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Technical Communication Research: Dissemination, Reception, Utilization

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Työn tavoite on kaksitahoinen: pyrkimyksenä on kartoittaa teknisten viestijöiden ammattikuntaa Suomessa sekä selvittää teknisen viestinnän tutkimustiedon välittymistä, vastaanottoa ja hyödyntämistä.

Teknisten viestijöiden ammattikunta kasvoi erityisesti 1980- ja 1990-luvuilla niin Suomessa kuin muuallakin tietotekniikan ja korkean teknologian lisääntyessä. Tekniset viestijät tuottavat teknisiä dokumentteja, kuten käyttöohjeita, erilaisille kohderyhmille, joiden kieli- ja kulttuuritausta voi vaihdella.

Teknisille viestijöille tehtiin kyselytutkimus. Tulosten perusteella tyypillinen suomalainen tekninen viestijä on noin 30-vuotias nainen, jolla on humanistinen koulutus ja työkokemusta alle viisi vuotta. Työkokemuksen lyhyys kertoo, että teknisten viestijöiden ammatti on Suomessa suhteellisen uusi. Myös alan koulutusta on ollut Suomessa niukasti saatavilla ja tutkimusta on tehty melko vähän.

Teknisen viestinnän ammattilaisten työtä leimaavat nopea teknologinen kehitys, kasvava erikoistuminen sekä työskenteleminen yhteistyöympäristössä, jossa työrutiineja ei ole vielä ehtinyt syntyä. Tutkimuksen yhtenä hypoteesina on, että tämä asetelma on synnyttänyt teknisille viestijöille tarpeen käyttää alansa tutkimustietoa.

Tutkimuksen hypoteesia tukivat teknisille viestijöille lähetetyn kyselyn vastaukset: enemmistö vastaajista seuraa teknisen viestinnän tutkimusta melko aktiivisesti ja tarvitsee tutkimustietoa työssään silloin tällöin. Vastoin työn toista hypoteesia, tekniset viestijät eivät kuitenkaan ensisijaisesti hyödynnä tutkimustietoa instrumentaalisesti vaan käsitteellisesti. Kaiken kaikkiaan ammattilaiset näkevät tutkimustiedon hyödyntämisen odotettua rikkaampana ja monitahoisempana ilmiönä.

Tutkimus on ensimmäinen, monitieteinen selvitys suomalaisista teknisten viestinnän ammattilaisista ja siitä, miten he hyödyntävät alansa tutkimustietoa. Tuloksia toivotaan voitavan käyttää hyväksi suomalaisen teknisen viestinnän koulutuksen ja tutkimuksen kehittämisessä, suunnittelussa ja toteuttamisessa.

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1 Introduction

> Warning in the instructions for a water boiler: "This equipment will become hot when being used." – HS, 23 July 1998

A new group of professionals has emerged in the industrial and business life of Finland since the 1980's and 1990's. They are called technical communicators, whose tasks include writing and editing technical documents for hardware and software aimed at various target groups. This new situation has been the incentive for writing this study.

1.1 Technical Communication

To begin with, we must define technical communication. To put it simply, technical communication refers to transferring knowledge from those who know to those who need to know (Barnum and Carliner 1993: 3, also Carliner 1999a: 89). In practical terms, we can talk about the production of various *communication products*, as Saul Carliner (1999b) calls them: these may include manuals, technical specifications and marketing material in paper or electronic form. These products will be addressed in more detail in chapter 2.

Technical information in various forms has been produced for a long time. As a field, however, technical communication developed around World War II when the military and defence industry needed people to write user's manuals and maintenance manuals for hardware and weapons systems (Markel 1996: 3). The number of professionals began to grow: effective business and technical communication in companies demanded a significant amount of both written and oral communication, and this became so important that various writing tasks were delegated to professional technical communicators (Ulijn and Strother 1995: 45). It was the English departments in universities that began to launch degree programmes in technical communication for English majors, and the first professional organizations were founded. The United States is the pioneer country in this field.

One of the reasons for the increased growth of technical communication was the explosion in the computer and high technology industries (Markel 1996: 3). The growth of technical communication is thus clearly related to the development of the information society, which has far-reaching effects for people generally. Consumers with different backgrounds are faced with an increasing number of diverse high technology information products. The more complicated and technically more demanding equipment or machine we are dealing with, the more technical documentation is needed (Varantola 1993: 135).

The area of information technology production and utilization can been seen as a triangle as shown in Figure 1.

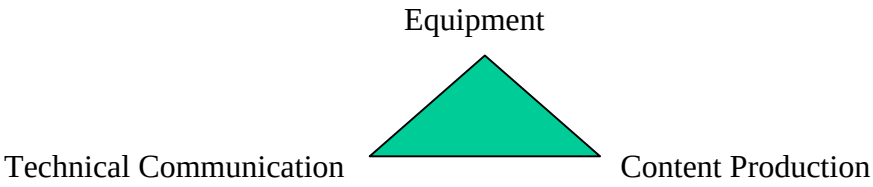

Figure 1. Components of Information Technology Production

Along with information technology (equipment) and content production, technical communication forms one cornerstone of this triangle. In this trinity, the role of technical communication remains underestimated, and too little attention has been paid to the quality and adequacy of product documentation. Yet, at the same time, an increasing number of high-technology products are intended for the general public, which demands high-quality product information on its own terms. The public has the right to expect that product documentation is aimed at the end-user and that it consists of well-organized and comprehensive information about the properties and uses of the product in question. We are basically dealing with the interaction of man and machine where technical communication acts as the bridge. This bridge can only be constructed if we have enough knowledge about the information needs and tools of the bridge builders as well as the needs of the potential users of the bridge. (Varantola and Suojanen 1999a, 1999b.)

The underestimation of the importance of technical communication is manifested in the disregard for the quality of the various communication products that (should)

accompany a hardware or software product. Consumers experience frustration, which may be caused by the poor design of documents or technology, or both (Schriver 1997: 1). Causes for complaint vary; the consumer cannot find the information he[1] needs, or the manual either underestimates or overestimates the consumer's knowledge, skills and experience.

Fortunately, there are signs that both the business world and the educational sector are gradually realizing the importance of technical communication. Companies invest in their communication products more heavily than before, and they recognize the importance of technical documentation, such as a user's guide, as a vital part of the product, whether the product is computer software, a paper machine or a mobile phone, for example. Traditionally, technical communication has often been an afterthought (Markel 1996: 3), but nowadays more than before it is seen as a competitive factor in the market: technical communication is one element in customer satisfaction and loyalty. There is also an increasing awareness that communication products do play an important role in helping users cope in an increasingly complex, information-loaded environment. Product liability is another noteworthy factor in the production and use of various communication products: in many countries, instruction manuals, and the like, are governed by product legislation.

The increased attention to technical communication has also meant that the number of technical communicators has grown rapidly during the past twenty years. At the end of the 1980's, in fact, the Ministry of Labour in the United States predicted that technical communication was one of the fastest growing areas of the 1990's and that the need for professionals would increase rapidly (Carliner 1989: 187, Varantola 1993: 135). This is also true in Finland where the demand for technical communicators seems to be on the increase, judging from the abundance of jobs available and from the willingness of companies to be involved in developing courses and educational programmes for technical communicators.

[1] Throughout the text I will use the form 'he' as a general reference.

Because of the strong demand for technical communicators in the business world, increasing attention is being paid to training, for both future and practising technical communicators. Until now, professionals in Finland have primarily learned their trade through practice: university-level education only emerged in the 1990's in two universities. In addition to two programmes leading to an M.A., continuing education courses for practising technical communicators are also available around the country. However, there are serious concerns regarding the further training of professionals: it is difficult to find educators who have the necessary knowledge, skills and understanding of the technical communicator's work so that they could offer adequate training for professionals.

The above is clearly due to a lack of tradition in technical communication training in Finland. The role of universities has so far been insufficient. A cycle where professionals with experience return to universities to carry out research, to train future generations of technical communicators and also to offer training for professionals, has not emerged yet as it has done, for instance, in the United States. Overall, designing education and training programmes where the interests of all parties – industry, academia and students – are taken into consideration is a challenge for educators, researchers and professionals in technical communication.

Technical communication is a multidisciplinary field of study, which is strongly rooted in practice. As professionals internationally and in Finland have mostly learned their trade through practice, technical communication studies have also traditionally had a strong practical orientation. It is only since the 1980's that there have been more theoretically-oriented studies (Anderson et al. 1983: 7-9). Practice is also in the foreground in the Finnish context: there is growing research cooperation between university and industry, and more and more M.A. theses about various aspects of technical communication are being completed, many of them tailored to the specific needs of companies. At this point of development there is a need for both basic and applied research on all levels.

The Finnish Ministry of Education has in its 1999-2004 development plan for education and university research included many aspects which apply particularly

well to technical communication. The plan also provides apt arguments in this context as to why, in my view, there is a need to know more about technical communication in Finland: about the principles and practices involved in technical communication within the Finnish corporate world; about the training of technical communicators; and about technical communicators as a distinct group of language and communication professionals.

The Ministry's plan states that in our present information and knowledge-intensive society, the universities should ensure the availability of high-quality researchers and the production of new scientific knowledge on which new innovations can be built. University degrees should meet the needs of working life, also bearing in mind the overall internationalization of Finnish society and industry. Moreover, research carried out in universities should emphasize high quality as well as the utilization of research results in the corporate sector, for example. Equally relevant is the popularization of scientific knowledge so that it can be utilized by citizens, which is an important aspect in building the Finnish information society. (Opetusministeriö 1999: 21-24.) These aims also reflect the rhetoric and government strategies concerning the user-friendly information society, and technical communication plays an important role in this development, as was suggested.

There is a clear demand in Finnish companies for technical communicators, but training and research in this field has until now been scarce. At the moment, universities are unable to respond fully to the Ministry's aims in the field of technical communication: they cannot ensure the availability of technical communicators with the necessary knowledge and skills, nor are they producing enough new scientific knowledge which could be utilized by working life and which could benefit the entire field. To improve this situation, we need more information about all aspects of Finnish technical communication.

1.2 Aims of This Study

Technical communication professionals are the starting point of this study. Firstly, the aim is to find out more about Finnish technical communicators as a relatively new group of professionals: for example, what educational backgrounds they represent and how much work experience they have in technical communication.

Secondly, the aim is to map out research dissemination, reception and utilization in Finnish technical communication. The focus is on technical communicators as users of research, and answers are sought to the following questions:

- Do technical communicators follow research carried out in technical communication?
- What channels do they use in order to obtain this research?
- What do they gain from it?

The focus is on the transfer of research from academia to professional settings, and how – or if – it is received and used. On a more detailed level, the issue is to find out what type of knowledge is valued and perceived to be useful by technical communicators. These types of questions will be put to technical communicators themselves. It is hoped that their responses will bring valuable information and incentives for future research and training in Finnish technical communication.

The rationale for studying technical communicators and their utilization of research is the following:

- We are dealing with an emerging field of research: Finnish technical communication has been studied relatively little so far. Thus, a study like this is relevant to the whole development of the field of technical communication in Finland.
- Technical communicators work in a collaborative work environment, which is characterized by rapid technological development. Their work is also typified by gradual professionalization and a lack of established routines. It is expected that all these factors create a need for information among technical

communicators. Research can be one source of information which these professionals can use to support their work practices.

- Following from the above reasons, we are also dealing with the professional identity, value and recognition of technical communicators.

Based on this rationale, my hypothesis is that Finnish technical communicators are interested in technical communication research and use it in their work. This expectation has also been influenced by previous surveys carried out among technical communicators in the United States: these studies found that technical communicators have positive attitudes toward research. The findings of these studies, as well as other arguments for utilization, will be presented in more detail, and the hypothesis will be tested with a questionnaire. This study, thus, hypothesizes for utilization instead of nonutilization.

This study concerns technical communication examined in a social framework; one could call it technical communication sociology. Below the surface lie the work practices, values and attitudes of technical communicators, and how they relate to texts disseminated from the world of research to the world of practice. We are also dealing with interaction between two groups – researchers and technical communicators – which also contributes to the development of the entire field.

Although attitudes and forms of interaction are relevant, the main aim of this study is to elicit information about technical communicators and their utilization of research. An important distinction needs to be made at this point: the intention is to study the dissemination of research findings to technical communicators and their utilization of research, not to examine how technical communicators popularize their own knowledge when they write various communication products aimed at different target groups. Obviously these two issues are linked, but here the focus is on transferring knowledge from academic settings to practical settings, and not how the theoretical competence of professionals is transformed into practical performance. Since this distinction is important to bear in mind throughout this study, it will be demonstrated in Figure 2.

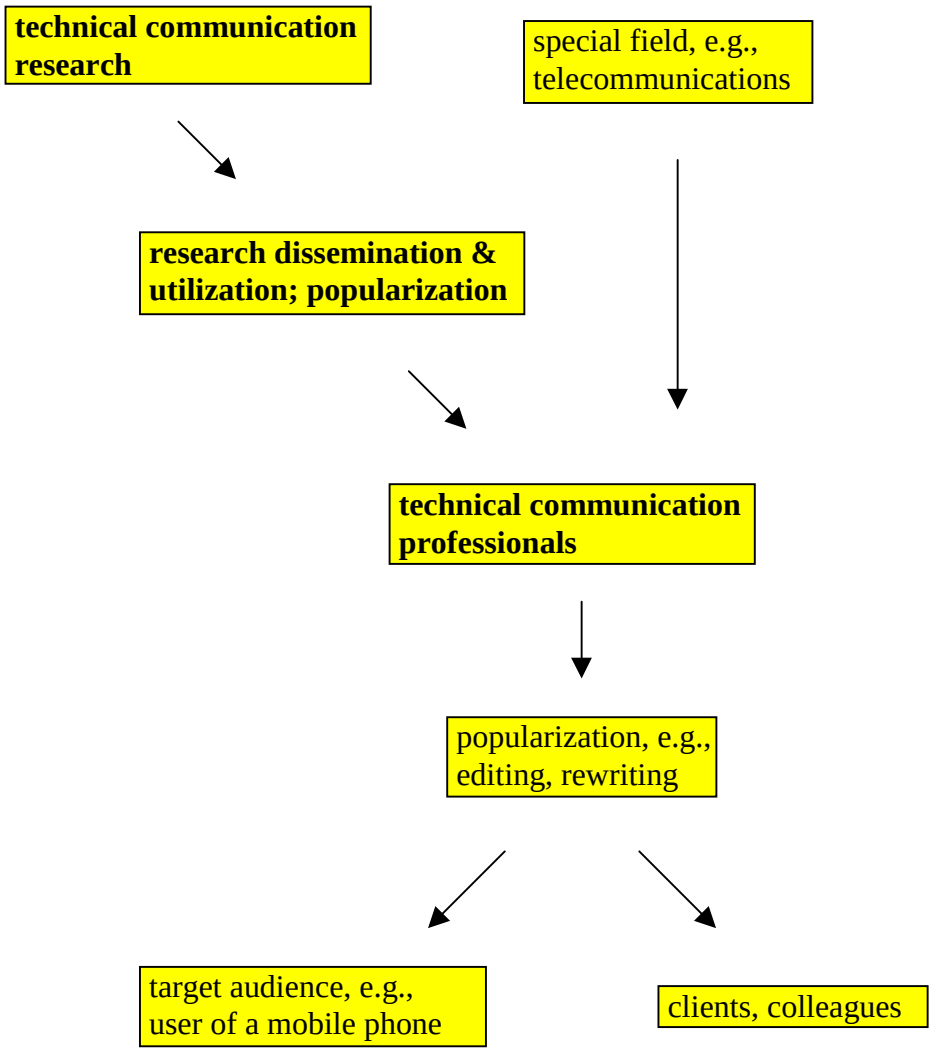

Figure 2. Technical Communication Professionals as Users of Research and Popularizers of Knowledge

This study is concerned with the items marked in bold in the figure: the dissemination and popularization of technical communication research to technical communicators and the potential utilization of that research. In addition to research knowledge, technical communicators use their knowledge of a special field or fields, such as telecommunications, when they write technical documents. When they write these documents, the technical communicators often act as popularizers, especially when the target audience is the average consumer, such as the user of a mobile phone. In this writing process, the competence that the technical communicators have gained from research and from the special field in question meets performance. In addition to this, technical communicators also act as popularizers when they deal with clients and colleagues: they share knowledge, for

example, about their own profession with other professionals in an organization, such as developers. This role of popularizer will be further addressed in chapter 4. In the figure, two-way arrows could also have been drawn: for example, technical communicators may give feedback to research, and ideally, technical communicators receive feedback from their target audiences, clients and colleagues.

This study falls under the field of translation studies. There are no departments of technical communication in Finland: training is provided and research carried out, for example, within translation studies. The main reason for this is that many translators have changed from their traditional work of the translator to work as technical communicators in a collaborative setting. The skills that translators learn during their training seem to provide a similar kind of expertise that is needed in the profession of the technical communicator: firstly, technical communication is culture-bound, and its style and information structures vary (Varantola 1993: 138-139). These are factors that translators face every day. Secondly, analyzing the target audience is of vital importance in both technical communication and translation. And thirdly, for a successful result, such as a user-friendly manual, both technical communicators and translators have to use their creativity and various information sources. Translators working as technical communicators also have a unique understanding of the challenges that translators face when they translate documents that the technical communicators themselves have written.

Technical communication is thus a new territory within translation studies. This development is, in fact, natural because technical communication in Finland is characterized by multiculturalism and multilingualism: technical communication professionals often write in a non-native language, mainly in English. This is also one of the reasons we can talk about European, or Finnish, technical communication, as opposed to technical communication in the United States where technical communication professionals are typically native speakers of English. The main basic difference in the job profiles of translators and technical communicators is that translators work from a source language text into a target language text, whereas technical communicators take advantage of varied source material and often write in a non-native language.

The fields of technical communication and translation studies are also similar in the sense that the public has first-hand experience of both translations and technical documents (translated ones included), and they may have strong feelings about them. Technical communication, however, is a more recent field in Finland in terms of training, profession and research, and it is only beginning to struggle with issues such as the public's awareness and knowledge of technical communicators, and of technical communication as a field of study.

The bulk of this study was carried out in 1999 in a research project called "Man, Machine and Technical Communication" in the Department of Translation Studies at the University of Tampere. The project was funded by the National Technology Agency, Tekes.

While writing this study, I have had two major target groups in mind: audiences within the research community, for instance, in translation and language studies, and technical communication professionals, hoping that this study will bring new information that interests and perhaps benefits both. Since we are dealing with a new field and since this work is multidisciplinary in nature, the goal has been to start by introducing some of the central concepts in technical communication and in research dissemination and utilization, and then continue on to a more pragmatic level.

1.3 Research Dissemination and Utilization

The transfer of scientific knowledge from academic settings to professionals is a specific type of dissemination where the focus is often on the utilization of research. To better grasp this specific instance of dissemination, it is worthwhile to address research dissemination on a general level.

If we consider research dissemination as a phenomenon covering the entire society, we can find three main target groups to whom research is diffused: the research community, the users of research findings, and the general public (e.g., Niiniluoto

1994: 9). The emphasis in this study is on the user group, namely technical communicators, and their use of research.

Research dissemination can be seen as a metafield which is shared by all academic disciplines, and many theories concerning it have been formed. Some focus on the conversion of the knowledge to be disseminated, some see dissemination as bridging a gap between researchers and users, and some pay attention to the power aspects involved in research dissemination (Laaksovirta 1986). Theories that are relevant in the dissemination of technical communication research to the users and in their use of that research will be addressed in this study.

How research findings are used in professional settings forms a specific field which is called by different names, such as *knowledge dissemination and utilization*; *research dissemination and utilization*; *dissemination and utilization of research knowledge*. I will use these interchangeably in this study. Despite the names of the field, the bulk of studies concentrate on the actual utilization phase, and often the field is simply called *research utilization*, or *use*, which will also be done in this study. Research utilization has a fairly long history, but the field is varied in nature: no overall conceptual framework or general theories exist; rather, the field is characterized by different perspectives and approaches (Oh and Rich 1996).

Much of the research on utilization has been done within the social sciences, and it has focused on policy-making issues. The existing research in these areas will be used as a point of reference, because no academic studies have been done on research utilization in technical communication against the background of the research utilization framework.

Research utilization studies typically focus on the implementation of a programme in a government institution or a teaching method in a school, that is, research is used to improve the practice of practitioners. This study, however, does not aim at introducing a policy, for example: rather, the aim is to get more information about the use of research among technical communicators. This information will hopefully help design and plan training and research in the field, which might, in turn, help practitioners in the long run.

There are three important considerations in the study of research dissemination and utilization in technical communication:

- What is the research referred to; in other words, what does research in technical communication offer?
- Why should technical communicators need or use research in the first place?
- What is meant by utilization?

The answer to question one is fairly straightforward: technical communication is a multidisciplinary field, which means that there are a variety of research topics of relevance to professionals. Question two is connected with the rationale of this study, but it also includes more detailed considerations: technical communicators may need to use research, for example, because it helps to increase professional credibility.

The third aspect is more complex, and it will be dealt with in great detail. A number of different models of research utilization exist, but the two main poles that are usually mentioned in research utilization studies are instrumental use and conceptual use. Instrumental use refers to the application of research results and knowledge in a decision-making situation or in problem-solving, whereas conceptual use refers to a situation where research affects the understanding of issues more broadly, and where theories and facts are used in human thought and action in general (Lampinen 1989: 95, Weiss 1981: 23).

