.

Tidskrifternas innehåll – tidskriftsartiklarna – kan Du söka fram direkt genom olika hjälpmedel. Dels finns
REFERENSPUBLIKATIONER (INDEX)
som upptar artiklarnas titlar och artikelförfattarens namn, dels
REFERATPUBLIKATIONER (ABSTRACTS)
som ger korta referat av artiklarnas innehåll.
Dessa publikationer är uppställda längs väggarna i kataloghallen.
Hur Du hittar det Du vill låna

1. Känner Du NAMNET på FÖRFATTAREN till den önskade boken?
   → Sök då i de alfabetiskt ordnade korten i de ALFABETISKA KATALOGERNA

2. Söker Du böcker inom ett särskilt ÄMNESOMRÅDE
   → Sök då i de ämnesmässigt ordnade korten i ÄMNESKATALOGEN

? Söker Du en bok och den- na ej finns på biblioteket
   → Fråga då BIBLIOTEKARIEN
   Tycker Du det är svårt att hitta eller är Du tveksam
   → BIBLIOTEKARIEN
   → INFORMATIONEN, som finns där för att hjälpa Dig
Beställning och framtagning

På Chalmers bibliotek förvaras huvuddelen av litteraturen i slutna bokmagasin. Därför måste Du fylla i en särskild

Låneblankett

som Du lämnar vid lånedisken. Den beställda boken eller skriften tas därefter fram på kort tid av bibliotekets personal.

Biblioteket är öppet

UNDER TERMINERNA:
måndag–fredag 9.00–20.00
lördag 9.00–12.00

UNDER FERIERNA:
måndag–fredag 9.00–16.00
onsdagar dessutom 16.00–18.30
lördag stängt

Telefon 810100/ankn. 1406, 1407 då växel är stängd 810215
Postadress Fack 40220 Göteborg 5
Gatuadress Chalmers tvärgata 1