Some utilization researchers have found that conceptual use is likely to be more prevalent than instrumental use (Weiss 1981: 23). However, the hypothesis in this study is that technical communicators would report using research primarily in an instrumental fashion. There are mainly two reasons for this: the practice-oriented history of technical communication, and previous feedback from professionals which has suggested that technical communicators value concrete information that they can apply to practice. I shall return to conceptual and instrumental use as well as other utilization models in chapters 3 and 5.

Research dissemination and utilization is closely related to the issue of popularization, which is a specific approach within research dissemination. Popularization is generally regarded as the dissemination of scientific knowledge only to the public at large. However, popularization is also relevant in research dissemination and utilization concerning professionals, in this case technical communicators. There are two reasons for this: firstly, the majority of Finnish technical communicators do not have a background in technical communication studies, and research in the field may be unfamiliar to them. Therefore, there may be a need for popularization, or a kind of "professionalization", of research findings. A practical example of this is that some channels and information sources through which technical communication research is diffused to professionals make use of popularization. This is also reflected in the empirical material of this study. Secondly, the results of the empirical material indicate that technical communicators themselves act as popularizers of technical communication research. Both these points were briefly mentioned in connection with Figure 2. (see page 8). I shall return to the connections between popularization and technical communication in chapter 4.

Popularization as well as the field of knowledge dissemination and utilization immediately present the problem of terminology: What is meant by *knowledge* and by *information*? In this study, knowledge will be defined as a property of the individual, enabling and orientating him to function as an individual and member of society, whereas information refers to processes taking place between individuals. Information can, however, become knowledge once it is adopted.

Scientific knowledge is a particular type of knowledge, and it is the starting point in research dissemination and utilization. Scientific knowledge is something that has originated within an individual researcher. When it is detached from its origin, it becomes information, which may be disseminated. When this information reaches its intended target audience and becomes understood, it becomes knowledge again. I use this train of thought throughout this study with an awareness of the fuzziness of these concepts when used in different contexts. It is also worthwhile to point out that there is a great deal of variation in the terminology used within the research utilization literature. This also applies to the

transfer process of research: we can talk about *diffusion*, *dissemination* or *technology transfer*. These will be addressed in more detail in chapter 3, but at this point we can note that *diffusion*, *dissemination* and *transfer* will be used interchangeably in this study.

A note should also be made on the use of *science*: although the English term science is usually considered to be a synonym for natural science (Wilss 1982: 52), it is used here in a general sense to mean all organized bodies of knowledge created within the scientific institution (defined by Niiniluoto 1984: 21, see section 4.1), including the field of technical communication. *Field* or *field of study* in connection with technical communication will be used throughout this work to refer to technical communication as a typical multidisciplinary "studies" area. *Field* in connection with research utilization is used to characterize its nature as a metafield, which examines research utilization across disciplines.

A relevant issue related to knowledge and popularization in this context is the question of theory and practice, which also poses a challenge for the dissemination and utilization processes: how to dress the academia-based research in a form and language that takes into consideration the user and the practical setting in which he operates? Technical communication is an exceptional field in this sense because of the historical development of the field: it originates in highly practice-based settings, which has also led to practice-oriented research. It is important also to make a note about the use of the term *research* in this context: we are not dealing with traditional academic research, but with a "studies" area characterized by a strong professional underpinning. This slightly different understanding of research will be discussed further in the empirical part of this study in chapter 5.

The gap between theory and practice is related to the aims of research in general. Who are the beneficiaries of research? Practice-oriented studies traditionally carried out in technical communication have clearly aimed at helping professionals with their tasks. However, the situation has changed with the emergence of more theoretical studies, and therefore, it is relevant to consider what the present aims of technical communication studies are. This will be discussed in more detail in subsection 3.3.7.

1.4 Materials and Methods

Since this study focuses on technical communicators and their use of research, the professionals themselves make the best informants. To elicit information from them, a questionnaire was designed with 13 questions (Appendix 1).

Of the 13 questions, eight can be considered to elicit information about the respondents (also referred to as *informants* or *subjects* in this study): their sex, age, job title, education, work experience, experience in carrying out research and publishing it, and the company where they work. Even in the United States, where the profession of technical communicators has a long tradition compared to Finland, there is a lack of this type of basic information about this profession (Carliner 1999h). This kind of information is also important because it is related to the overall image of the profession.

In addition to the background questions, there were four core questions in the questionnaire, which were designed to shed light on the three elements mentioned in the title of this thesis, namely dissemination, reception and utilization: Do technical communicators need and follow research? Where do they find out about it? Do they actually use research and in what way? There was also one further question that dealt with hopes and expectations that technical communicators have concerning university training and research carried out in technical communication. The reason for this question was the assumption that professionals can give valuable and practical information as to the type of research and training that they currently consider relevant in Finnish technical communication. This information will hopefully also contribute to a holistic development of the field.

The questionnaire was first tested as a pilot study on 11 informants. In the selection of all informants, primarily nonrandom sampling was used (see Zimmerman and Muraski 1995: 130). The individuals to whom the questionnaire was sent were selected because they had certain common characteristics; in this case, they were all representatives of the technical communication profession in Finland.

The questionnaire was sent both by traditional mail and email. The informants came from a number of sources, from the continuing education courses at the University of Tampere and from the mailing list of the Finnish Technical Communications Society, to mention but a few at this point. The entire population of technical communicators could not be studied since the size of this population is unknown in Finland. Altogether 106 responded. The exact response rate could not be calculated due to reasons explained in chapter 5, but the results will be viewed against the estimated number of technical communicators in Finland.

The research strategy used in this study is primarily qualitative: the aim is to describe technical communicators' use of research. However, because the number of respondents was so high, some cautious generalizations will be made about Finnish technical communicators in general.

1.5 Organization of This Study

The theoretical framework of this work is divided into three parts, namely chapters 2, 3 and 4. Chapter 2 introduces technical communication in more detail in order to familiarize the reader with the whole scope of the field. Therefore, historical developments will be addressed as well as some of the present-day trends in technical communication. The actual work of technical communicators will also be examined, and special attention will be paid to training and research in technical communication. Some central issues in modern technical communication research will be taken up. Because technical communication is a fairly unknown field in academic circles in particular, chapter 2 will also take a brief look at some of the most important institutions and publications in the field.

Research dissemination and utilization will be examined in chapter 3. The distinction between *knowledge* and *information* will be addressed before giving a brief introduction of theories about research dissemination in general. The emphasis in chapter 3 will be on utilization, which will be discussed from various viewpoints: its definition, practical application and reasons, as well as factors which influence the level of utilization. As a fairly long tradition in utilization

research exists in the social sciences (education in particular), this research, both new and older, will be used as a basis against which technical communication will be examined. Knowledge formation and the gaps between theory and practice will also be considered.

Chapter 4 deals with popularization. Popularization will be defined in relation to knowledge, and special attention will be given to scientific knowledge. The problems involved in popularization will also be taken up. Connections between popularization and technical communication will be examined in more detail.

Chapter 5 forms the empirical part of this work. The material and methods will be introduced in detail. The responses to the questionnaire will be analyzed and discussed within the theoretical framework of the study. In chapter 6 I shall gather together the main findings of this study and make suggestions for further research.

I have included a summary at the end of each theoretically-oriented chapter (2-4). These summaries comprise the subtopics that are essential and most relevant for examining and discussing the empirical material.

2 Technical Communication

> A manual for an air-bed specifically instructs the consumer not to eat the product.
> – HS, 23 July 1998

In this chapter I will set the stage for this study by outlining technical communication as a field and the profession of the technical communicator in both the international setting and the Finnish context.

2.1 What is Technical Communication?

A variety of definitions for technical communication can be found in the literature, and a consensus does not seem to exist about its meaning. The intention here is to provide some basic definitions in order to give an overall view of the field. We can move from general definitions to more specific ones, which also comment on the individual characteristics of technical communication.

As mentioned above, technical communication can be defined as transferring knowledge from those who know to those who need to know (Barnum and Carliner 1993: 3, also Carliner 1999a: 89). This definition is highly general, but gives the bottom line about what technical communication is concerned with: technical communicators are in possession of knowledge that a target audience needs, and they must communicate this knowledge using the appropriate means. Another slightly more detailed definition is provided by Mike Markel:

> Technical communication is the process of creating, designing, and transmitting technical information so that people can understand it easily and safely, effectively, and efficiently. Most technical communication is written by people working in or for organizations. Technical communication is reached by people who need to carry out procedures and solve problems. (1996: 2.)

As in the first general approach, Markel's definition also considers the need for information, namely people's need to complete procedures and solve problems in a manner that takes into consideration issues of safety and effectiveness. James Shelton summarizes the purpose of technical communication: to inform, instruct,

describe, explain, or otherwise document scientific or industrial processes and mechanisms (1994: 1).

As suggested in the introduction, technical communication comprises everything from manuals, user's guides, technical specifications, operation and installation instructions to contracts and marketing texts. Carliner divides these communication products into five categories according to the purpose of information. The communication products in the first category explain how to use products, services and policies; examples of them are user's guides, help and references. The second category refers to the exchange of "basic" scientific information and includes technical reports, articles and books. The third category refers to market products and services, including proposals, catalogues, brochures and videotapes. The fourth purpose category is to train users: examples of it are workbooks, tutorials and quick references. The last category is a mixed group: a combination of purposes, such as newsletters and magazines. (Carliner 1999b.)

The categories that are most relevant in the Finnish context, and which are produced specifically by technical communicators in this country, seem to be categories one and four: professionals produce explanatory material to go with products and also documents to train users. To simplify reference to the bulk of this material throughout this study, I will talk about *technical documentation* and *documents*, in addition to which I will use Carliner's term communication products. The general target group that I have in mind is the average consumer, who is the main recipient of the bulk of product-related documentation.

In addition to descriptive definitions of technical communication, the field can be characterized on a more detailed level through its different features, as Markel has done:

Technical communication

- addresses particular readers
- helps readers solve problems
- is part of an organizational context
- is created collaboratively
- involves words and graphics
- uses design to increase readability
- involves high-tech tools (1996: 7).

Some of the items in this list have been given emphasis in my study. These comprise reader-orientation, working in an organizational context and collaborative work environment, and the different tasks involved in technical communication. These will be commented on more extensively later in this chapter.

Definitions, whether they are general or specific, are often related to terminological issues. As in many fields, there is also some terminological variation in technical communication. It is often referred to as *technical writing*, but I think it gives a simplistic image of the field and the work of these professionals. Therefore, the term *technical communication* will be used in this study as it gives a wider view of the field: graphics and the use of new media, such as online documentation, are increasingly important in technical communication (Markel 1996: 2). I think this term also reflects the fundamental importance of expressive skills better. For the same reason, *technical communicator* will be used as the general term instead of *technical writer* to refer to the communication professionals who produce technical documentation. Terminological and job title use in the field will be further discussed below and in the empirical part.

2.2 The Consumer in the Real World

Nowadays consumers are surrounded by rhetoric about the information age and information society, and technical communication is playing an increasing role in people's lives: we have a number of different appliances at home, which all come – or should come – with a manual. People depend more and more on information technology, whether it is a word processor in the office or an automatic cash dispenser in a bank (Preece 1993: 7). The quality of technical documents

accompanying products, however, may not always satisfy the consumers, as shown, for example, by customer feedback and complaints in the newspapers. As mentioned above, the frustration people experience is often caused by the poor design of documents or technology, or both (Schriver 1997: 1). Causes for complaint vary. The consumer cannot find the information he needs, or the manual either underestimates or overestimates the consumer's knowledge, skills and experience. Thomas Huckin and Leslie Olsen report on a study by Fred MacIntosh, who asked 182 different senior officials in science and industry to list their complaints about the technical communication they saw. Out of the altogether 18 complaints, the top five were the following: generally foggy language, inadequate general vocabulary, failure to connect information to the point at issue, wordiness, and the failure to stress important points. (Huckin and Olsen 1991: 13.) Feedback like this can be valuable both for companies producing documentation and for educators teaching technical communication.

A technical document is a part of a product and it should serve the user. A good technical document for a product should be accurate, safe, efficient and easy to use. Technical documentation is also related to legal issues: although there is no single general instruction on how manuals should be written, there is a product safety law in Finland, which specifies, for example, what type of information consumer goods should contain and which also gives some guidelines for writing manuals. (Pohjola-yhtiöt 1991: 5, 10.)

Some of the problems involved in designing user-friendly documentation are related to an understanding of how we as humans read documentation in general. This understanding can to a large degree affect the design of a document (content, organization, delivery). The following research results demonstrate some examples of what this understanding means. Karen Schriver and her research team asked a group of consumers the question "Generally speaking, how do you read instruction manuals?" Approximately 80 per cent reported scanning their manuals or using them as reference, while 15 per cent reported reading manuals cover-to-cover and 4 per cent said they never read them at all. A related question in this study was "How did you read and use the instruction guide that came with your product?", which referred to the last product the respondents had acquired (the four given categories

were VCR, telephone answering machine, phone and stereo). More than 80 per cent reported using manuals, and most tried out the product while reading the manual, which suggests that a well-designed manual can help consumers take full advantage of a product. In other words, documentation may contribute significantly to customer satisfaction. (Schriver 1997: 213-214.)[2]

It is not only customer satisfaction that is at stake when we read technical documents. Schriver has also carried out an interesting study of how readers assign blame for the troubles they experience with documents accompanying a product. The study showed that people, irrespective of age or gender, clearly have a tendency to blame themselves for their confusion or errors they made with consumer electronics instead of the manual or the machine. Situations which lead us to blame ourselves are unpleasant and they may have cumulative effects: if the experience of using new technology is predictably unpleasant, the users may be less enthusiastic about making new purchases. But what is even more significant is that users get accustomed to thinking and feeling about documents negatively: "Memories of documents that readers have encountered in the past may shape their beliefs about texts they have not yet read and may determine whether reading will take place at all." (Schriver 1997: 216-223.)

Huckin and Olsen remark that one of the reasons for so much bad technical communication is poor training. Technology advances so rapidly that universities and schools have trouble keeping up. They often have to make sacrifices, and sometimes they are made in the wrong place, such as in the training of communication skills. (Huckin and Olsen 1991: 13.) In fact, one of the crucial issues in the training of technical communicators is to know what the proportion should be between instruction in tool use and in other types of instruction, such as writing and editing. Training in technical communication will be examined later in this chapter.

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[2] In addition to various approaches to documents, users also have different reading styles. Ulijn and Strother have identified five major reading styles: scanning, search reading, skimming, receptive reading and responsive reading (1995: 136-137). Knowledge of these can be vital for the technical communicator when he plans the organization of a document intended for a defined target audience (ibid. 325-326). This is one example of a piece of research that technical communicators might utilize in their work. More examples will be given in subsection 2.4.2. and in chapter 5.

Another aspect of poor technical communication is that the people putting together the documents often have neither experience nor interest in document design[3], and that documentation is often an afterthought at the end of the product development process (Schriver 1997: 219), as suggested in the introduction. We are also dealing with corporate cultures and overall attitudes toward technical communication. Next I will discuss how documents that sometimes cause so many complaints are produced and by whom.

2.3 The Technical Communicator

As mentioned in the introduction, the number of technical communicators has grown rapidly during the past twenty years, largely because of the growth of the computer industry and related high-technology fields (Markel 1996: 3). This is also true in Finland, where there are estimated to be 500-1,000 technical communicators (Haimi 1998: 3), and the demand seems to be growing. World-wide, it is estimated that over 200,000 people work in the field (Carliner 1999b).

The businesses and industries in which technical communicators work vary. Most commonly, they work in the software industry. But there are also a number of other fields of business where technical communicators can be found: banking, finance and insurance firms, the defence industry, energy, environmental engineering, health care, pharmaceuticals and telecommunications. (Carliner 1999b.) These examples, however, are to some extent culture-specific and they best reflect the situation in the United States. In Finland, the greatest need at the moment seems to be in telecommunications, but I expect that the range of fields will expand along with overall globalization and the development of the information society. To get a reliable picture of the scope of the field in Finland, we would need a comprehensive survey of Finnish technical communicators in their work environments.

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[3] Schriver uses *document design* to refer to technical communication. The variety in terminology used in technical communication will be addressed on pages 25-26.

People who enter the technical communication field have varied backgrounds. They may have technical experience in a certain field; they may have a background in the humanities and social sciences disciplines, such as English, psychology and education; or they may have formal degrees in technical communication. (Carliner 1999b.) According to an old survey of 160 industrial firms in the United States, the preferred profile of technical communicators are 1) engineering major, English major, 2) science major and English minor and 3) English major with a science minor (Walter 1966 in Ulijn and Strother 1995: 86). Technical professionals are needed especially when the product itself requires a high level of technical expertise, whereas I agree with Jan Ulijn and Judith Strother when they say that technical communicators with a background in the humanities are better able to place themselves in the position of the consumer, who usually lacks a technical background and wants to operate a piece of equipment efficiently (1995: 86).

Ulijn and Strother continue to say that if we want to produce readable texts, especially technical texts, the technical communicator should ideally be a native writer of the language with strong background knowledge of the subject of the text. However, this is not always possible, in which case one has to make a compromise between the amount of language knowledge and background knowledge that are sufficient: it is advisable either to hire technical communicators who are native speakers, but who might not know the special field, or to hire technical communicators who are non-native speakers, but have the relevant background knowledge in a special field. (Ulijn and Strother 1995: 239-247.)

The empirical material in this study suggests that the situation in Finland follows neither of the two alternatives above. Companies typically hire technical communicators with a background in the humanities to write in English. In other words, technical communicators are mostly non-native speakers of English, and they often do not have background knowledge of the special field before they enter a company.

Although many translators have become technical communicators, they are not the only ones to work as technical communicators in Finland: other common educational backgrounds of technical communicators include engineering and

language studies, as the results of the empirical material in this study demonstrated. The primary language of technical communication in Finnish companies who employ technical communicators is English, and from English the products are translated or localized into other languages according to need. Localization refers to "the process of creating or adapting an information product for use in a specific target country or specific target market" (Hoft 1995: 11). Localization is often accompanied by internationalization, the re-engineering of information products in such a way that they can be easily localized (ibid. 1995: 18).[4]

Localization and internationalization demand careful methods of audience analysis, which will be addressed below. When products are distributed globally, technical communicators need to perform an international-user analysis, which can entail different variables: political, economic, social, religious, educational, linguistic and technological (Hoft 1995: 57-77).

Writing in a non-native language and for an international audience has given European, and Finnish, technical communication a unique multilingual and multicultural perspective, as suggested in the introduction. The role and importance of English among non-native technical communication professionals in general has been studied, for example, by Ulijn and Strother (1995) and Kirk Amant (1999), who pay special attention to the rhetorical expectations of audiences across cultures. It would also be interesting to see an in-depth study of this aspect in the Finnish corporate world.

Before going into the actual tasks of technical communicators, I want to return to the issue of terminology mentioned above. Carliner argues that one of the major issues facing the field is to find a suitable professional name for technical communicators. He says that "Some people in industry want to change the name of the profession from technical communication (or technology) to information design and development". This move began from IBM in the 1980's when it gave its

[4] As localization and internationalization are costly, companies have also adopted the method of globalization: creating products in a way that they can be used in many cultural contexts without modification. For more details, see Hoft 1995: 22-25.

writers the new job title of “information developer”. The company was worried that the distinctions among writer, editor and designer were becoming blurred because of the growth of electronic publishing. The term “writer”, on the other hand, brought to mind a novelist, according to the company. Since IBM implemented this policy, many organizations have followed suit and started to give the name “information developer” to professionals who produce communication products. The term “technical” is another objection to the name, as it has brings the word technician to mind. Still, among the Society for Technical Communication, which is the largest professional organization in technical communication, the most common job title is “technical writer/editor”. (Carliner 1999d.)

Schriver also comments on the terminology used in the field of technical communication. She asserts that there is a problem with *technical communication*, namely that it fails to suggest that the professionals must be able to think visually as well as verbally. She prefers *document design*, because, in her view, it suggests the **act** of writing and designing. (Schriver 1997: 10.) Both Carliner’s and Schriver’s comments demonstrate that although some practices have emerged, a consensus does not exist concerning terminology in technical communication.

The Finnish terminology in technical communication is also unestablished and quite varied. *Tekninen viestintä* or *tekninen kirjoittaminen* are used as the general term, but they do not seem to be very clear or familiar to people outside the field. Professionals are usually referred to as *tekninen kirjoittaja*, but as in the case of English, it gives a very narrow picture of the actual tasks of a technical communicator. My suggestion for the general Finnish terms are *tekninen viestintä* and *tekninen viestijä*, accompanied by efforts to increase general awareness of the field and these professionals.

The different job titles found among technical communication professionals reflect the types of tasks they perform. As said above, “technical writer” is a common job title. A technical writer’s practical tasks can be outlined along four dimensions: firstly, the technical writer writes the original technical document by using a variety of source information, such as technical specifications and interviews with designers. In fact, gathering and understanding source material are major activities

for most technical communicators (Grice 1989: 27). Secondly, the technical writer updates existing technical documentation, which occurs when a new version of a product is launched on the market. Thirdly, the technical writer edits and corrects technical documents produced by a company's marketing division, for example. And fourthly, the technical writer takes care of preparing and sending the final documentation package to the customer. These tasks, of course, are somewhat different depending on the company, its field of business and its profile. Especially in companies which offer documentation services, the technical writer may also be involved in designing and tailoring the entire technical documentation for a customer company. In addition to the "technical writer", professionals involved in the production of technical documents can be called "documentation specialists", for example.

Carliner offers a condensed view of the above, and divides the tasks of technical communicators in general into four phases: design, development, production and maintenance. Design refers to the process of planning a communication product, such as choosing and sequencing the appropriate content for the target audience. The development phase refers to the process of turning the design into a finished communication product, such as writing and editing. Production refers to the process of preparing the communication product for duplication and distribution. And the maintenance phase includes tracking user satisfaction and usability. (Carliner 1999b.)

Ideally, technical communicators should be involved in all phases of the communication process, starting from the planning. Throughout this process, they assume a number of different communication roles: audience analyst and task definer, researcher, planner and organizer, synthesizer of information and production specialist. (Dorazio 1995: 175.) In fact, technical communicators spend only a portion of their time writing; the remainder is spent communicating and working with others (Grice 1989: 27). Ulijn and Strother note that technical communicators spend at least two-thirds of their time on planning activities. When they describe the writing, they aptly remark that we are dealing with a complex

nonlinear recursive process: the activities of planning, drafting, reading, rereading and revising all occur during the writing process. (Ulijn and Strother 1995: 324.)

The technical communicator does not work alone, as was suggested above (see page 20). There are a number of other people involved in the production chain, such as product developers, marketing representatives, testing personnel, graphic designers, editors and production specialists (Grice 1989: 31). I would also add translators and terminologists to this list. The technical communicator works at the centre of a social network, trying to find a compromise and to fit together the requirements and wishes of other members in the work community. Therefore, the technical communicator also needs good social skills. He may also have to compromise because of time restrictions: a product may have a strict deadline, and the technical communicator has to make a compromise concerning the quality of his document, because the product accompanied by the document must be delivered to the customer or to the market on time.

Huckin and Olsen fittingly see the technical communicator as a problem solver. The technical communicator tries to find a balance between the actual state of affairs and a desired state of affairs, which is determined by certain goals, constraints and criteria determined, in turn, by different audiences. The problems are embedded in the organizational context, which means that they are socially conditioned. In other words, they are created by the wants and needs of different people in the organization. (Huckin and Olsen 1991: 14-16.) The image of problem solving also goes back to Markel's notion that technical communication helps readers solve various problems. Thus, we can sum up the activities of technical communicators as a five-step ladder: they define the problem, they plan a solution, they test the solution, they implement the solution and, finally, they evaluate the solution (Anderson 1995: 10).

The target audience for whom technical communicators produce documentation varies depending on the product. The audience can be seen in a continuum: at one end, we have professionals who have a command of the special field in question, and at the other end, we have the average lay consumer, who is expected to be able to complete such tasks as putting together a bookshelf. (Varantola 1993: 135.)

The wide range of audiences requires a user and audience analysis, which was suggested earlier. Companies use different methods for getting information about the users of their products. These may include marketing research, after sales feedback and direct customer feedback: typically the analysis consists of several different methods (Ruotsalainen 1999). We said earlier that gathering and understanding source material are major activities for most technical communicators; audience analysis is another crucial area, especially bearing in mind users' complaints. It is also an area that is receiving more and more attention in many forums of technical communication today. For this reason, I will overview three audience analysis models presented by Schriver, namely classification-driven, intuition-driven and feedback-driven audience analyses (1997: 152-167). I think that they also give a useful perspective to the development of technical communication.

Classification-driven audience analysis was developed in the 1960's and gives professionals methods for creating profiles of their anticipated readership. They list audience demographics (e.g., age and sex) and psychographics (e.g., values and attitudes), and these profiles are used to classify audiences into groups such as nontechnical – technical or general – specialized.[5] However, with this model the leap from the analysis to the actual writing of the text is quite long, and it can give a rather narrow and static view of readers.

Intuition-driven audience analysis was developed in the 1950's. It is based on imagining the audience. In other words, the technical communicator uses a mental construct of imagined readers. The model emphasizes the technical communicator's personal creativity in invoking the reader, but it is vague how this is actually done.

[5] Within technical communication, different categories of audiences have been created. For example, Huckin and Olsen define five most important types of audiences a technical communicator is likely to encounter: managerial, nonspecialist, peer, international and mixed audiences. These audiences may have a different background knowledge, needs and purposes, and thus, they may also have different reading strategies, which need to be considered when writing for them. (Huckin and Olsen 1991: 56-71.)

Feedback-driven audience analysis views real readers in the process of interpreting texts. This model springs from two research traditions: one focuses on how people read and interpret texts (e.g., reading comprehension and cognitive psychology), and the other focuses on people reading and interpreting text in context, (e.g., rhetoric and cultural studies). The method became popular in the 1980's and 1990's among professionals in usability testing, human-interface design and user-centred design of products: "understanding the user" became the focus. Like with all the models, the weakness of the feedback-driven model is the gap between forming an image of the audience and action based on that image. It is interesting that until now there has been little research on how technical communicators move from stage one, in which they collect the data, to stage two, where they interpret their observations, and then to stage three, where they make revisions that reflect those interpretations. (Schriver 1997: 155-162.)

All of these models – classifying audiences, imagining them and listening to them – can be used alternately, depending on need and the situation. They also demonstrate an important point: whenever audiences are analyzed, the technical communicator and the audience should be compared, and an assessment should be made concerning their knowledge, values and beliefs about the subject matter. Sometimes the gap is go wide that bridging the two is not easy. (Schriver 1997: 162-164.) In my opinion, these analysis models demonstrate two things: firstly, how challenging and relevant the aspect of audience analysis is in the technical communicator's work, and secondly, how the field has evolved. The focus in present-day technical communication is on the user, and these different models provide technical communicators with an arsenal for analyzing their audiences.

In order to perform all the tasks described above, technical communicators are required to have specific knowledge and skills. They need to be able to write, in other words, to communicate information through words and visual images, and to edit text, namely to correct grammar, spelling and style. The ability to design information is also a relevant skill, especially in the design phase. Project management is required to be able to plan and implement projects, and graphic design is a useful skill needed in the design, development and production phases.

And finally, knowledge of usability is also an important asset: the ability to design products and information as well as to test them affects the user-friendliness of the product itself and the documentation accompanying it. (Carliner 1999b.)

Patricia Wright follows a similar logic in her list of skills that a technical communicator needs. These comprise

> 1) Task analysis of how readers will use the document.
> 2) Use of language, especially in the explanation of technical terms and complex procedures, with an awareness of the value of alternatives to prose.
> 3) Use of graphic and typographic presentation to help the reader grasp the underlying structure of the text.
> 4) Interpretation of behavioral research relating to the design of information.
> 5) Management of the documentation process.
>
> (Wright 1981: 10-16, also Ulijn and Strother 1995: 238.)

Task analysis has three components concerning the reader: he must find the relevant information, he must be able to understand that information and, finally, he may have to reinterpret that information to answer a certain query (Wright 1981: 11). Task analysis, of course, is closely related to audience analysis, and they can often be mixed: the characteristics of users also provide clues as to what types of tasks they want to perform with a product. Task analysis is also one consideration in usability studies in general, whether the studies concern a product such as software or the documentation that accompanies it; other considerations are the nature of the work the user does, the environment in which the work is carried out and nature of the technology used (Suikola 2000). As we can see, the skills required of technical communicators are wide-ranging, and this also poses a challenge to the design of training for technical communicators.

2.4 Emergence of a Discipline

The issue of communicating technical information has existed since technical development began: even the Greek and Roman societies produced operational information which included technical information. But technical communication emerged as a profession only in the 20th century. (Carliner 1999e.) As mentioned

in the introduction, it developed into a special field around the time of World War II, when the military and defence industry needed people to write user's manuals and maintenance manuals for hardware and weapons systems (Markel 1996: 3). In the 1950's, the first professional organizations in technical communication (Society for Technical Writers and Editors) were founded and the first degree programme was established (Carnegie Institute of Technology, now Carnegie Mellon University). In the 1960's and 70's, two unrelated trends helped fuel the growth of the profession: the growth of the computer industry required more extensive documentation, and the growth in plain language laws in the United States made consumers demand documents that were written in plain language. In the 1980's, consumers started buying computers, and technical communicators had the responsibility to provide user-friendly documentation. During that decade, employment and the number of academic programmes grew significantly. Today, computers continue to change the publication of information, and employment has continued to grow. Delivering information to users online was a trend of the 1990's. (Carliner 1999e.)[6]

Schriver notes that the field of document design [technical communication] did not begin in the United States, although the American perspective dominates the historical record (1997: 14). This is also demonstrated by the short historical account above. Today, the United States is the forerunner in technical communication, with an abundance of academic studies, textbooks, professional activities and different types and levels of educational programmes. Traditionally, technical communication professionals have been English majors and journalism graduates who were fascinated by technology and science (Kalmbach et al. 1995: 31). As a consequence of the growth of technical communication, these university departments started new training programmes and research projects in technical communication to meet the needs of the marketplace better. Thus, the field has traditionally been viewed as belonging to the humanities.

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[6] Schriver notes that the history of document design [technical communication] is a much more complicated issue than it is often portrayed to be (1997: 44-49). She also notes that there is a lack of historical sources for document design. She has, however, produced a good, comprehensive timeline of document design from 1900 to 1995, see Shriver 1997: 13-149.

In the absence of comprehensive studies on technical communication in Finland, it is difficult to trace the development of the field as accurately as in the case of the United States. The field is fairly new in terms of the development of the professional scene, educational programmes available and research. For example, the Finnish Technical Communications Society was established as recently as 1997, and M.A.-level education in technical communication is offered in only two Finnish universities, Tampere and Vaasa. In the former, training is offered in the form of a specialization programme (Technical Communications Programme) in the Department of Translation Studies, and in the latter, students can take a degree in the Departments of Communication Studies, and Information Technology and Production Economics (Multimedia Systems and Technical Communication).

Both university programmes were launched in the second half of the 1990's, and consequently, academic research in the field has also been fairly limited. Usability can be considered to be an exception in this sense, as it has been studied for a longer period of time, mainly within computer science and the social sciences. In addition to basic education, continuing education courses in technical communication are offered to practising technical communicators, and some preparatory training is provided for the unemployed. The field does not have a status of a discipline, unlike in the United States, as there are no actual technical communication departments. At this point, I would therefore describe technical communication as an emerging discipline.

2.4.1 Research Characteristics and Training

Technical communication is a multidisciplinary field. The fields that contribute most to technical communication are rhetoric, business management, composition theory, cognitive psychology, human factors (interaction between humans and machines), instructional technology (e.g., the application of learning styles when creating tutorials), linguistics, sociology, systems theory and transfer of technology (how people adopt and adapt technology). In addition, technical communicators need to have an understanding of the theories underlying the subject matter that they communicate. Technical communicators who work in the computer field, for

example, need a background in operating systems, database management systems, programming or data communications. (Carliner 1999f.) In addition to placing a variety of demands on the skills and knowledge of professionals, the multidisciplinary nature of the field is naturally visible in training and research. Research in the field is broad-based and ranges from studies of style and simplified language to usability, cross-functional teams and writing for the information networks.

Earlier we saw similarities between the work of the technical communicator and that of the translator. The two fields as a whole also share a further common characteristic: Thomas Pinelli and Rebecca Barclay note that technical communication can be viewed both as a discipline and a profession, and this has been considered problematic. Technical communication as a discipline (US) is facing problems with methodology and purpose: "Technical Communication research has been variously criticized for failing to meet the standards of 'scientific inquiry' in both of these areas." (Pinelli and Barclay 1992: 528.) Interestingly, in 1985 Pinelli wrote:

> At present, technical communication is considered to be a field of endeavor to many and a profession to some, but not a discipline. It is time for technical communication to assume its rightful place with the other academic disciplines. A body of knowledge derived from research is the key to attaining that position. (Pinelli 1985: 6.)

Thus, although it was said above that technical communication has the status of a discipline in the United States, this has not been self-evident for a long period of time, and technical communication has struggled to attain the position it has today. The multidisciplinary nature of the field makes it a typical "studies" area, as noted in the introduction.

Being both a discipline and a profession has also given a unique nature to the research that is carried out in technical communication. Paul Anderson, John Brockmann and Carolyn Miller note that technical communication consists of three subdisciplines: the theoretical, the pedagogical and the professional. What has mostly been produced is practical research by the pedagogical and professional subdisciplines, which have a strong research tradition. The theoretical subdiscipline

has been lacking in both quantity and quality, but the 1980's witnessed a need and opportunity for its development because of the growth of the pedagogical and the professional subdisciplines. (Anderson et al. 1983: 7-9.) The field of technical communication has thus expanded gradually, starting from the pedagogical and practical needs of the profession.

Carliner has commented on areas in technical communication that seem to raise particular interest. In his outline for a model of technical communication, he asserts that technical communication should provide readers with access to information. This access exists on several levels: physical, emotional and intellectual. Much research exists on issues of physical access: how readers find the information they seek. There are also studies that pay attention to emotional access, which refers to cross-cultural communication and getting the reader's attention, for example. But less research exists concerning intellectual access: when readers find the information they were looking for, can they understand it and make use of it? This involves, for instance, choosing the form of the communication product (a user's guide, help, tutorial, etc.), or designing the structure of a document. (Carliner 1999i.) Intellectual access seems to border on themes such as human cognition and readability of documents, which in the Finnish context appear to raise increasing attention among students who take part in technical communication training.

If the research scene has changed, and is changing, so has the educational profile of technical communication over the past twenty years. Muriel Zimmerman offers an interesting contrast concerning what has been taught in technical communication over the years, and how it has been taught: in 1977, teachers taught students to make abstracts, proposals, progress reports, journal articles, feasibility studies, instructions and procedures; in 1997 they taught documentation, HTML and SGML, visual elements, documents design, ISO9000, intranets and multimedia. The teaching methods in 1977 were lectures, instructions on facts and rules, solo assignments, and included style, clarity and rhetorical features of technical genres; in 1997 the methods were computer workshops, construction through applied learning, collaborative projects, and included software user psychology, human factors, learning theory and usability. (Zimmerman 1997, also in Krull 1999: 4.) These changes also reflect the multidisciplinary nature of technical communication

and the challenge to technical communication training trying to keep up, which was addressed earlier.

Much of technical communication training offered around the world is characterized by a strong tradition of cooperation between university and industry. As pointed out in the introduction, this is also the case in the Finnish context, where some forms of cooperation between university and industry have been tested with good results. In the following, I will briefly outline one example.

The Department of Translation Studies at the University of Tampere launched the Technical Communications Programme in the autumn of 1997. The programme comprises 20 credits, and is intended for students who are in the final stages of their studies. The programme is organized together with 20-30 Finnish companies. There are four forms of cooperation: firstly, since companies which employ technical communicators have an arsenal of expertise in technical communication, representatives of these companies give visiting lectures on different aspects of technical communication. Secondly, an important part of the programme is a three-month summer traineeship where students work as technical communicators, and get to test the knowledge and skills they have learned in the programme. Thirdly, students make excursions to the companies to familiarize themselves with the work of the technical communicator, or the companies themselves visit the university to present themselves. And fourthly, the students write their M.A. thesis in cooperation with the company. Topics concern areas of technical communication that are in the interest of the company. The students learn to combine theory with practice through writing their thesis, and the companies receive the benefits of the latest research carried out in the field, which they can adapt to suit their own objectives.

As cooperation between university and industry increases, more and more students have the opportunity to write their M.A. thesis in cooperation with companies.[7]

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[7] Rich notes that carrying out u*seful* research was often viewed as a menace to one's professional prestige in the 1960's (1979: 16); fortunately, this has not seemed to be the case in technical communication at any point.

This also suggests that the development of technical communication in Finland, with its multicultural and multilingual dimension, may follow the same pattern as international technical communication, from professional into more theoretical perspectives. The pedagogical perspective, namely designing courses and programmes, is also important, as suggested in the introduction.

Commissioned M.A. theses are also related to the dissemination of research among practising technical communicators and the utilization of that research. When students write their thesis for a company, they themselves are acting as diffusers of knowledge. And once they transfer from the university into working life, they become the users of research, which they once produced themselves.

Having completed a piece of research in technical communication, it could be assumed that the students are more open to new research. This does not, however, remove the problems related to research dissemination and utilization. Overall, there are a number of factors which affect how receptive people are to research, such as educational background, personality (some are theoretically-oriented, others practically-oriented), overall attitudes toward science, toward authority and toward lifelong learning, and the availability of suitable channels for research dissemination, not to mention the substance which is being diffused. I shall return to these in connection with research utilization in chapter 3.

2.4.2 Trends and Challenges

George Hayhoe has listed three challenges for technical communication in the 21st century. Firstly, he calls for broadening technical communicators' understanding of who their audiences are, if they are to compete locally and globally. This importance of the audience was also commented on earlier in this chapter. Secondly, Hayhoe asserts that technical communicators must confront the consequences of not knowing the research basis and methodologies of the field. This is connected with the arguments as to why technical communicators would use research overall, which will be examined in subsection 3.3.4. Thirdly, technical communicators should acknowledge that, most importantly, they need to master the

basic skills of communication, not so much the latest software. (Hayhoe 1998.) In my view, this last notion, which was briefly commented on earlier, also sends a comforting message to teachers and those who plan training programmes in technical communication: although tools are important, the emphasis should still be on communicative skills.

In 1996, the Society for Technical Communication (STC) approved a research agenda that is intended to guide future research and developments in the field. The elements in the agenda are listed below, as they give a holistic picture of technical communication:

- job skills and knowledge: what makes a technical communicator and what skills and knowledge technical communicators need;
- audience analysis and understanding: the extension of our understanding of users, usability, customers, their primary tasks and work processes, reading processes, etc., in natural settings;
- designing new documentation processes: the effects of new documentation paradigms, such as structured and single-sourced documentation on the technical communication process;
- designing for visualization: we need guidelines for making decisions about when to use text, when to use visuals, and how to integrate the two;
- information dissemination tools: issues surrounding the use of the Internet and World Wide Web and how they affect the information that technical communicators produce;
- collaboration and team-based projects: studies of face-to-face versus computer-mediated collaboration in the environment where technical communicators work;
- hardcopy and online evaluation: improving the evaluation of methods of hardcopy and online texts in a way to support the design of usable and persuasive information;
- settings for writing and internationalization: how technical communicators plan, design and evaluate texts for translation;
- professional, social and environmental trends: the role of technical communicators in the next century when new genres and writing situations emerge, audience types become wider and globalization grows;
- research models for technical communication: technical communication researchers need more research on research.

In addition to these, there is concern for the name of the profession, as discussed above, and also for the status of the profession: many feel that the profession is not valued highly enough by others in society. (In Carliner 1999f.)

The research agenda by the STC is significant in two respects: at the same time as it provides researchers with quite a number of challenges, it also provides examples of the substance of technical communication research that may interest professionals and prove useful to them. Since the focus in this study is on the dissemination of research and its use among technical communicators, we also need to pay attention to what the knowledge being diffused actually means, as pointed out in the introduction.

The research agenda gives an extensive overview of research areas, all of which can contain a number of individual research topics. A good example of an area which is quite popular nowadays in technical communication is usability and audience analysis (the second point above): for example, technical communicators may be interested in reading about the usability of documentation in order to carry out their own usability testing. More examples will be given in chapter 5 in connection with the analysis.

Of a more general interest to the theme of this study is the last item in the STC's research agenda: technical communication researchers need more research on research. According to Carliner, this means searching for answers to the following questions, such as:

- How do we better bridge the gap between practitioners (corporations) and researchers/teachers (universities)?
- What sorts of rewards do we need to build into the academy to encourage researchers to collaborate with industry?
- What sorts of rewards do we need to build into industry to encourage research-based practices?
- Should we design intermediary publications for the dissemination of pure research to practising technical communicators?
- How do we strengthen the relationship between pure and applied research? (1999f.)

The first item is particularly relevant in this context: bridging the gap between practitioners and researchers is at the heart of research dissemination and utilization, as we will see in a moment. The aim of this study is to survey the size and shape of that gap. The rewards of cooperation between university and industry is also a topical issue particularly in Finnish technical communication as we saw

above. Finally, Carliner's suggestion about intermediary publications is interesting, although its practical implications are somewhat vague and should be expanded. His notion is related to the issue of access to information in general, which will be addressed in chapters 3 and 5.

Since we are dealing with an emerging discipline, the beginning of the 21st century will undoubtedly show interesting developments in technical communication. The advancement of technology causes some of these, as Robert Krull notes: "As technologies and our knowledge of their usability change, we will have to update our education of professionals, users, and students" (1999: 5). Changes will occur on the fronts of research, training and profession alike. To give an indication as to which areas these developments could concern and where the entire field is headed, Carliner provides a good starting point by listing the general trends in technical communication in 1999. In the following paragraph, I will mention a few of these trends, which I think also apply to Finnish technical communication.

As a result of the strong economic development, there is more information to be disseminated, and there do not seem to be enough workers for the amount of work available. The demand for technical communicators is too great for the present supply. The business is also becoming more and more global, and it seems that translation and localization companies are benefiting from it: many are expanding to technical communication. Another development is that companies want to reduce the time to market, in other words, the time between inception and introduction of a product, and web publishing have enabled them to reduce the publication time of their communication products. The importance of the web will thus grow, and consequently the demands placed on the skills of technical communicators will expand. Being able to write a manual is no longer enough; one has to be able to switch between writing manuals, kiosks, online help, tutorials, etc. (Carliner 1999d.)

2.4.3 Publications and Organizations

One of the items in the questionnaire sent to technical communicators for this study asked the respondents to give examples of sources from which they get information about technical communication research. Having an idea of existing publications and organizations in technical communication will therefore be useful when assessing the results in chapter 5.

Scholarly journals that technical communicators read include Technical Communication, IEEE Transactions on Professional Communication, Technical Communication Quarterly, the Journal of Technical Writing and Editing, and the Journal of Business and Technical Communication. These are all publications which use a review process to assess the importance and validity of the claims in the articles. The content in professional magazines, on the other hand, is primarily selected by an editor-in-chief. These include Intercom, Editorial Eye, WinHelp Digest, Writer's Digest, The Writer, Wired and New Media. (Carliner 1999g.)[8] Most of these publications can be considered to be targeted mainly at technical communicators. Some of them also appear in the answers to the questionnaire.

The nature of professional organizations in technical communication is similar to publications: some cater almost exclusively for technical communicators, but there are a number of other organizations to which technical communicators may belong. One organization was mentioned earlier, the Society for Technical Communication based in the United States. It is the largest professional organization for people in the field and has chapters around the world, including Europe. The Professional Communications Society of the Institute of Electrical and Electronic Engineers (IEEE-PCS) mainly specializes in communication related to engineering disciplines. The Special Interest Group on Documentation (SIGDOC) of the Association for Computing Machine operates in the field of computers in North America. The Association of Teachers of Technical Writing (ATTW) is

[8] For a more extensive list of publications related to technical communication, see Schriver 1997: 498-501.

an organization for those who teach technical communication in various institutions. Tecom is an organization for technical communicators in Germany. INTECOM is an organization of technical communication organizations, which includes the STC, IEEE-PCS, Tekom and as a new member, the Finnish Technical Communications Society, too. In addition to these organizations, there is the Technical Writer's List (TECHWR-L), which is not a membership organization as such but a popular meeting place for professionals in the field. (Carliner 1999g.) The Finnish Technical Communications Society was established in 1997, as was mentioned earlier. Nowadays the society has over 100 members and it organizes seminars and other events for its members. The society also publishes a magazine called *Näkymä*, which was used in the selection of informants in this study, as we will see in chapter 5.

Summary

The focal points in this chapter were the following:

- Technical communication as a field has a short history in Finland.
- Finnish technical communication has a unique multilingual and multicultural element: technical communicators write in a non-native language.
- Technical communication has traditionally been a highly practice-oriented field. Practice has permeated both research and training. One manifestation of practice-orientation is the growing cooperation between university and industry.

3 Research Dissemination

> The owner of a dog whistle is warned that
> the product does not work if the dog is deaf.
> – HS, 23 July 1998

Scientific knowledge is created continuously in the research community, and it is disseminated to different target groups in society through a variety of channels. As mentioned in the introduction, scientific knowledge is diffused a) inside the research community, b) to users and those who adapt scientific knowledge (hereafter called users or the user group) and c) to the public at large (Laaksovirta 1986: 103, Niiniluoto 1994: 9, Niiniluoto 1989a: 109-110, Takala 1983: 8).

Eric Dyring was the first to define knowledge according to target group. His division was as follows: 1) knowledge targeted at science (internal dissemination within the research community) and 2) research targeted at society (user knowledge, decision-making knowledge and general research knowledge). (Forskning... 1977: 11, also Laaksovirta 1986: 103.) The latter can also be called popularized knowledge, and in addition, popularized knowledge includes one segment of the first group: dissemination of research from one discipline to another (Laaksovirta 1986: 103). I shall return to popularization in chapter 4.

This chapter will focus on research dissemination and utilization among the user group (b above). However, before it can be discussed, I will address the two basic concepts behind knowledge dissemination and utilization, namely *knowledge* and *information*.

3.1 Knowledge and Information

The two fundamental ways in which man pursues reality are his own action and knowledge (Heikkilä and Holma 1990: 115). Knowledge is a concept which is often considered to be self-evident and uncomplicated. We know that we know some things, and we know that there are things which we do not know. On the other hand, a part of our knowledge may not be conscious. Sources of our

knowledge include traditions, authorities, our own perceptions and experiences, and most reliably, scientific research (Uusitalo 1991: 10-13). In other words, knowing is not only based on scientific knowledge or well-founded statements about the world; it includes many experiential, subjective dimensions, some of which are common to us all (Heikkilä and Holma 1990: 48). However, science is regarded so highly that knowledge is often equated solely with scientific knowledge and other types of knowledge are deemed as non-knowledge.

Knowledge is an essential concept in research dissemination and utilization, and in the literature it is often distinguished from *information*. The relationship between knowledge and information is a highly complex one, and many different views have been expressed about them (Savolainen 1985: 19). In this study, their relationship will be viewed according to the analysis by Reijo Savolainen[9], as suggested in the introduction: knowledge is a property of the individual, enabling and orientating him to function as an individual and member of society, whereas information refers to processes taking place between individuals. Information can, however, become knowledge once it is adopted.

As mentioned in the introduction, *scientific knowledge* is the starting point in research dissemination and utilization. The term scientific knowledge in this study does not exclude information. In line with Tuula Laaksovirta's definition, these concepts are considered hierarchical in that *knowledge* can contain *information*, but *information* does not encompass the entire scope of the concept *knowledge*. Therefore, examining the dissemination of scientific knowledge may also include examining the dissemination of scientific information (Laaksovirta 1986: summary 5). A more detailed difference between scientific knowledge and scientific information is the following:

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[9] ". . . käsite 'tieto' edustaa 'tietämys' -merkityksessä inhimillisen subjektin omaamien käsitteiden sisällöllistä kokonaisuutta, joka mahdollistaa ja orientoi hänen toimintaansa yksilönä ja yhteiskunnan jäsenenä. Sitä vastoin 'informaatio' viittaa pitkälti Machlupin ja Bouldingin näkemysten suuntaisesti niihin prosesseihin, ts. siirto- ja vaikutusyhteyksiin, jotka muuttavat jollakin yksilöimättömällä tavalla subjektin omaamaa 'tieto-' tai paremminkin 'tietämysvarantoa' sisällöllisessä mielessä. . . . 'tieto' on aina jonkun (yksilöllisen) subjektin tietoa tai tietämystä. Sitä vastoin 'informaatio' voidaan nähdä paremminkin kahden tai useamman subjektin omaamien tietovarantojen välisenä toiminnallisena ja siten niitä muuttavana siteenä." (Savolainen 1985: 22, also Laaksovirta 1986: 55-56.)

> - Scientific knowledge is an entity, whereas scientific information is fragmented. Scientific information can be used when aiming at scientific knowledge.
> - Scientific knowledge is tied to the subject's knowledge structure, deepening and expanding it, whereas scientific information is "only" an addition in the individual's knowledge structure.
> - The shell of scientific knowledge cannot be separated from its content when knowledge is processed. (Laaksovirta 1986: 56.)

Scientific knowledge will be used as the standard term throughout this study, although as Laaksovirta's definition suggests, scientific knowledge becomes scientific information at some point of the dissemination process before it again becomes scientific knowledge, the property of the knower. It is noteworthy that there is also some variety in this terminology within the research utilization literature, as mentioned in the introduction. Scientific knowledge will be discussed further in section 4.1 in connection with popularization, and I shall also briefly return to knowledge and information in subsection 3.3.2.

In addition to knowledge and information, *communication* is another term which is often presented together with the first two. Together they form a complex conceptual and functional entity. Communication can be understood as referring to those factors and conditions which enable the connection between knowledge and information to function. (Savolainen 1985: 23-24.) Knowledge and information, however, are the relevant concepts here. Next I will look at research dissemination as a general social phenomenon.

3.2 Research Dissemination Theories and Considerations

A number of theories and models concerning research dissemination in general have been created within various disciplines. In this subsection, I shall rely heavily on Laaksovirta's doctoral dissertation (1986), in which she provides a good overall view of these theories. Reproducing them here in detail is not purposeful, since this study focuses on research utilization. Instead, a grouping of these theories will be briefly presented in the following, and those theories that are relevant to research utilization in technical communication will be examined more closely below.

Laaksovirta divides theories of research dissemination into two main groups, which are not so relevant in this study. These are a) causal-formalistic theories and b) social-power theories. The causal-formalistic theories comprise circuit theories of the flow of information, knowledge-specific theories, and gap, obstacle and deficiency theories. The social-power theories, on the other hand, include liberalistic models, theories of group determination, re-creators of knowledge, and power theories. More relevant to this study are theories which fall between these two groups, namely a) user studies and b) theories of instrumentalism and enlightenment. (Laaksovirta 1986: 65-91, summary 8-9.) A mixture of the "in between" theories were used both as a starting point for designing the questionnaire in this study and in interpreting the respondents' answers. These theories will be explained in the following.

User studies concentrate on the person or persons who may need scientific knowledge. The studies may, for example, focus on the user's relationship to and attitudes toward information channels, his immediate surroundings and the society. Within these studies various user group typologies have been created. (Laaksovirta 1986: 76-78.) As we will see later on, the questionnaire in this study asks a number of questions about the background of the informants as well as the channels of information they use, and in this sense we are dealing with a user study.

The theories of instrumentalism and enlightenment are concerned with the purposes for which scientific knowledge is used. Instrumentalism assumes that researchers provide ready answers to problems of society, whereas in the enlightenment model, research does not solve social problems as such, but provides means and bases for intellectual conceptualization, assumptions and orientations. (Laaksovirta 1986: 81-84.) Some categories in the questionnaire of this study were created bearing in mind these two models. Instrumentalism and enlightenment are highly relevant in the discussion on research utilization in technical communication, and they will therefore be examined in more detail in connection with research utilization below.

Many of the theories mentioned above assume that the diffuser of research and the user are in consensus about the entire process of research dissemination. However,

according to Laaksovirta, conflict as a starting point would be fruitful when knowledge is disseminated in society. (Laaksovirta 1986: 243.) “An important part of research dissemination is public debate, critique and disagreement on research results” (Ketonen 1989: 19, my translation).

The consensus versus conflict setting is also relevant in the field of technical communication: since training and research in Finnish technical communication was not developed until the end of the 20th century, it seems that neither a consensus nor a conflict tradition has emerged. It is also important to note that the interests of researchers and users may vary even to a large extent: they are often interested in different aspects of science (Laaksovirta 1986: 224). Some of the answers to the questionnaire in this study will demonstrate that different interests also exist in technical communication, and professionals criticize what research has to offer.

Another general consideration in research dissemination is the view of science that diffusers and users have. This view affects 1) how and what type of knowledge is disseminated, and 2) how and what type of knowledge eventually gets through. It is usually this difference in views that may prevent dissemination, not necessarily the often mentioned opinion that research is not adaptable in practical settings. We are dealing with a wider issue of how science is formulated and how it can be transformed in general. (Laaksovirta 1986: 223-227.)

The view of science is connected to the issue of power. Science holds a strong position in society as a source of new, “true” knowledge. This position of authority also means that science and researchers have power, or at least it is assumed that they have power. Consequently, as Laaksovirta points out, the diffusion of research is connected to social power, and as the amount of information increases, there is more demand for the dissemination and popularization of research. (Laaksovirta 1986: 107.) In the introduction, I argued that technical communication was intertwined with the development of the information society. Based on Laaksovirta’s remark, research dissemination is also connected to the increase of information and its distribution. I shall briefly return to the power aspect in subsection 3.3.2.

Taking into consideration the power aspect, knowledge is more and more becoming a measure of equality. This is related to the social question of "the knows" and "the know-nots" in the information society as Carliner calls them: in the industrial age people talked about "the haves" and "the have-nots"; now in the information age we can talk about "the knows" and "the know-nots". People who report information are in a position to determine who knows what, and those who belong to "the know" are the ones who succeed. (Carliner 1989: 186.) Technical communicators can also to some extent be characterized as belonging to "the know" group.

Becoming a representative of "the knows" is closely connected with the question of access. In the information age, the question of access to information and opportunities for people to participate in society have become increasingly important. Some parts of the population are already at a disadvantage in not being able to make use of the information society, which is why considering people's needs should be the guideline for future development. (Kasvio 1999.) But even more importantly in this context, access and retrieval are also a part of the utilization process (Rich 1979: 20), which will be discussed below. "One of the requirements for being able to utilize knowledge is that one must have access to it" (Short 1973: 277, also Love 1985: 343). Some informants in this study also commented on the access to research, which will be further addressed in the empirical section.

3.3 Dissemination and Utilization of Research Knowledge

In this section, I will concentrate on the dissemination and utilization of research knowledge among professionals. As mentioned in the introduction, much of the research in this field has been done within the social sciences (education in particular), and it has focused on policy-making issues. Since research dissemination and utilization in technical communication has been studied very little, the existing research in the above fields will be used as a basis against which technical communication will be examined.

Research dissemination and utilization is important, because it contributes to the view that professionals have concerning their own field. It also has to do with the way in which a discipline or a field such as technical communication in Finland evolves and how professionals work. In other words, we are dealing to some extent with technical communication sociology, as suggested in the introduction.

Before I continue, some terminological issues must be addressed. The terminology used in the field of knowledge dissemination and utilization varies. Sometimes utilization is used to refer to both the process of transfer **and** utilization (Love 1985: 344), which is demonstrated in the following definition:

> Traditionally, research utilization (RU) has to do with the transfer of theories, constructs, findings and robust products from a universe of inquiry to one or more universes of practice. It has, in short, to do with the relation of theory to practice. (Huberman and Ben-Peretz 1994: 3.)

I agree with John Love, who notes that it is more useful to draw a conceptual distinction between the transfer and the utilization phases (1985: 345). When we look at the transfer process, we can ask questions such as what knowledge is disseminated, how it is conveyed, who the sender and target group of the message are and when the knowledge is disseminated. When we study the utilization phase, we can examine which factors influence the level of utilization. Overall, we must continually ask: Knowledge for whom? By whom? For what? And in what context? (Rich 1979: 26). In this study, both dissemination and utilization are considered, but the emphasis is on utilization. It should be noted that knowledge transfer, knowledge utilization as well as the circumstances of knowledge generation or production are intertwined (Love 1985: 339), although they can be studied separately (Rich 1991: 323).

There is also variety in the terminology related to the transfer process: we can, for example, talk about *diffusion*, *dissemination* or *technology transfer*. *Dissemination* is used as a general term, referring to the spreading of information to potential users; *diffusion* is a communication process and used to refer to the spreading of innovations and ideas; and *technology transfer* is used as a general reference to the application of basic research findings to problem-solving contexts. Whichever of

these terms we use, the dissemination activity is clearly the responsibility of the sender, and it is directed at some target system. In this study, the terms *diffusion*, *dissemination* and *transfer* are used interchangeably to refer to "the process of transmitting or conveying information from the developer, organizer, or interpreter of research to the potential user(s)". (Love 1985: 343-344.)

Maria Friedman and Erik Farag note that there is no commonly accepted definition of dissemination and that the dissemination nomenclature depends on the discipline in question; *knowledge transfer* is used in the field of psychology, and *technology transfer* is used in fields such as agriculture and education (1991: 269). When one reads literature concerning this field it is also easy to see the varied practices.

3.3.1 Developments

The dissemination and utilization of knowledge has a long-standing history: "The notion of adapting knowledge to the needs of society dates back to the Greeks and is a theme running through much of Western thought" (Rich 1979: 15, also Backer 1991: 228). The pronounced notion that science could be useful can be traced to Francis Bacon, who believed that science was useful to the state and to society in general. Many others followed. The growth of the prestige of science over time also raised questions, such as what the role of science was in industrial progress and whether there should be public investment in the advancement of knowledge. It was recognized that science could be applied to national goals, but it was not until the 1940's that the US government, for example, began to intervene and support the use of science for public purposes on a large scale. By the 1960's, utilization began to be increasingly important to decision-makers and R&D managers. In the United States, social scientists were the first ones to give emphasis to the social utilization of scientific knowledge in the 1930's. (Rich 1979: 9-16.)

Various programmes to be used in government institutions were developed based on social science research and its concepts. However, gradually it was realized that the expectations about using social science research to solve problems were not fulfilled. As a result, there has been some ambivalence as to how extensive the

contribution of social science can be to programme development. (Weiss 1980: 6.) Some of the problems involved are that social science research may be limited in scope or incomplete in explanation; it can become outmoded, and it is often time- and situation-specific (ibid. 1980: 14).[10]

As the utilization field developed, organizations for the diffusion of knowledge were also established. The Royal Institution was established in Britain in 1799 and the Society for the Dissemination of Useful Knowledge in 1826. They aimed at making people more literate about science and technology, but both failed. (Takala 1983: 14, also Weiss 1991: 7.) In this sense we are also dealing with the history of popularization. Nowadays the aim of those who want to share knowledge accumulated by art and science is more pragmatic: they want to help practitioners improve their practice (Weiss 1991: 10). In education, for example, a particular teaching method can be implemented to improve learning.

The utilization field in the US was personified by two figures, Kurt Lewin and Paul Lazarsfeld, who were both positivists. They believed that there was a body of knowledge offered by social science that could alleviate social problems and guide social affairs. Lazarsfeld's "disciples" developed a model known as the Research, Development and Diffusion (RD&D) model: it comprised intermediate centres or laboratories, which would convey university-level research into schools. (Huberman 1994: 15.) The model takes research products as its starting point: it describes situations in which knowledge is developed as a part of a research programme for the purpose of understanding phenomena and building theories (Love 1985: 351). This model is still the dominant one in the US (Huberman 1994: 15). In addition to the development of the RD&D Model, a number of other thought models have been generated. A selection of utilization models will be examined more closely in the next subsection.

Gradually the field became more widely recognized. Robert Havelock suggested in 1973 that a "science of knowledge utilization" should be developed and since then scholarly interest in knowledge utilization has increased (in Leeuw 1991: 73).

[10] For a more detailed account of the historical developments of research utilization, see Rich 1979.

There were two forces that had a profound effect on the entire development of this "science of knowledge utilization": firstly, the knowledge explosion, and secondly, the growing expectation of industrial executives, government leaders and the general public that scientific knowledge should be useful to man, as was suggested above (Havelock 1969: 1-1). In the 1980's, Judith Larsen called knowledge utilization an emerging discipline (1980: 422); today, it seems to be a fairly established one. An increasing number of researchers from widely divergent fields, such as communications, sociology, philosophy, political science and social psychology have contributed to the field (Huberman and Ben-Peretz 1994: 4).

Researchers who study utilization also have their own forum: the Knowledge Utilization Society operates as a forum for researchers, scholars and others who want to examine the processes of knowledge utilization and develop new strategies. Society members explore new research agendas and how they can be incorporated into practical means for reducing human suffering and improving society. (Backer 1991: 226.) There are also a number of specialized journals where researchers publish results of research or experience with knowledge utilization, such as *Knowledge and Policy*, which is an international journal of knowledge transfer and utilization.

As more studies have begun to appear, the understanding of utilization has also changed. Earlier, utilization was perceived as a fairly straightforward activity, but this was found to be incorrect: the utilization process required a more in-depth understanding before knowledge could actually be translated into action; in fact, we are dealing with a complex process, which involves political, organizational, socioeconomic and attitudinal components in addition to the actual knowledge in question (Larsen 1980: 423-424). Some of the large societal trends in research utilization in the 1990's were quality assurance, accountability, ethics and advances in information technology (Backer 1991: 235). As we saw in the previous chapter, technical communication is also closely linked with the rapid development of information technology.

Overall, the research utilization paradigm has changed considerably over the years, partly because of criticisms of its limited use in practical settings, and partly

because fundamental queries have been raised about its political and epistemological status (Huberman and Ben-Peretz 1994: 5). Robert Rich asserts that there are serious conceptual and methodological gaps in the field, such as the way in which utilization can be measured. He also notes that, over the past ten years, there has been relatively little new empirical work done in knowledge utilization. (Rich 1997: 11-12.)

In recent years, researchers in the field have paid increasing attention to understanding the research transfer process as well as to understanding the settings where research might be used. John Watkins notes that in order to gain this better understanding, researchers need to build on several traditions and to incorporate images from critical theory, postmodernism, cultural anthropology and organization change literature (1994: 71-72). At this point it is worthwhile to note that there is no overall theory of knowledge utilization or conceptual framework, as suggested in the introduction: the field comprises different perspectives and approaches, which help understand the parts of the utilization process (Oh and Rich 1996: 4).

3.3.2 Approaches and Methods

When the research dissemination and utilization processes are studied, there are a number of approaches available for researchers. It can be examined on four levels: the individual, the interpersonal, the organization and the social system (Havelock 1969: summary). This study focuses primarily on the level of the individual, namely technical communicators.

Much of the research on utilization seems to concentrate on examining utilization in organizational settings. However, utilization involving individuals is an equally complex phenomenon, including individuals' attitudes, values, beliefs and goals (Larsen 1980: 432). Utilization can be manifested on three levels, namely in behaviour, cognition and emotion:

- an individual's behaviour can change as a result of research;
- at the cognitive level, conceptual utilization can occur when, for example, a problem is seen from a different perspective;
- at the emotional level, research may affect the degree of caring or concern about an issue, which may be crucial for future behavioural change (Anderson et al. 1981: 122).

Weiss provides a slightly more detailed description of the approaches available to researchers to study research dissemination and utilization, which are appropriate here. These approaches, which will be presented in the following four paragraphs, tend to be linked to certain methodological strategies.

Firstly, we can begin with studies and use various means to examine their effects on decisions. The method used in this approach is often a case study, which includes using organizational records and performing interviews with informants.

Secondly, we can start with the people who might use research knowledge and ask them about the sources of knowledge they have used. Surveys, mainly interviews of a sample of potential users of research, are usually used in this approach.

Thirdly, we can start with issues and examine ways in which research has shaped a particular policy. The methods of study in this approach are the review of documents, such as reports, which give information about the history of the issue, and relevant research studies.

And fourthly, we can start with an organization and examine what impact research has had on it. The used method here is participant observation, including researchers' notes and records. (Weiss 1981: 26-29, also Love 1985: 374.)

In this study, the focus is on the people who might use research knowledge, i.e., Finnish technical communicators. Secondary considerations are the nature of the technical communication knowledge that is disseminated and the sources of information, or linkages, between the knowledge and the users. External agents, such as research utilization specialists, popularizers or consultants, are beyond the

scope of this study (see Louis 1981), but professional technical communicators producing their own research will be addressed later in this chapter.

Weiss reports some commonplace questions in a study which starts with people: Which studies did the users use? When did they use them? How did they use them? What were the consequences of use? The assumption here is that people can remember the studies that influenced them and that they are accurate in their responses. (Weiss 1981: 27.) As we will see later on, remembering studies or pieces of research one has read over time, and pinpointing their influence, can often be difficult.

The questionnaire in this study does not specifically ask which studies the users used, although some of the responses do give detailed examples of certain sources of information. Neither does it ask when the respondents used them. Rather, this study assesses how technical communicators use research and what consequences it may have had; in other words, the approach is slightly more general, focusing on the self-reports of technical communicators.

Weiss also comments on the questions best answered when a study focuses on potential users: “What kinds of people (by position, location, training, etc.) are most likely to use research?” and “How much use do they make of research?” (1981: 29). Although the data collected for this study does not provide direct answers to these, we do get information about the characteristics of the users and how often they use research.

Although this work takes advantage of the approaches and methods used in utilization research presented above, it has quite different aims from typical utilization studies, which, for example, aim at improving policy or practitioners’ work processes. The method to be used also deviates slightly from utilization studies in general: a questionnaire will be used instead of interviews, which is more typical of a study with potential users as its starting point.

Overall, using a survey is a typical and the most common methodological approach in utilization research (Larsen 1980: 437, Rich 1997: 21). However, there are some

limitations to this method when, for example, one tries to elicit information about potential users: as mentioned above, the respondents may not remember studies or sources of research; they may be unable to distinguish research from all the other material that they have read; they may be unable to give references, to remember the conceptual consequences of research and to trace the steps of use; and finally, they may simply misreport (Weiss 1981: 30, also Larsen 1980: 437).

All of the factors just mentioned do not come into play in the questionnaire in this study, because it does not ask for specific references. Those that are relevant will be considered in connection with the analysis in chapter 5. The overall difficulty when people are asked to cite instances of use is that they have to atomize their conception of social reality and take knowledge out of its context, without which the knowledge would not have been retained in the first place (Caplan et al. 1975: 18-19).

Regardless of the approach or method chosen, many utilization studies employ the two communities metaphor as their underlying conceptual structure (Oh and Rich 1996). Originally this metaphor has its roots in the theory of the two cultures created by Charles P. Snow (1969). His theory concerned scientists and professional authors: it maintained that both scientists and professional authors had their own culture, including attitudes, standards, behaviour norms and common assumptions about the nature of reality. The group into which one belongs determines to a great extent how one behaves and sees the world. Because of these traits, the two cultures have difficulty communicating with each other. (Snow 1969, also Laaksovirta 1986: 79-81.)[11]

Snow's theory has been a popular one: many papers written since then report on studies which maintain that users and researchers belong to separate communities (Caplan et al.) or worlds (in Boggs 1992: 30, Weiss and Weiss 1981: 837, Laaksovirta 1986: 79-81). On the other hand, there are also studies which have found the opposite, such as a study by Janet Weiss and Carol Weiss within mental

[11] For current discussion on Snow's distinction between the natural sciences and the humanities, see, for example, Niiniluoto 2000: 12-15.

health. They found that social scientists and decision-makers could not be characterized as two separate cultures or communities which have distinct ideas about social research: the decision-makers evaluated research in very much the same ways as the researchers, which was contrary to the researchers' expectations. (Weiss and Weiss 1981, also Weiss 1977.) I shall return to their study in chapter 5.

What then would divide the research community and practical settings into two separate groups? Cheol Oh and Robert Rich have examined this question in connection with their study on research utilization in government institutions. The divide between the research community and government institutions is explained by a few factors: the two communities do not trust one another, their language and jargon are different, they work under different conceptions of time and have different world views, and it is said that researchers should be more concerned with the needs of government officials (relevance, which will be addressed later). However, the study by Oh and Rich showed that the effects of the two communities metaphor are highly varied depending on policy areas and also on the other utilization variables (see subsection 3.3.5). Still, it is true that the more interaction there is between the two communities, the more likely it is that knowledge will be used. (Oh and Rich 1996.)

This is important information if we consider technical communication. For the field to develop, there needs to be interaction between researchers and professionals, and interaction is also one of the keys to increase research use among professionals. Effective interaction is a challenge, involving value, ideological and technical dimensions (Caplan et al. 1975: 29). I shall return to interaction between researchers and professionals in chapter 5.

Overall, it is important to bear in mind that utilization is a process, not only an outcome: it is a series of "less than discrete" events – Weiss (1980) uses a good descriptive term "knowledge creep" – which may lead to a specific action at a point in time. These events comprise the pick-up of the information, the processing of that information and finally, its application. (Rich 1997: 17, 20.) We are dealing with a process, not mechanical distribution (Laaksovirta 1986: 221).

The power aspect addressed above is also relevant in research utilization. One study found that power and conflict also penetrate research utilization in organizations, and that research use does not only appear as quantitative differences or differences in the modes of utilization (Sunesson and Nilsson 1989: 151). Watkins also notes that dissemination should not only be a "transfer of ways of doing things", as such dissemination easily becomes a way for one group to exert control over another. This kind of dissemination results in epistemic misunderstanding of knowledge as well as knowledge poverty, "a lack of owned knowledge, a lack of rituals for knowledge production, and a lack of ideologies for 'being knowledgeable'". (Watkins 1994: 66.) Weiss also argues that simply telling people what is good for them often does not have much effect (1991: 11).

Earlier I mentioned that criticism has been expressed about research utilization as a research object both conceptually and methodologically. To conclude this subsection, one example of this criticism will be introduced, namely the epistemological assumptions involved in research dissemination and utilization. It also demonstrates the complex nature of utilization.

Researchers who disseminate scientific knowledge may have epistemological assumptions, of which they may not be aware or of the fact that they have a bearing on the transfer process. Watkins (1994) has presented three different epistemological underpinnings of knowledge use: the positivist, the interpretivist and the critical realist epistemologies. These originate in the philosophy of science, but Watkins applies them to research utilization successfully. His notions are important for understanding the core issue of research dissemination and utilization. Watkins himself argues for the critical realist view.

Positivism views knowledge as objective, generalizable and disseminable. Watkins maintains that the objectivist view of knowledge drives modernist notions of research to a large degree. This objectivism also holds that knowledge is separate from the knower and the real world, and it can thus be transferred to another setting where it can be used by another knower. A strong counterview to objectivism has been that of interpretivism. According to this view, "reality" does not exist apart

from our perceptions of it, and it depends entirely on the social and cognitive construction of meaning of groups and individuals. (Watkins 1994: 58-59.)

Watkins is unsatisfied with both of the above epistemologies, for he seeks to formulate a postmodern critical theory of research use because:

> Such a theory can help us move beyond unproblematized views of knowledge creation and use, of the relation between theory and practice, of the transmission of knowledge and skills . . . (1994: 74).

Watkins builds his critical theory of research use on the critical realist perspective. Critical realism argues that there is a reality, but that because of the nature of perception and cognition, we can neither perceive nor understand reality directly. (Watkins 1994: 59-69.) The critical realist holds that individuals are not value-free:

> For the critical theorist knowledge and value are fundamentally interrelated, since knowledge is constituted by interests. The researcher is never just a passive observer telling us how the world is; he or she is a participant in the very act of maintaining and reconstructing the social life-world. (Bredo and Feinberg 1982: 275-276, Watkins 1994: 61.)

In other words, a critical theory of research use is at odds with the traditional, modernist view of knowledge. In addition, it sees science as being only one of many systems of making sense out of the world, and it is itself embedded in a culture. (Watkins 1994: 62-63, see section 3.1, pages 43-44.)

It is this idea of knowledge embedded in a culture that poses the greatest problem to traditional dissemination of research. If knowledge is objective, generalizable and theoretical, it is disembodied from its cognitive and social matrix and thus it is no longer valid knowledge. (Watkins 1994: 65.) This also follows the train of thought in the definition presented earlier about knowledge and information, as well as the notion about the difficulties involved in utilization surveys.

Knowledge is knowledge only so long as it is an active part of cognitive and social processes, embedded in social structures, rituals and ideologies. When knowledge leaves this culture, it becomes bits of information. Knowledge that claims to be “generalizable” is particular to researchers and intrinsically meaningless to other

contexts, to people who did not do the research or who are not researchers. According to the critical theory, knowledge is not disseminable per se, although information *is* disseminable. (Watkins 1994: 65.) Before knowledge is valid it needs to be reconstructed, "re-known", in any use setting (Watkins 1994: 72). This bears resemblance to one of the research dissemination theories reported by Laaksovirta, namely active-creative decision of selection, which proposes that both the producers of knowledge and those who receive it are actively creating knowledge. Laaksovirta adds to this by saying that also the mediators of knowledge cognitively process scientific knowledge. (Laaksovirta 1986: 76.)

3.3.3 Utilization

In addition to epistemological assumptions, there are a number of factors which have an effect on the research utilization process and the level of utilization. These are called variables. However, before going into these variables in subsection 3.3.5, I want to clarify what is meant by *utilization*. The issue is by no means clear, and many writers have found and defined different types and scales of utilization. Some of these will be examined in the following.

Love offers a good starting point: "Utilization, or use, is the process of applying the knowledge received by a potential user toward the solution of a problem or the attainment of a goal" (1985: 349). This is similar to Osmo Lampinen's idea of utilization, which was mentioned in the introduction: a narrow interpretation of utilization, or usefulness, would be the application of research results and knowledge in a decision-making situation or in problem-solving; understood in a wider scope, the usefulness of theory would mean using scientific theories or facts in human thought and action (1989: 95).

In explaining research utilization, there seems to be agreement among researchers concerning the distinction between the instrumental use of research and other models of research utilization, the enlightenment function in particular (often referred to as conceptual use). This distinction is theoretically the most important one and easiest to make empirically. (Sunesson and Nilsson 1989: 145.) Thus,

research utilization has the potential for problem-solving and enlightenment combined (Larsen 1980: 439). This is also clear when one reads the literature in the field: the most often commented categories are instrumental and conceptual use, which take us back to the theories of instrumentalism and enlightenment presented in section 3.2.

However, a consensus does not exist about instrumental use and conceptual use in the research utilization literature. For example, Yrjö Männistö, who has treated utilization in his recent doctoral thesis within the field of education, is sceptical about instrumental use. He remarks that social science research is not usually able nor does it attempt to produce ready-made solutions to practical problems. This does not mean that research cannot affect the way people think, but users must have a strong interest in research in the first place. (Männistö 1997: 280.) Weiss also reports that many researchers (such as Caplan et al.) have shown that conceptual use is, in fact, likely to be more prevalent than instrumental use (1981: 23), as mentioned in the introduction.

The entire distinction between instrumental use and conceptual has been regarded as inaccurate: concepts are instruments and they are used by decision-makers in a number of ways. Actions result from concepts so that instrumental use could in reality be regarded as a particular case of conceptual use. (Dunn 1983 in Love 1985: 347-348.)

Rich, on the other hand, remarks that the distinction between instrumental and conceptual types of utilization is a rather primitive one, and says that one might uncharitably argue that only one type of utilization has been identified, namely, instrumental use: it can be documented, whereas other use can be classified into a "grab bag" category (1991: 333, 1997: 18).[12] It is true that one of the problems with the conceptual model is that it is difficult to measure its effects (Sieber 1981:

[12] For the purposes of evaluating research utilization, Rich also distinguishes between use, utility, influence and impact: use means that information has been received and read; utility represents a user's judgement that information could be relevant; influence means that information has contributed to a decision or action; and impact means that the information has led to some concrete action (of which rejection can be one) (Rich 1997: 15).

149).[13] This study, however, does not attempt to measure the effects, but rather it is more concerned with the general qualitative nature of utilization among technical communicators.

Weiss claims that seeing utilization only as either instrumental or conceptual is a disillusioned picture and a very restrictive definition of research use, and that there are many other kinds of research use (1980: 10-11). This has also been verified in many studies, as we will see below. I tend to agree with Weiss.

These other kinds of research use paint a much wider picture. Weiss has distinguished between seven different meanings that have been associated with utilization. She calls these meanings models[14], which takes us back to the beginning of this chapter. The models will be introduced in the following, because they will be relevant in the interpretation of the questionnaire responses. It should be noted that the nomenclature concerning utilization types also varies depending on the discipline. The models, which have been found in the use of social science research, are:

1) the knowledge-driven model
2) the problem-solving model
3) the interactive model
4) the political model
5) the tactical model
6) the enlightenment model
7) research as part of the intellectual enterprise of the society
(Weiss 1979, Weiss 1977: 11-16, also Sunesson and Nilsson 1988: 143-144).

These models will be explained in the following paragraphs. The names will be marked in bold to distinguish them from the text. **The knowledge-driven model** derives from the natural sciences and follows a clear-cut sequence:
basic research → applied research → development → application. The problem

[13] Sieber has divided the enlightenment function, as he calls it, into three subfunctions: "(1) the inducement of an informed, cosmopolitan climate of opinion; (2) the infusion of new concepts that underlie particular change efforts; and (3) the provision of options and of specific bits of advice, products, and practices for creative adaptation to local settings" (1981: 149).
[14] Other researchers have also listed various models, see, for example, Love 1985: 350-353, Gundem and Özerk 1996: 4-5.

with this model is that not all scientific knowledge, such as social science knowledge, readily lends itself to conversion into technologies, either material or social.

The problem-solving model involves a direct application of the results of a specific study to a pending decision, and assumes that there is a consensus on goals between policy-makers and researchers. Although this model is the prevailing picture of research utilization, it, in fact, describes a fairly small number of cases.

The interactive model sees research as only one part of an interactive search for knowledge: in addition to researchers, information is sought through practitioners, administrators, interest groups and friends, among others. Research is thus only one part of a process that also uses experience, for example.

In **the political model** research is used as political ammunition and to support a position. **The tactical model**, in turn, has little do with the actual substance of the research: the fact that research is being done is invoked, among others, to deflect criticism.

In **the enlightenment model** the concepts and theoretical perspectives that research has produced permeate to the practical setting. There is no direct dissemination, but research finds its way to the practical setting through manifold channels, such as professional journals, the mass media, conversations with colleagues, and over time these provide decision-makers with tools to make sense out of the world. What is especially relevant in this model is that, for example, policy-makers at whom the research is directed have difficulty citing findings of a specific study that influenced their decisions, but they feel that research has given them ideas and orientations that has had consequences. The downside of this model is that the use of indirect and unguided channels can cause invalid generalizations and oversimplified, inadequate or wrong understandings of a field.

In the final model, namely **research as part of the intellectual enterprise of the society**, research is seen as one part of an interconnected intellectual enterprise: for example, there is an emerging policy interest that leads to the appropriation of

funds for research and this will also attract researchers to study that particular area. (Weiss 1979.) The applicability of these models to the data gathered for this study will be examined in chapter 5.

Overall, so many strategies, schemes and models – both normative ones and descriptive ones – have been generated in the field of research utilization that Sam Sieber commented even in the 1970's that they have "created mounting confusion" (1974: 63). On the whole, we can perhaps say that different types of research use should be treated critically (Sunesson and Nilsson 1989: 151).

The different models reported by Weiss reveal the nature of research utilization. Weiss notes that the distinction between instrumental use and conceptual use has been a useful one because it suggests that the use of research can take different forms. These categories have served a useful purpose, but according to her, they are somewhat arbitrary. Therefore, it might be appropriate to take the middle road and reconsider the idea of categories of use and think of utilization as a continuum, as Weiss suggests: at one end are those few cases where research directly influences a decision; in the centre we find the many cases where "research evidence is taken into account but does not drive the decision – cases where users filter research evidence through their knowledge, judgment, and interests, and incorporate much besides research into decision making"; and at the other end, research contributes more diffusely to a general understanding of issues. (Weiss 1981: 23, also Love 1985: 346-347.)

Although I support the notion of seeing utilization as a continuum, I think the categories of instrumental use and conceptual use can serve a purpose in this study, and therefore, they will be taken advantage of in the questionnaire. The aim is to imply to the informants that research utilization can take many forms. However, a more detailed definition of utilization is left to the respondents themselves, as is often done in surveys in this field (Rich 1997: 21). Oh and Rich call this self-anchored conceptualization (1996: 17). The strategy adopted in this study will be examined in more detail in chapter 5.

Michael Huberman states that to determine “use”, and to sort it out from other influences, is often a nearly impossible task (1994: 21). This is also supported by Rich, who remarks that we regularly employ information gathered during schooling and professional training from colleagues, friends, the media and other diffuse sources of information (1991: 331). The same is also pointed out by Love in connection with teachers: it is difficult to isolate the factors that influence utilization and to identify the diffuse impact of the knowledge teachers obtain through workshops and staff development, for example (1985: 366). However, if we consider research utilization as a continuum, the medium through which the information is received is not the decisive factor. In other words, research knowledge can be filtered through a variety of media.

For reasons of later comparison, it may be worthwhile to define what knowledge utilization could mean in more detailed terms. For example, Sieber has found ten main ways in which educators utilize knowledge:

- legitimating ongoing activities or deciding to do or not to do
- winning an argument
- satisfying intellectual curiosity
- avoiding certain practices
- increasing awareness of barriers or pitfalls in a course of action
- keeping current with what educators are doing elsewhere
- learning about college courses
- learning about activities in the field of educational R&D
- achieving conceptual clarity about one’s activities
- “being inspired to higher levels of energy and commitment”

(Sieber 1974: 64-65, Love 1985: 345).

Although, as Sieber notes, these examples may not result in any concrete action, they demonstrate that Weiss’ idea of a continuum is appropriate. I shall return to Sieber’s items in connection with the analysis in chapter 5.

Another consideration related to the problems of defining utilization is how much use is enough, in other words, how much effect is required. Does an entire set of recommendations have to be implemented? Does it count if research helps people make sense of what they are doing? What if users find new grounds to justify what they are already doing? (Larsen 1980: 427, Weiss 1981: 25.) Early research tended

to define utilization as an implementation of an entire set of recommendations, the reason being that the pioneering studies dealt with agricultural innovations: for farmers, complete adoption was in general advantageous. Use of research to change social programmes, however, can take on a number of forms, ranging from complete implementation to nonutilization. (Larsen and Werner 1981: 78-80.)

If we look at this from another point of view, we can talk about obstacles to research use. These obstacles can arise in the system that produces the research, in the system that uses the research and in the linkage systems, which transmit information between these two poles (Weiss 1980: 16)[15]. The extent of research utilization does not come into play in this study, but it is good to bear in mind in future studies of utilization in the field of technical communication.

3.3.4 The Need for Utilization

In chapter 2, I gave some examples of the research produced in technical communication that can be disseminated and utilized. A related key issue in the whole of this study must be addressed before I continue: Why should technical communication research be disseminated? What is the relevance of research to professionals? In the introduction, I gave some arguments why, in my view, there would be a need for research among technical communicators, and why research utilization among them should be studied. In the following, I will present arguments from other researchers.

Hayhoe commented in a keynote address in 1998 that “we are woefully uninformed about research in our field” and offers three reasons why research and research methodologies should matter to technical communicators. These will be presented in the following paragraphs.

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[15] Weiss has produced a detailed list of obstacles to research use within these three groups (1980: 16-23).

Firstly, as technical communicators meet new challenges, research can help them respond to these challenges effectively, such as when they need to train themselves to write in a completely new field.

Secondly, Hayhoe also encourages practitioners in technical communication to conduct their own studies as a part of their duties, as is done in other fields. In order to do this, technical communicators require the necessary skills in conducting quantitative research, for example. Knowledge gained by this type of research would help to determine customer satisfaction, to demonstrate the value of technical communicators in organizations and to justify budgetary increases. It would also assist them in becoming more effective and complete professionals.

And thirdly, research tools help increase the professional credibility of technical communicators: the value and credibility of technical communicators is difficult to point out if they are ignorant in methodology. (Hayhoe 1998.)

Hayhoe's encouragement that technical communicators would also conduct their own studies can, in fact, be one of the functions of research utilization, in addition to the enlightenment and instrumental functions. Karen Louis calls this function the capacity-building function, where information is used to improve the system's own capacity to search, process and generate information. A system cannot be entirely independent, but it can become more autonomous and acquire the ability to solve its own problems without depending on an external source of information. This means acquiring new skills and external assistance. (Louis 1981: 176-179.) It has been found in the social sciences that knowledge which is generated within an organization is more likely to be used than externally produced knowledge, because decision-makers trust it and think it supports the goals of the organization (Oh and Rich 1996: 15).

Wright also offers one clear reason why research should matter to technical communicators. The tasks that technical communicators perform at work require a deep understanding of the behaviour of different users. Research provides professionals with information that they can benefit from, for example, in the areas of audience and task analysis, as was suggested earlier. However, research should

not be thought of as *dos* and *don'ts*, and that is why it is important that technical communicators would also be able to interpret research findings and apply them to their own special circumstances. (Wright 1981: 15.) Weiss also notes that when professionals understand the conditions under which outside research is performed, it can help them recognize the potential scope and inherent limits of its influence (1980: 2).

The illusion that research could be viewed as a series of "how to" instructions is very real in the case of technical communication: as was discussed earlier, the research tradition is very practice-oriented and more theoretical studies have only gradually began to surface. This change also demands more from those who read and want to use that research. I shall return to this theme briefly in subsection 3.3.7.

Both Hayhoe's and Wright's arguments show strong support for utilization. Interestingly, Larsen remarks that studying nonutilization can be just as important: nonutilization can be intentional or unintentional; for example, there may not be any observable change as a result of knowledge, or a potential user may knowingly decide not to use a piece of research (1980: 429). Weiss also notes that there is an implicit assumption that use is good and nonuse is bad (1981: 21). Sometimes it almost seems that those who do not seek or use knowledge are not acting on a "rational" basis (Rich 1997: 12).

I find Hayhoe's and Wright's arguments supporting utilization quite convincing, and they support the initial hypothesis of this study mentioned in the introduction. Their views are also supported by the findings of a study by John Beard, David Williams and Stephen Doheny-Farina (1989). Their study, which will be presented below, suggests that technical communicators look favourably on research.

3.3.5 Research Utilization Variables

After considering the meaning of utilization and the need for research among technical communicators, I will go on to look at research utilization variables. There have been numerous studies that have identified variables which may have an effect on the transfer and utilization processes of research. Although some

factors have already emerged throughout this study, these studies offer a systematic approach to the issue.

Huberman, who has been especially interested in variables in school settings, has gathered together variables which have been recorded in different studies. His model divides the field into five factors with a number of subcategories, which compose the impact or use of research, and they may also have some secondary effects. However, as Huberman points out, these variables have been found to vary in different fields, and although they can be influential, they are not predictable: ". . . no single variable produced very large effects, and several others work well in certain settings but not in others" (Huberman 1994: 19). Although Huberman's collection of research utilization variables provides a good overall view of all the factors that may have an effect on the level of utilization, the model is too detailed and wide-ranging to be of use in this initial study on the use of research in technical communication.

A more fruitful approach for this study has been presented by Love. He has identified four factors which affect the level of utilization of research. They are related to

1. the nature and process of knowledge production,
2. the process of transferring knowledge from the producer to the potential user,
3. the user (including the context or setting in which the user operates),
4. some combination of these three elements (Love 1985: 339).

Ruth Zuzovsky notes that the first two factors can be controlled by the researcher, whereas the user or the context of use cannot be determined by him (1994: 79).

There are certain characteristics related to these four factors that are associated with high levels of utilization. Love has summarized a number of studies by different researchers regarding these characteristics. These will be presented in the following paragraphs. In the first category, Love points at relevance, clarity, the comprehensiveness and well-articulated nature of the knowledge products, the "vitality" of the topic and action orientation.

The second category includes both the means with which knowledge is disseminated, and the variables describing the relationship between the knowledge producer and the user. High-utilization factors in this category are mostly the personal characteristics of people who are involved in the transfer mechanism. In fact, in all cases found by the researchers included in Love's article, knowledge use is greater when it is transmitted through personal interaction over long periods of time.

In the third category, characteristics associated with high levels of utilization are related to a prevailing positive attitude toward scientific research and profit incentives. (Love 1985: 356-362, Zuzovsky 1994: 79-80.)

With regard to the user's context or setting mentioned in the third category above, Larsen's typology of situations is appropriate, as situations are closely linked with the attitudes and commitment of potential users. Her classification of situations includes the following: the participants, the purpose of utilization, the beneficiaries, internal and external influencing factors, the intended nature of the utilization and the time frame. (Larsen 1980: 433, Love 1985: 368, Zuzovsky 1994: 79-80.)

These categories and characteristics that are connected with high levels of utilization provide valuable information in view of the aim of this study. Apart from Larsen's typologies, which are not relevant here, these factors will be reconsidered in the empirical part of this study together with the analysis of the questionnaire responses.

It is important to note that utilization is directly and indirectly affected by numerous factors, and we should not overgeneralize the importance of certain factors to all fields. Oh and Rich have demonstrated this in a more recent report, which provides a clear synthesis of the variables in research utilization. These support Love's categories above. In their model of research use, the variables comprise the environment, organizational characteristics, decision-makers' motivation/attitude, characteristics of information and the use of information. Between these elements there are a number of linkages involving, for instance, incentives for using information, information needs, position in organization,

information types and sources, and the amount of information. (Oh and Rich 1996.) The model again demonstrates the complexity of the utilization process.

Zuzovsky quotes Love, among other researchers, to show that there is a difference in the level of utilization of research between what he calls the realist and pragmatist research traditions:

> The realist tradition, which views knowledge as a true representation of reality with the role of research being to reveal its underlying causal relations, is less associated with high levels of utilization. In the pragmatist tradition, on the other hand, knowledge is a personal construction of reality, not necessarily its true representation, but rather a fruitful one that leads to desired consequences in a given context. This tradition is associated with higher levels of utilization. (Zuzovsky 1994: 78.)

Realists believe that there is an objective reality, which is independent of the observers, while pragmatists perceive knowledge as a personal, and thus subjective and instrumental, way of looking at reality. The reason why the pragmatist tradition is linked to a higher level of research utilization is that the products of pragmatic research are judged, above all, according to their relevance to problematic situations, their correspondence with accepted ideological frameworks, their feasibility and, most importantly, their yielding of the desirable consequences. The realist approach, in turn, focuses on validating a theoretical model that enables the reader to understand, to plan an inquiry, or to interpret findings. The results of realist research are directed at the research community rather than at practitioners. (Zuzovsky 1994: 80-82.)

Considering these two traditions from the point of view of technical communication, the field seems to have a strong pragmatist research tradition: technical communication has originated in practice, and research results have traditionally been aimed at practitioners. This would also suggest that the level of utilization of research is high in this field. I shall return to this in chapter 6.

Beard et al. found evidence of a high level of utilization in technical communication in their study, where they gathered research suggestions of relevance to practitioners in technical communication. Firstly, their respondents

were frequent readers of technical communication research literature; secondly, they expressed positive attitudes toward research; thirdly, large majorities reported that research was helpful to them; and fourthly, they felt that research is needed for the field to evolve as a profession. (Beard et al. 1989: 190.) The finding that the technical communicators had positive attitudes toward research is important: attitudes, in combination with the need for knowledge and interaction between researchers and professionals, have an effect on the use of research (Oh and Rich 1996: 14). The study by Beard et al. also showed that written communication, which is traditionally the focus of technical communication, was at the time the most important area for research (Beard et al. 1989: 192). I shall return to these findings in connection with the analysis in chapter 5.

3.3.6 Knowledge Formation

At this point I will make a slight diversion into a topic which is not central to this work. However, it is an important consideration in research utilization when it is viewed from the individual's point of view, as is done in this study. We can call this the cognitive or individual factor, namely that of knowledge formation.

The adoption of knowledge is related to our ability to use and take advantage of knowledge in practice. It is thus an important consideration when scientific knowledge is diffused to practitioners and when they utilize that knowledge. Knowledge formation is also addressed here to show how complex and, in essence, human the entire process of knowledge dissemination and utilization is.

Our system of storing knowledge is complicated, and it is not clear how knowledge is stored in the human memory. In order to interpret impulses coming from our environment, we have to search for counterparts in our earlier experiences, with the help of which we can connect the new information into our knowledge structure, our mental framework, or schema (e.g., Van Dijk 1980: 233, Schank and Abelson 1977, Leino 1987: 39). Individuals construct their own unique knowledge entities, and at the same time they form an idea about themselves and reality. This

construction, which can be called a world view[16], also guides the reception, interpretation and use of new information. (Heikkilä and Holma 1990: 41.) This also applies to research utilization: information, past experiences, intuition and values merge and form a frame of reference, which is involved in the utilization process (Caplan et al. 1975: 19).

Jaana Venkula offers an interesting suggestion as to how knowledge is formed, connecting it to the question why knowledge is not helpful: even though we increase our body of knowledge, why does it not help us in action when we want it to? Drawing on system theory, Venkula sees the human mind as a mental system, which comprises five subsystems, namely, the epistemic, emotional, ethical, aesthetic and empirical systems. (Venkula 1990, 1993: 1-26, also Heikkilä and Holma 1990: 47-48.) This also coincides with the idea that the users of research actively create knowledge.

The epistemic subsystem represents rationality and intellectuality, and according to the present view of knowledge prevailing in society, it controls the other four subsystems. The emotional subsystem is related to emotions and instincts, and it has traditionally been considered to be the "inferior" part of the mind, which has to be suffocated (cf. Freud's *id*). The ethical subsystem becomes visible in people's value judgements and in their sense of responsibility and duty. Contrary to a common conception, ethics is not solely defined by norms prevailing in society, but all individuals have their own ethical principles and customs. The aesthetic subsystem is a system of form, harmony and relations, but early on it began to mean the sensation of beauty. The final subsystem, namely the empirical subsystem, is based on the individual's own action and experience. Experience comprises human activities, life's events and personal processes, which define individuals' behaviour in a given circumstance as well as their understanding of knowledge. (Venkula 1990: 95-99, 1993: 11-14.)

[16] For example, Niiniluoto distinguishes between four types of world view, namely, the scientific, the unscientific, the religious and the metaphysical (1984: 79-83).

The epistemic subsystem has been considered to dominate over the other subsystems in knowledge formation. According to Venkula, this restricts the possibilities of the human mind and its perception of reality as a whole. If the overemphasis on the epistemic subsystem continues, much of the information disseminated in society remains hidden and people are unable to broaden their world view through other models of thinking. All the five mental subsystems should interact, and the message must "click into place" with respect to all the subsystems in order for the knowledge to be helpful. In other words, the subsystems need to be in a responsive state, and there is a need for a dynamic symbiosis between them. (Venkula 1990, 1993: 1-26.) Knowledge is knowledge only after it has been explained; in other words, the individual has to be able to apply the new knowledge into his existing conceptual framework (Heikkilä and Holma 1990: 49). This also takes us back to Watkins' notion about reconstructing knowledge (see pages 59-60).

Knowledge formation is especially topical in the modern-day information society, and it is connected with the earlier discussion about "the knows" and "the know-nots". An increasing amount of information is being disseminated, but this does not necessarily mean that people know more than before. Pertti Hemánus points out that the adoption of information is not comparable to the supply of information and that the relationship between them is much more complicated; information that is being offered is often too conceptual, abstract and distant from the individual's environment (1979: 65). Niiniluoto also emphasizes that the quantitative growth of communication does not guarantee that the quality of information will improve (1989b: 83). Quality is also becoming an increasingly important consideration in technical communication as the volumes of communication products grow. However, quality may also be one of the aspects in which the technical communicator has to compromise, as was noted earlier. The growth of communication in general has resulted in a situation where it is increasingly difficult to hear anything among the information noise (Niiniluoto 1989b: 83). Finding the right information efficiently is a challenge.

3.3.7 Theory and Practice

As suggested in the introduction, theory and practice are important considerations in research utilization. They were briefly touched upon in the first definition of research dissemination and utilization: “It [research utilization] has, in short, to do with the relation of theory to practice” (Huberman and Ben-Peretz 1994: 3). Theory and practice are thus at the core of research dissemination and utilization, and also popularization examined later on.

The gap between theory and practice poses problems in many disciplines and fields, such as in the design of contents for university courses. One of the aims of research dissemination is to bridge the gap between theory and practice, but paradoxically that gap is one of the major problems in research dissemination in general (Takala 1983: 34). The encountering of theory and practice will lead us, once more, to the importance of knowledge and to the issue about the aims and beneficiaries of research.

In the following, the views of Colin Yallop will be introduced: he speaks about theory and practice in translation studies, but his notions are equally applicable to technical communication, as I will comment on below.

Yallop approaches the issue of theory and practice from the point of view of knowledge, which is appropriate bearing in mind the framework of this study. Yallop maintains that there is a distinction between unconscious practical knowledge, which is based on everyday experience, and self-conscious scientific or analytical knowledge. Yallop sees pragmatic knowledge and scientific knowledge as separate, and admits that there is a gulf between theory and practice. But he also remarks that there is no need for a fusion between theory and practice, as we are dealing with two different but equal types of knowledge, from which the translator, or in this case, the technical communicator, selects his own. In order to be a good translator one does not have to be a theorist. Similarly, in order to be a good technical communicator, one does not have to be a theorist, although knowledge of research and methodologies can be beneficial, as noted earlier. Yallop also points out that neither the translator’s practical knowledge nor the linguist’s theoretical

knowledge is an obstacle to respectful interaction and discussion. One can also take an interest in both kinds of knowledge. (Yallop 1987: 347, 351.)

When discussing the relationship between researchers and practising translators, and between theory and practice, Yallop offers the following view:

> . . . the distinction between theory and practice is not one that allows theory to ignore practice. Translation theory arises from practice, in the sense that theory analyses the products and processes of translation. In this light, practice is more essential to theory than theory is useful to practice; and it is more the theoretician's responsibility to address questions that arise from practice than it is the practitioner's responsibility to listen to theory. (Yallop 1987: 351.)

The products and processes that technical communication research addresses also arise from practice to a large extent. But the question of the theoretician's and practitioner's responsibility is a more complex one. James Holmes remarks that it need not be the main aim of translation studies to help the translator perform his tasks. But what we must ask is whether translation studies can help them. This depends, for example, on the state of the theory: there are valuable theories, which provide insight into a phenomenon, and there are insufficient theories, as there are in all disciplines. Although the state of translation theory may not have been powerful enough to explain the phenomena to the extent that we would have liked it to, it can be of a great deal of help, on a general level, to translators. (Holmes 1988: 97.)

In technical communication, paying attention to the needs of professionals was a natural course of action at least in the beginning. Pinelli has argued that technical communication research should be tied to daily problems confronted by practitioners and that research should be developed in such a way that practitioners can apply it to solve problems (1985: 7, also Beard et al. 1989: 188). However, at present I do not believe that the sole aim of technical communication research should be to help professionals: there is both room and need for all types of research. However, if a piece of research has the potential of helping professionals, it should do so, especially as the products and process of technical communication

tend to arise from practice. It is in the interest of the entire field – and also the responsibility of the field – to actively seek interaction with practising technical communicators. As noted earlier, interaction is also an important variable in research utilization.

The issue of the beneficiaries of research is manifested on a practical level. Yallop has noted that in translation studies there are works that are clearly written for translators and which talk of techniques; then there are works that address the question of what translation theory is, and there are works that are a mixture of these two (1987: 347-348). This is also the case in technical communication. Since practice has been the starting point in technical communication, much of the literature in the field is prescriptive and talks of techniques, i.e., literature which concentrates on the practical performance aspect of the work. However, there are also works that discuss the nature of technical communication, and works that are a mixture of the two, in other words, works that also address the theoretical competence of technical communicators and how it meets performance. Since the mid-1980's there have been attempts to move away from "how-to" advice towards a more systematic inquiry into what does and what does not "work" (Morgan 1988: 25).

Summary

The focal points in this chapter were the following:

- Research utilization variables and arguments why technical communicators would use research.
- The potential applicability of the research utilization models to the empirical material, with special consideration to conceptual and instrumental use, as well as the difficulties involved in selected research methods.
- The growth of information and information technology is connected with the development of technical communication, and research dissemination and utilization.
- Technical communication seems to have a pragmatist research tradition.

4 Popularization of Scientific Knowledge

> When changing batteries in a watch, the consumer receives the following advice: “In order to change the battery, take out the old battery and put in a new one.”
>
> – HS, 23 July 1998

Popularization is not at the core of this study, but because it has many links with research dissemination and utilization within technical communication as suggested in the introduction, it deserves a short chapter of its own. As I have done throughout this study, I will start by introducing popularization on a general social level, and where appropriate, I will make references to the framework presented in chapters 2 and 3.

Bernard le Bovier de Fontenelle, who was appointed secretary of the Academy of France in 1697, is considered to be the first known popularizer. He wrote about astronomy for the upper and middle classes. (Laaksovirta 1986: 94-95, 104-105.) Popularization in the form of publishing can be seen to have started in the 1800’s: a divide emerged between publishing aimed at the general public, on the one hand, and at scientists, on the other hand, when German universities pioneered the institutionalization of science. There was also a clear need for popularization when conducting research became a professional activity. (Manten 1980: 14, also Laaksovirta 1986: 95.) Popularization has thus emerged from the professionalization of science, and as suggested in chapter 3, it is part of the history of research dissemination.

Popularization in Finland has its roots in the 1800’s, when a number of events occurred involving the popularization of science. Research dissemination as a part of the tasks of the universities was introduced in 1857 by Johan V. Snellman:

> The relationship of modern science to real life has also changed the position and aims of scientists. The cell in the monastery is no longer the scientist’s real home. He should connect with real life and with those who work there. He should have a clear purpose. This he must do for the sole reason that his theories must be based on reality and particularly because his characteristics as a scientist in no way detract from his characteristics as a citizen and a citizen of the world.

> The university is not an institution of scientific study but of scientific instruction. It is an institution of scientific study only in the sense that true scientific instruction requires scientific study from the teacher. The present-day university is not only an institution which produces new scientists, but an institution which must share scientific education and culture with the people, in all the various fields that they work in. The university teacher must thus pay more attention to practical life than a pure scientist. (In Tommila 1974: 127, my translation.)

Popularization has thus had powerful advocates and a long tradition. Overall, various means have been, and continue to be, used to disseminate scientific knowledge: lectures, books, magazines, museums, exhibitions, film, television, science centres, and now also the Internet (Persson 1999: 38). Considering Snellman's words in the present-day academic world, we can briefly note that nowadays both research and teaching are considered equally important in many universities. Universities are also active in holding lecture series for the general public, and they have their own information and PR units for the dissemination of scientific knowledge. In this study, however, we are not concerned with the history of popularization or the general role of universities, but rather with the nature of popularization and its relevance in the framework of research dissemination and utilization within technical communication.[17]

4.1 Popularization in the Frame of Knowledge

Concerning the scope of popularization, I am using the same frame as Laaksovirta: when speaking about popularization, I do not assume that the target group is solely *populus*, i.e., the people, even though the literature on popularization is usually restricted to mean research dissemination among the public at large (*the public* meaning lay persons). Popularization is a much wider issue. It has to do with all the three target groups to which scientific knowledge is conveyed, namely the research

[17] For a more detailed account of the historical development of scientific publishing and popularization, see Laaksovirta 1986: 91-99, 104-107, Takala 1983. For more on the history of popularization in Finland, see Takala 1983: 12-17, Huuhka 1974.

community, the users of research and the public at large. Thus, popularization is also relevant in research dissemination and utilization within technical communication.

In the following, popularization will be defined from different perspectives to illustrate that the aspect of popularization is often, if not always, involved when research is disseminated to one of the three research dissemination target groups. Thus, the three groups can also be called popularization target groups. In order to understand the phenomenon of popularization, as Laaksovirta points out, it is, firstly, necessary to be familiar with the nature of the discipline in question, and secondly, to understand the social dimension in which popularization emerges and has an influence (1986: 103). We are already familiar with the nature of technical communication, and now I will address the latter aspect.

Greg Myers provides a good overall definition for popularization in this study:

> What scientists do with texts has been fairly well studied. . . . Much less is known about what people do with popularizations. This is partly because the term covers such a wide range of texts, from science fiction to TV documentaries, from hands-on science museums to toothpaste ads, from shock-horror headlines to the rather scientific popularizations of *Scientific American* and its equivalents. What all these forms have in common is that they try to place scientific knowledge within a new discourse. . . . popularizations are all texts through which people relate academic knowledge to their lives and assess its claims. . . .
>
> (Myers 1996: 41-42.)

Thus, knowledge is transferred from one context to another and used as a resource in different contexts (Väliverronen 1994: 31). Myers' definition applies to all forms of popularization, whether we are talking about diffusing research within the research community, to users of research, or to the public at large. I shall return to his definition in connection with the analysis in chapter 5.

Laaksovirta defines popularization as an intersection between scientific knowledge and common knowledge; it is an attempt to unite these two types of knowledge (1986: 103-104). It can be seen as a phase between science and everyday life (ibid. 1988: 3). It is this phase-type nature that forms one of the links between

popularization and research dissemination and utilization; only, in the latter case, the phase is between science and professional life. Another link is recreation: in the process of popularization, scientific knowledge is recreated as common knowledge (ibid. 1986: 236); in chapter 3 we talked about “reknowing” and “reconstructing” before knowledge becomes valid when research is disseminated to professionals.

The practical implementation of popularization, such as science programmes produced for television, is often implicitly based on gap, obstacle and deficiency theories mentioned in chapter 3. These theories see popularization as a bridge linking people on different sides of the river. However, this picture is too simple, as we are dealing with people, power and social status, and with a recreation of knowledge, not mechanical dissemination. (Laaksovirta 1986: 236, 106, see also subsection 3.3.2, page 57.)

In the above definitions of popularization, we see the importance of scientific knowledge as the starting point in the dissemination process. Scientific knowledge has been characterized in many ways. Usually it means propositional knowledge that is hoped to be “objective”, i.e., neutral, and it includes all the reliable research results obtained with the “best methods” and “accepted” within the research community (Niiniluoto 1980: 148, also Laaksovirta 1986: 56, summary 5). Scientific knowledge is knowledge acquired through a scientific method within the research community, whereas common knowledge is knowledge which is inherent and which people have gained from their environment (Niiniluoto 1994: 9). Common knowledge is characterized by its experienced nature, its subjectiveness, its holistic-synthetic nature, and its language, which is that of the subject. It is obvious that science cannot directly be common knowledge, although it is often hoped that it could be. (Laaksovirta 1986: 103-104, summary 10.)

It should also be borne in mind that scientific knowledge is not a separate entity, but intertwined with three other aspects of science, namely 1) the scientific institution (researchers, research organizations), 2) the research process and

3) the scientific method (Niiniluoto 1984: 21)[18]. The border between scientific knowledge and common knowledge is not clear-cut either, because researchers are bound by their own values, their interpretations as well as their scientific and individual world views, and thus, common knowledge permeates research knowledge on a number of levels (Heikkilä and Holma 1990: 71). Even the knowledge of the original sender, the researcher, is interpreted knowledge (Laaksovirta 1988: 5-6, see also subsection 3.3.2, page 59).

The aim of popularization is to combine scientific knowledge and common knowledge in a way that is appropriate to the reader. Laaksovirta's definition of popularization can also be applied to the user group, but it has to be modified: popularization is an intersection between scientific knowledge and *craft*[19] knowledge. Users to whom research findings are diffused are experts in their own field and they often have an academic background. Sirkka-Liisa Leinonen aptly notes that sometimes it is impossible to say where scientific communication ends and popularization begins when we talk about communication to the users of research (1993: 10).

It should be pointed out that although the popularization target groups are useful aids in theoretical discussion, popularization is not necessarily so straight-forward in reality. Leinonen suggests in her licentiate thesis that the presentation of all new information could be regarded as popularization in the sense that the receiver does not have that information yet (1993: 9). Consequently, the three target groups can be visualized in a continuum where some points are more strongly marked than others (Eriksson and Svensson 1986: 12, 34-35), as was the case in the discussion on research utilization.

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[18] For a wide-ranging analysis of the characteristics of science, see Heikkilä and Holma 1990: 59-76, Niiniluoto 1984: 19-32, Pirttilä 1991: 1-21, Uusitalo 1990: 24-34.

[19] The term is taken from Louis. With regard to types of knowledge, Louis makes a distinction between three groups: a) research-based knowledge generated through scientific study, b) craft knowledge, based on the experience of those who are actually engaged in practice, and c) common knowledge (Louis 1981: 176-177, also Love 1985: 341).

Popularization is often considered to be a commonplace practice, but in fact there are a number of ideological standpoints behind it, when we consider popularization on a general level. According to Anto Leikola, popularization involves a cultural-idealistic perspective: knowledge is valuable in itself, which is considered to enrich life in general. Furthermore, it is assumed that communication and equality between people will increase when scientific knowledge is adopted. There is also a financial angle which cannot be dismissed: the public has a democratic right to know what researchers are doing, as it is the public who helps to fund this work. (Leikola 1974: 13-16.)

The dissemination of research also helps people to better understand and guide their own action as well as the action of society as a whole: the diffusion of scientific knowledge decreases uncertainties in life caused by ignorance (Takala 1983: 9). The motivation for acquiring knowledge can also be explained by our natural curiosity and our natural desire for information, and also by our need to construct our own world view with the help of well-founded information (Niiniluoto 1989a: 116, also Hemmi 1982: 5). Some of these arguments can be applied to research dissemination and utilization in technical communication, to which I will return in chapter 5.[20]

Maurice Goldsmith suggests that the entire term *popularization* should be abolished. He maintains that diffusers' efforts turn against science in the long run: the more intensive the idea of scientific knowledge as detached, unproblematic results and facts is, the more likely it is that the general understanding of the foundations of scientific knowledge will weaken. (Goldsmith 1986: 80-84, also Venkula 1988: 12.) The danger is that science and knowledge are presented as if they were straightforward to produce, diffuse and adopt (Venkula 1988: 11).

This danger was also discussed in chapter 3 in connection with the enlightenment model presented by Weiss. In the model, research finds its way to a practical setting through manifold channels, and this causes the danger of invalid

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[20] For more information about the motives behind popularization, see Laaksovirta 1986: 236, Niiniluoto 1989a, Takala 1983: 70-71, Tommila 1974: 128, Saarenheimo 1979.

generalizations being made, and oversimplified, inadequate or wrong understandings of a field may emerge. I think this danger is justified, especially in technical communication where the multidisciplinary nature of the field poses additional challenges to popularization. I shall return to this in the next chapter.

Another danger is potential alienation. Goldsmith remarks that "popularization of science has tended to alienate people from science" by presenting it as a collection of facts (1986: 14, also Venkula 1988: 9). Science can also alienate potential users of research, for example, by offering substance that is not relevant to professionals. The relevance of research to professionals will be further commented on in chapter 5.

What can be done to avoid the dangers involved in popularization? Hayhoe's notions presented earlier (see pages 67-68) can be said to promote a more in-depth understanding of the foundations of research and research methodologies among technical communicators, which could improve the situation in this particular field. Goldsmith offers a more general solution to the problem of misunderstanding science. He proposes that instead of having disseminators of information, we should have science critics who would place science in relation to other live phenomena, such as the arts, ethics and social environment, and who would build comprehensible scientific entities (1986: 80-84, also Venkula 1988: 12). This is a good, but highly challenging idea in a time characterized by increased specialization of science: where do we find these science critics who, according to Goldsmith, "must seek to bring what we see in science around us into some relationship with the non-science things we see"? Goldsmith continues to argue that there is a need to replace the concept of popularization with that of the public understanding of science and the public appreciation of its impact. (1986: 82.) Venkula is in the same lines: we can forget popularization and instead concentrate on the philosophical and psychological foundations of knowledge formation (1994: 10).

Sven Öhman, who specializes in popularization, represents an extreme and rather pessimistic viewpoint of popularization with respect to the receiver: "You really don't understand a scientific word, if you do not know how to use it in a scientific

work" (1995). Öhman thus argues that, in principle, popularization is impossible. Popularization does not help us understand scientific knowledge, even though we may think so. (Öhman 1993, 1995.) However, we must bear in mind that people's need of information varies: it is not necessary to understand everything in Öhman's terms – it is not even possible within a lifetime. In addition, we can ask what we mean by a "public understanding of science": understanding the **content** of scientific knowledge is quite different from understanding the **nature** of scientific knowledge (Myers 1987: 689-690). Here again we can refer to Hayhoe's notion that technical communicators should, in fact, be able to understand the nature of the way in which knowledge is generated and also to be able to carry out research themselves on some level. To summarize, we can say that there are a number of levels of understanding, and it can be seen as a continuum just like the receivers of popularized messages (Eriksson and Svensson 1986: 61-67).

I would argue that there is no need to abolish the term popularization, especially considering its long history, but there is a need to improve the understanding of popularization as a phenomenon and to learn more about the way in which popularization can be carried out successfully. Practice, training, research and in-depth awareness of the phenomenon (including a self-analysis by the disseminator) would help the diffuser find communicative strategies suitable for the target audience at hand.

Studies have been carried out in order to find communicative strategies that the diffuser can use when writing for different target audiences. These are not at the core of this study, but I think it is worthwhile to introduce some, because they give an idea of the practical element of popularization. To facilitate the process of communication, the diffuser may choose 1) to try to adapt the message as accurately as possible to the existing cognitive background of the readership, 2) to build background into the message itself, 3) to simplify the message, or 4) to promote communication by textual, structural and typographic means (Leinonen 1993: summary 211).

In addition to the above aids for the diffuser, there are a number of other instructions as to how one should popularize. Popular magazines often have their

own writing instructions and conventions, but strategies in the diffusion of scientific knowledge to members of other disciplines and to practical settings are more varied. Leinonen's study shows that there is no ideal structural or other model for dissemination (1993: 200). However, she found some strategies which may promote communication targeted at users of scientific knowledge. They may also function as a guide when technical communication research is popularized for technical communicators. The following points are regarded as potentially significant and communicatively effective when scientific knowledge is diffused to lay readers (*lay* here meaning professionals):

> 1) Attempt to find links between theoretical terms and concepts of occupational practices.
> 2) Use of both abstract and concrete words in the same text.
> 3) Use of associative verbal imagery to support the semantic contents of the text.
> 4) Macrothematic consistency and coherence.
> 5) Sufficient explicitness.
> 6) Use of narrative structure as a main or auxiliary organizing frame.
>
> (Leinonen 1993: 204-206, 218-219.)

In technical communication, the first point is particularly relevant: as the terminology of technical communication varies, finding links between theoretical terms and concepts of occupational practices would, first of all, require terminology work. Overall, these findings are important if we consider that the use of language is one of the factors which affects research utilization, as the high-utilization factors reported by Love also suggested (clarity mentioned on page 69). The role of language in research dissemination and utilization within technical communication would be an interesting topic for further study.

4.2 Popularization in Technical Communication

As emphasized in the introduction and demonstrated in Figure 2. (see page 8), we must make a distinction between the three different aspects of popularization in the framework of this study. These will be addressed below.

The first aspect is popularizing technical communication research for professionals, or the so-called professionalization of research. On page 82 it was mentioned that

users of research are often experts in their own field and have an academic background, and therefore it may sometimes be impossible to say where scientific communication ends and popularization begins. The case of technical communication professionals is slightly exceptional, as suggested in the introduction. The majority of Finnish technical communicators do not have a background in technical communication studies, but in some other field, such as translation or language studies. Instead, they have gained their skills and knowledge about technical communication mostly through practice, which have then been complemented by continuing education courses, for instance. In the sense that they know the language of academic research, the dissemination gap between their professional knowledge and scientific knowledge may be nonexistent (Laaksovirta 1986: 237). However, the substance of technical communication research may be unfamiliar to them, outside the scope of their everyday work, and therefore there may be need for popularization, or "professionalization" of research findings. Popularization is also required, if we maintain that technical communicators should also be able to understand the nature of generating technical communication research (see pages 67-68 and 85). This will be further commented on in the next chapter.

The second aspect is popularization that takes place when technical communicators write instruction manuals, and the like, for different target groups. This is marginal in this context, and deserves a separate study of its own, which could examine textual popularization strategies, for example. Therefore, it will not be addressed here.

The third aspect involves technical communicators acting as popularizers and transmitters when they share scientific knowledge with clients and colleagues (see Havelock 1969: 2-1). Technical communicators hold a key position in what colleagues in their work community, and also the public at large, know about technical communication and how they understand it. Knowledge is thus first filtered to professional groups, and they interpret it for their clients and colleagues, and to the public at large. Technical communicators are thus both receivers of knowledge and disseminators of knowledge (see Havelock 1969: 2-1).

Popularization from the research community to professionals and popularization from professionals to clients, colleagues and the general public can also be seen as marketing of science, as Per-Edvin Persson suggests (1992: 54, also Niiniluoto 1989a: 116). He refers to popularization to the general public, but I think the idea can be extended to both of the examined cases of popularization in technical communication. The field is fairly new, which means that it has to "market" or "sell" itself. When the research community in general disseminates research findings, it is also doing PR; after all, research is dependent on the funding and support of society (Niiniluoto 1989a: 116). The dependence on outside funding is topical in Finnish technical communication at the moment, as more and more M.A. theses are being commissioned by companies. This naturally affects the topics and nature of the research, as commented on in chapter 2 in connection with the traditional practice-orientation of technical communication. "Marketing" technical communication to clients, colleagues and the general public, in turn, may also influence the professional recognition, awareness and value of technical communicators.

Both forms of popularization – popularization of research to professionals, and from professionals to clients, colleagues and the general public – can function as important means for making technical communication more familiar to Finnish society on the whole. We would also need more studies on the different aspects of popularization in this new field.

Summary

The focal points in this chapter were the following:

- Forms of popularization: popularization in general; popularization involved in research dissemination to professionals; technical communicators as popularizers to target audiences; and technical communicators as popularizers to clients, colleagues and the public at large.

- Technical communicators' understanding of the nature of the way in which technical communication research is generated.

5 Technical Communicators' Use of Research

> Warning on a vending machine selling whisky-flavoured condoms: "Do not drive a car while using this product."
> – HS, 23 July 1998

As mentioned earlier, technical communicators themselves make the best informants when we want to elicit information about their background and use of technical communication research. This chapter provides a detailed description of the data collection and analysis processes, thus forming the empirical part of this study.

5.1 Material and Method

In this section I will go over the method by which the empirical material was obtained for this study and how the informants were selected.

5.1.1 Data Collection Methods

The method used to collect the data was a mail questionnaire, which was targeted at technical communicators (Appendix 1). As mentioned in the introduction, nonrandom sampling was primarily used in the selection of informants (Zimmerman and Muraski 1995: 130). In general, nonrandom sampling can be divided into purposeful samples and haphazard samples (ibid. 1995: 130). In this study, a purposeful sample was used. In other words, the individuals to whom the questionnaire was sent were selected because they had certain characteristics in common; in this case, they were all representatives of the technical communication profession in Finland.

In practice, the technical communicators to whom the questionnaire was sent, along with a cover letter and a self-addressed envelope, were selected on the basis of the following criteria:

- Technical communicators who had participated in two continuing education courses organized by the Institute for Extension Studies and the Department of Translation Studies at the University of Tampere during 1998-1999 (n=41). The topics of these courses were Graphic Design, and Usability and Technical Writing.
- Technical communicators who had been involved in the organization and development of the Technical Communications Programme of the University of Tampere (n=20).
- Students who had completed the above-mentioned Technical Communications Programme and who had started working as technical communicators after their traineeship period (n=27).
- Members of the Finnish Technical Communications Society (n=65).
- Subscribers to *Näkymä* (n=32), the above-mentioned publication which began to appear in 1999 and which is distributed by email.
- In addition to the five groups above, the individuals who had participated in the pilot study (see 5.1.2. below) also replied to the final questionnaire (n=11).

Some of these groups may overlap; for example, those who participated in the continuing education courses may also be members of the Finnish Technical Communications Society, and members of the society may subscribe to the *Näkymä* mailing list. Therefore, they might have received the questionnaire twice, because I did not have access to the personal contact information of the members.

The questionnaire was sent using two media: to members of the Finnish Technical Communications Society and to subscribers to *Näkymä*, the questionnaire was sent via their respective electronic mailing lists, whereas traditional paper mail was used in all the other cases. Including the pilot respondents, the total number of questionnaires sent via traditional mail was 99. In addition to these, two extra questionnaire forms were included in 20 envelopes; in other words, 40 extra forms were sent in the hope that the informants would distribute them to their colleagues. Thus, altogether 139 paper-form questionnaires were sent, and the number of potential respondents by email was 97. Consequently the total number of potential informants was 236.

In the case of the two mailing lists and the 40 extra questionnaires, the sampling can be considered to be more random, as individuals could not be identified as specifically as in the other cases. However, the lists were selected on the assumption that the individuals had subscribed to the lists because they represent the technical communication profession.

The paper-form questionnaire was sent on 30 July 1999 and the electronic version somewhat later (6 August 1999). The informants were asked to fill in the questionnaire by 18 August 1999; thus they had approximately two weeks to respond. Some questionnaires did, however, arrive after this date. In the analysis presented in section 5.2., all responses are included which arrived by mid-September 1999.

The final number of responses was 106, of which 87 were received by traditional mail and 19 by email. It is difficult the calculate the actual response rate mainly for two reasons: firstly, I do not know whether the extra 40 questionnaire forms reached the recipients' colleagues, and secondly, I do not know to what extent the different potential informant groups mentioned above overlap. I suspect they overlap significantly especially in the case of the society's and the *Näkymä* mailing lists. Of course, in addition to overlapping, we also have to consider that some recipients did not answer the questionnaire simply because they may not read technical communication literature and did not feel that answering it was worth their time and effort.

We could calculate that the response rate of questionnaires sent via traditional mail was 62.5 % and those sent by email 19.5 %, and the total response rate when we calculate it from the potential number of respondents was 45 %. However, since these figures are inaccurate, I think we can get a better overall picture if we view the number of responses against the estimation presented earlier of the size of the technical communication profession in Finland: 106 responses in comparison to the population of 500-1,000 technical communicators might be enough to make some cautious generalizations about Finnish technical communicators and their use of research, or at least to show some tendencies in these areas.

Despite the high number of responses, this study remains qualitative in nature. As in descriptive studies in general, which attempt to identify features of an event (Morgan 1988: 27), the aim is to explore and describe who technical communicators are, and to describe and explain their use of research, not to produce prescriptive rules or guidelines. Next I will present the content of the questionnaire. All examples provided hereafter will be numbered separately in each section and subsection.

5.1.2 Questionnaire Design

Ideas for designing the items in the questionnaire were taken from Laaksovirta's study (1986), from the study by Beard et al. (1989) reported in chapter 3, and from John Beard and David Williams (1992), who did a survey of practitioners' attitudes toward and uses of research in technical communication. Books and articles on qualitative research were also used for this purpose (Plumb and Spyridakis 1992, Silverman 1993, Storå 1982).

The questionnaire contained 13 questions altogether, of which 10 were phrased as statements and 3 as questions. Of the 13 questions, 11 were structured (closed) and 2 were unstructured (open-ended) questions, but in 2 structured questions the respondents were also asked to give an example to support their answer. In the structured questions both checklists (e.g., Question 8 in Appendix 1) and scaled responses (e.g., Question 6) were used.

The questionnaire starts with five fairly easy questions to encourage the subjects to complete the form: the questions concern sex, age, job title, training and work experience. Questions 6-9 ask about the subjects' need for research, how often they follow research, where they find information about it and what it has given them. Questions 10 and 11 ask whether the subjects themselves have carried out technical communication research and whether they have presented or published it in some forum of technical communication. Question 12 asks about the subjects' hopes as to technical communication research and education in Finland. The final question (13) asks where the subject is employed.

The questionnaire that was sent in electronic form differed slightly from the printed version just described: some changes were made to enable the recipient to answer on screen: for example, no categories were given in questions 2, 3 and 5. In the analysis stage, the answers to the questions were placed according to the original categories used in the paper form. Surprisingly, sending the questionnaire in electronic form proved to be a problematic method: many respondents removed and changed the original categories, which made it more complicated and time-consuming to interpret their answers, and which made the analysis more difficult. On the other hand, the electronic form probably made answering faster for the informants, and they were more inclined to give longer answers to the unstructured questions (such as Question 12) compared to the answers in the paper-form questionnaires. In summary, when an electronic form is used, it should be technically designed in such a way that the form itself cannot be changed by the receivers. Of course, in some instances this change might bring new perspectives into the questions being asked, but this was not the case here.

One of the major issues in designing the questionnaire along with the cover letter was what to call *research/scientific knowledge* in Finnish. I decided to use the word *tutkimustieto* and *tutkimus* both in the cover letter and in the questions, in addition to which, examples of *tutkimustieto* were given (Appendix 1):

> Example 1, Cover letter:
> Tutkimustieto voi olla peräisin esimerkiksi ammattilehdistä, erilaisista dokumentointi- ja kirjoitusoppaista, konferenssijulkaisuista tai koulutustilaisuuksista.
>
> Example 2, Question 6:
> Tarvitsen teknisen viestinnän tutkimustietoa (alan ammattilehtiä, oppaita jne.)
>
> Example 3, Question 7:
> Seuraan teknisen viestinnän tutkimusta (esim. luen artikkeleita ammattilehdistä)

The alternative that could have been used was *tieteellinen tieto*, but I believed that it would be more intimidating than *tutkimustieto* and that it might narrow the informants' answers. As seen from the examples above and as suggested at the beginning of this study, *tutkimustieto*, *research knowledge*, is understood quite

widely in this context mainly because of the nature of technical communication. In the cover letter and in some of the questions, research is viewed against the medium through which it is offered: it can be a handbook for writing manuals, a continuing education course or an article in a professional magazine. This is consistent with the discussion in chapter 3: research utilization is seen as a continuum, and the medium through which the information is received is not the decisive factor; research knowledge can be filtered through a variety of media.

An exception to the above is Question 10: "Olen itse tehnyt tieteellistä tutkimusta teknisen viestinnän alalla (seminaarityöt, tutkielmat jne.)". Here *tieteellinen tutkimus* is used as the standard term for scientific research (science in the sense presented in the introduction), and it is complemented by examples to give the respondents a clear view of what is referred to. Although, in my view, defining research in the questionnaire was important, a notion by Laaksovirta is appropriate: science [research] is what it is thought to be; in other words, however researchers define it, individuals have their own ideas about it (1986: 227).

Another major question involved in designing the questionnaire was how to present the idea of research utilization. Ross Connor has reported on eight studies, all of which give a broad definition of use: both instrumental and conceptual usage were counted in these studies, and the majority concluded that usage generally was high. Overall, these studies[21] used interviews with open-ended questions; only one study used a questionnaire with fixed responses. (Connor 1981.) However, Connor has argued that utilization research has relied too much on open-ended interviews, and that there is need for a more systematic approach (1981: 72).

The respondents in this study were given a rough typology of utilization, which, however, was flexible enough to leave room for self-anchored conceptualization mentioned in chapter 3 (see page 64). Question 9, which specifically asks how the informants have used research, is actually a mixture of the two approaches presented by Connor. There are both open-ended and fixed questions; in other

[21] The studies that Connor reported comprised Weiss and Bucuvalas, Knorr, Patton et al., Alkin et al., Heiss, Urban Institute, Caplan et al., and Rich.

words, some categories are offered, but the subjects are also asked to give examples. As mentioned in chapter 3, the aim was to imply to the informants that research utilization can take many forms and that utilization can be thought of as a continuum. I shall return to this issue in connection with the analysis of Question 9 in subsection 5.2.3.

The questionnaire was first tested as a pilot study on 11 technical communicators. The aim was to test the clarity and order of the questions, and the need for other response categories, with the overall aim of improving the reliability and validity of the questionnaire (see Plumb and Spyridakis 1992: 634-635). The reliability and validity of some of the questionnaire items will be further commented on at a later stage. The technical communicators involved in the pilot study were individuals who had either participated in the Technical Communications Programme or been involved in the planning and organization of the programme. After the subjects had filled in the questionnaire, they were also asked to give free verbal feedback. The pilot study provided useful information for improving the questionnaire. The most important changes concern Question 8 “Saan teknisen viestinnän tutkimustietoa” (see Appendix 1):

- two categories were added: “the Internet”, “through societies in the field”
- “tieteellisistä kirjoista” was changed to “alan kirjoista” as the pilot respondents had difficulty judging what “scientific” meant (as opposed to “tieteellinen aikakauslehti” which was a clearer category)
- “Anna esimerkkejä” was added after the checklist, as the respondents thought it would be an interesting asset to know what types of sources are actually used by technical communicators.

Other minor changes made to the questionnaire were, for example, the following:

- in Question 3 regarding job titles, the category “dokumentaatiospesialisti” was changed to “dokumentointispesialisti”, which was the correct term according to the respondents.

- Question 5 was changed from “Olen toiminut dokumentointitehtävissä” to “Olen toiminut dokumentointitehtävissä teknisen viestinnän alalla” as the respondents felt it would be more accurate.
- Question 9 was changed from “Mitä teknisen viestinnän koulutus ja tutkimustiedon seuraaminen on antanut sinulle?” to “Mitä teknisen viestinnän tutkimustiedon seuraaminen on antanut sinulle?” as the original version was too loaded in asking two questions at the same time (about education and following research), and few technical communicators have actually participated in any form of systematic training in technical communication, because it has not really been available.

After these changes were made to the questionnaire, the new version was also sent to the pilot group one week after the initial questionnaire. This was done to measure the reliability of the questionnaire. In other words, I wanted to test whether the questionnaire elicited the same answers from the same people at different times (see Plumb and Spyridakis 1992: 635). This was true for the majority of the questions, but there were two questions in which several discrepancies occurred compared to the first answer: in Question 8 there were 22 different answers compared to the first one, and in Question 9 “Mitä teknisen viestinnän tutkimustiedon seuraaminen on antanut sinulle?”, there were four different answers. In Question 8, most of these differences can be explained by the changes and additions made concerning the categories. The discrepancies in Question 9, in my view, are related to the difficulty of defining utilization. This, however, was not strong enough evidence to change the categories.

The questionnaire responses were coded 1- 95 and the pilot answers P1 - P11. The answers were written on an Excel sheet according to the codes, and the responses were then calculated. The results of the questionnaire will be presented in the following section. The respondents will be identified throughout this chapter by R1, R2... and P1, P2..., the R standing for respondent and P for pilot respondent.

5.2 Results of the Questionnaire

In the following subsections, the responses to the questionnaire will be handled question by question. I shall start with the "easy" questions. One example of a completed questionnaire is shown in Appendix 2.

5.2.1 Background Information

The first five questions were included in the questionnaire to get information about the background of technical communicators. In addition to these, answers to questions 10, 11 and 13 can also be considered to elicit background information. As mentioned in the introduction, finding out who technical communicators are comprises the other aim of this study: their sex, age, job title, education, work experience, experience in carrying out research and publishing it, and the company where they work. As mentioned in the introduction, even in the United States, where the profession of technical communicator has a long tradition, there is a lack of this type of basic information about this profession (Carliner 1999g). The Finnish Technical Communications Society has also recently discussed the lack of basic information, for example, about the job titles that Finnish technical communicators have, the tasks that they perform and the overall salary scale among these professionals (Finnish Technical Communications Society).

Sex and Age

Questions 1 and 2 asked for the informants' sex and age, the distribution of which is presented in Table 1.

Table 1. Sex and Age Distribution According to the Number of Responses (Questions 1 and 2)

Sex		Age				
Male	Female	20-29	30-39	40-49	50-59	60-
24	82	37	59	10	–	–

We can see that the majority, 77 %, of technical communicators who responded are women. 56 % of the respondents fall between the ages of 30-39 and 37 % between

the ages of 20-29, whereas there are few above the age of 40 and no one above 50. In other words, these results seem to suggest that technical communicators are typically women in their thirties.

Job Title

Question 3 asked for the job title of the respondents. The question gives five categories to choose from and, if none of them applies, it asks for another title. These categories were mainly chosen based on job advertisements in Finnish newspapers and on the basis of my personal knowledge of the job titles used in this field. Two of the categories, namely "tekninen dokumentoija" and "lokalisoija" turned out to be irrelevant as no one selected them. The responses also gave rise to the issue of language: many technical communicators have an English job title. To rationalize the analysis of the titles, the English term and the Finnish term have been grouped together, for example, tekninen kirjoittaja – technical writer/author, dokumentointispesialisti – documentation specialist, projektipäällikkö – project manager. Table 2. shows the job title distribution of the given five categories.

Table 2. Job Title According to the Number of Responses (Question 3)

Tekninen kirjoittaja (technical writer)	47
Tekninen dokumentoija (technical "documentator")	–
Dokumentointispesialisti (documentation specialist)	17
Projektipäällikkö (project manager)	5
Lokalisoija (localizer)	–
Total	69

"Technical writer" seems to be a fairly common job title (44 %), but this table gives only a partial picture. The answers reveal that the technical communication scene in Finland is highly heterogeneous, at least when it comes to job titles. Of course, this also reflects the fact that companies have their own unique corporate cultures, and titles, too. One group that stands out from the high number of different job titles is what I will call the managerial level. Table 3. shows the job titles that I consider belonging to this group and the number of responses.

Table 3. Managerial Level (Question 3)

Group Manager (ryhmäpäällikkö, tiimin vetäjä/vastaava)	7
Documentation Manager (dokumentointipäällikkö)	4
Documentation Product Manager	2
Dokumentointiyksikön päällikkö/johtaja (head of the documentation division)	2
Customer Documentation Manager	1
Documentation Development Manager	1
Tuotemarkkinointipäällikkö (product marketing manager)	1
Documentation Quality Manager	1
Global Competence Area Manager	1
Competence Area Manager	1
Total	21

As we can see, some of the respondents gave an informal title, which is a kind of a description of their tasks, such as “tiimin vetäjä”, “tiimin vastaava”, “yksikön johtaja”.

In five cases, the respondents gave two titles, which is the reason why there were altogether 111 answers to this question: for example, they checked the given category “technical writer”, but in addition they wrote “tiimin vastaava”, “projektipäällikkö” or “documentation coordinator” in the free space provided at the end of the question. Table 4. shows the rest of the job titles according to the number of responses.

Table 4. Other Job Titles (Question 3)

Harjoittelija (trainee)	7
Technical Editor	4
Documentation Coordinator	2
Instructional Designer	2
Senior Technical Writer	1
System Specialist	1
R&D Engineer	1
Käytettävyysasiantuntija (usability expert)	1
Kouluttaja (trainer)	1
Other	1
Total	21

The number of trainees in this table is quite high. One explanation is that the questionnaire was sent to a number of students who had finished the Technical

Communications Programme, after which they had stayed at the company that offered them a traineeship. A company may also have a policy that employees remain trainees until they graduate from the university: this policy, along with the incentive of a salary increase, is a way in which companies encourage graduation. Only one trainee reported being "just" a trainee, whereas the rest also gave the actual job titles or areas for which they were completing the traineeship: "technical writer", "technical editor", "tekninen kääntäminen" and "dokumentointispesialisti". The job titles in Table 4., such as "käytettävyysasiantuntija", "kouluttaja", "R&D engineer" and "system specialist", also demonstrate the wide variety of job titles that can be considered to fall under technical communication or be closely linked to it.

Connor remarks that it is beneficial for a utilization study to include respondents from different levels of hierarchy (1981: 71). Utilization studies in general also tend to pay attention to this aspect. His notion refers to decision-makers, but I think it is worthwhile also to consider it in the context of technical communication. Are there different degrees or types of utilization at different levels of an organization? For this type of correlation we would need a more detailed study as well as information about the way in which an organization functions.

Education

The next background question in the questionnaire was about education. The question reads as follows:

> Example 1, Question 4[22]:
> 4. Koulutus
> - ❑ Humanistinen koulutus, tutkinto? _____
> - ❑ Tekninen koulutus, tutkinto? _____
> - ❑ Muu, mikä?_____

[22] Question 4:
4. Training
- ❑ Training in the humanities, degree?_____
- ❑ Technical training, degree? _____
- ❑ Other, what? _____

The reason for including this question originates in the discussion – or dispute in some instances – referred to earlier about the training of technical communicators: should their educational background be in technological fields, such as engineering, or in the humanities, which in practical terms can mean English or professional writing, for example? Before we in Finland can go into this question thoroughly and plan adequate training programmes, we need to find out what the current situation is. Going back to the beginning of this chapter: we need to know who technical communicators are, and education is an essential factor in forming an idea of the profession. Table 5. shows the distribution of the respondents' educational backgrounds.

Table 5. Education According to the Number of Responses (Question 4)

The humanities	91
Technical training	10
Other	9
Total	110

The majority (86 %) of the respondents have a background in the humanities: they have completed their Finnish FM (M.A.), or they are currently working on it (many reported that the M.A. thesis is the only uncompleted item). Half of the respondents with a technical training had an M.Sc. degree in engineering ("diplomi-insinööri"). The composition of the category "Other" is interesting, as the following examples demonstrate: "yo-merkonomi", "fil.tri (fysiikka)", "laitteet ja ohjelmistot itseopiskelulla", "ekonomi", and "FM (saksa, englanti) tutkinto kesken", the latter of which, in my mind, belongs to the first category, but the respondent had for some reason placed it under "Other". As the total tells us, some respondents reported being both "FM" and "merkonomi", for example.

According to these results, technical communicators in Finland typically have a background in the humanities. This, of course, does not answer the question why a background in language studies is preferred in the companies that the respondents represent. One possible reason for this was offered in chapter 2: technical communicators with a background in the humanities are better able to place themselves in the position of the consumer. Other factors that may affect the

situation are company-specific strategies and practices, as well as the multilingual and multicultural, increasingly globalizing environment in which the technical communicators work in Finland. In other words, the companies seem to have a high priority on English language communication skills in their recruitment.

Work Experience

The final background question at the beginning of the questionnaire was the length of work experience that the respondents had in the field of technical communication. Based on the short history of the field in Finland, it was expected that long work histories would be the exception. The following table presents the results.

Table 6. Work Experience According to the Number of Responses (Question 5)

1 year or less	25
1-3 years	32
3-5 years	25
5-10 years	19
10-20 years	5
20 years or more	–
Total	106

The results confirmed the expectation: it is quite revealing that 77 % of the respondents have 5 or fewer years of experience in working within technical communication. The profession is relatively new and long work histories are rare.

To sum up the results of the first five questions: a typical respondent is a woman between the ages of 30-39; she has a background in the humanities and she has been working within technical communication for less than 5 years. In the following, I will deal with the rest of the background questions.

Experience in Carrying out and Publishing Research

Question 10 asked whether the respondents themselves had carried out research in technical communication, and Question 11 asked whether they had published or presented their own research at a forum of technical communication. Only 18 of the respondents reported having carried out research in technical communication (2 respondents left the question unanswered), of which only 2 reported having published or presented it (1 respondent who answered yes to Question 10 did not answer this question). Beard and Williams also found in their study that only a small proportion of technical communicators had ever conducted, published or presented technical communication research (1992: 574). I think the results in this study demonstrate the educational situation and short history of technical communication in Finland: so far there have been few chances to study technical communication and thus, research in the field has also been scarce.

These results take us back to the earlier discussion about why understanding the content and nature of technical communication research is relevant for professionals. It seems that at this point research and methodologies in technical communication may not be familiar to technical communicators, but the situation may change as more opportunities for training and research surface, and as the field evolves.

Company Distribution

The final background question is Question 13, which asks where the respondents work. The following table shows the results.

Table 7. Company Distribution According to the Number of Responses (Question 13)

Nokia	68
Tecnomen	7
ABB	5
Tellabs	5
L&H Finland	4
Sonera	3
Labsystems	2
RAY	2
Valmet	2
Alpha	1
Comptel	1
Sandvik	1
TeamWARE	1
Vaisala	1
Varian	1
Total	104

Nokia is clearly at the top with 68 representatives out of a total of 104 (1 respondent answered “in the field of telecommunications” and 1 left the question unanswered). Someone might suggest that there might be a company bias in this result: companies have their own corporate culture, which is also reflected in the way they support the further training of their employees. In other words, a company may create a stimulating work environment where following and utilizing research is encouraged. This is true and undoubtedly also affects the results of this questionnaire. However, if I knew the number of all technical communicators in Finland and had been able to send the questionnaire to all of them, I suspect that the ratio between Nokia and other companies would have been roughly the same: we do know that Nokia is the company that employs the highest number of technical communicators in this country. In this sense, I think the results reflect the job market situation realistically.

5.2.2 Following Research

After the first five questions asking for background information, questions 6, 7 and 8 begin a set of core questions in this study. Question 6 asks whether the subjects need research in technical communication in their work, Question 7 asks whether

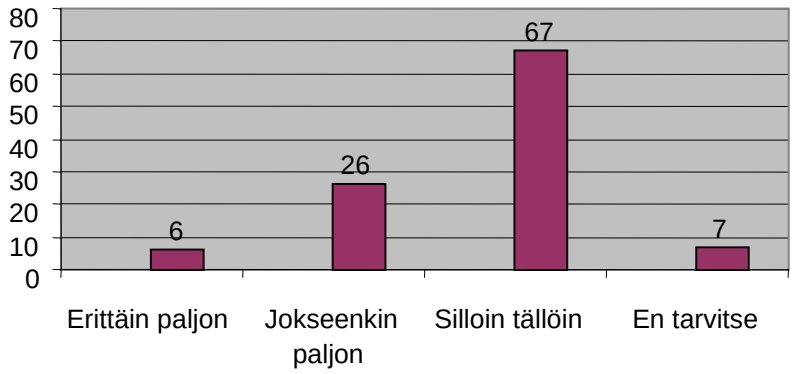
the informants, in fact, follow that research and Question 8 asks about the media through which the subjects receive information about research carried out in technical communication. In the following I will go through the answers to these questions individually.

Question 6 asks about the subjects' need for technical communication research in their work and gives a checklist with the alternatives

- Erittäin paljon (*very much*)
- Jokseenkin paljon (*a fair amount*)
- Silloin tällöin (*occasionally*)
- En tarvitse (*I do not need research*).

The hypothesis presented at the beginning of this study as well as the findings of the study by Beard et al. (1989) presented on pages 71-72 led to the expectation that the respondents would report that they need technical communication research. The following chart shows which alternatives the respondents (n=106 in the chart) selected and gives the number of responses.

Chart 1. Tarvitsen teknisen viestinnän tutkimustietoa työssäni (alan ammattilehtiä, oppaita jne.) (Question 6)



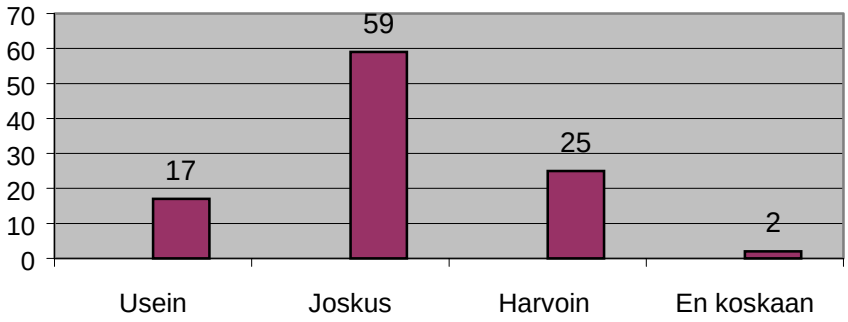
The alternatives in the middle were checked frequently, whereas few chose the extreme alternatives. The majority, 63 %, of the respondents answered that they need research occasionally, "Silloin tällöin".

Question 7 is closely related to the previous question: it asks whether the subjects follow research in technical communication. The alternatives were

- Usein (*often*)
- Joskus (*sometimes*)
- Harvoin (*rarely*)
- En koskaan (*never*).

Again the expectation was that the respondents would report that they follow research. Chart 2. presents the respondents' (n=103 in the chart) answers according to the number of responses.

Chart 2. Seuraan teknisen viestinnän tutkimusta (esim. luen artikkeleita ammattilehdistä) (Question 7)



Here we see the same type of tendency as in Question 6: the respondents typically selected the middle alternatives, although there is a little more variation. Slightly over a half (57 %) of the respondents reported that they follow research in technical communication sometimes, "Joskus". The number of respondents who reported that they follow research often was fairly high. There were three responses that could not be included in the statistics of this question, because the informants were unable to make up their mind: they had, for instance, checked two categories.

Looking at these two questions, we may infer that technical communicators are fairly active in following research carried out in technical communication, but they only occasionally use that research in their work. In other words, there is interest in research, but that does not mean that the informants need it for their work. This

takes us back to chapter 3 and Love's variables associated with high levels of research utilization. One of these factors was related to a prevailing positive attitude toward research. The interpretation of these results might be slightly stretched: the fact that the professionals are fairly active might also suggest that the overall attitudes among them are favourable toward research. Two earlier studies on technical communicators found this to be true: the study by Beard et al. (1989) reported earlier, and the study by Beard and Williams (1992), who found that practitioners value research and consult the literature to solve work problems.

The next question asked the subjects to identify the sources from which they receive information about research carried out in technical communication. Altogether 13 categories were given, in addition to which the category "Other" was provided, asking the respondents to specify what that other is. At the end of the question, I asked for examples of the alternatives that the respondent had selected. Table 8. shows the number of responses starting from the most often selected alternative.

Table 8. Saan teknisen viestinnän tutkimustietoa (Question 8)

Colleagues	74
The internet	70
Professional journals	69
Books	57
Congresses, seminars	56
In-house training	46
Continuing education	45
Societies	40
Conference proceedings	38
Scientific journals	20
The media	16
Research reports	7
Other	6
Researchers	5
Total	549

What I found surprising in the results is that colleagues and the Internet are at the very top. The respondents seem to exchange ideas about research in the workplace and use the Internet actively to search for information on technical communication. The respondents also follow research by reading professional journals and books,

and according to the results, they attend congresses and seminars quite actively, although reading conference proceedings is not as usual. In-house training and continuing education were also selected by almost a half of the respondents: the employer organizes training for the employees, and the respondents themselves attend courses offered, for example, by continuing education centres at universities. Societies operating in technical communication are also a fairly important source of research knowledge.

After the above-mentioned categories there is a clear drop in the figures: few respondents checked scientific journals, research reports and the media as sources of research. Researchers themselves are at the very bottom. The alternative "suoraan tutkijoilta" may be ambiguous, which made interpreting the results slightly difficult. I think the respondents interpreted the category to mean personal interaction with researchers: although researchers present their studies in conferences, seminars and through societies, and in this sense they act as sources of research, the results would seem to indicate that there is little interchange on a personal level between researchers and technical communicators. This is a discouraging result bearing in mind that interaction between researchers and professionals is one of the factors that influences research utilization. However, the result is not surprising if we think about the relatively low number of people in Finland who are engaged in technical communication research at the moment.

The category "Other" included the following answers:

- Documentation Researcher at the workplace sharing new information (1 respondent)
- the Technical Communications Programme (3 respondents)
- benchmarking what others are doing (1 respondent)
- email lists (1 respondent).

Next I will move on to the examples of the above categories.

In the original questionnaire form that was pilot-tested I did not ask for examples to the categories in Question 8. The pilot respondents suggested that a request for examples would be added, because they would like to find out which sources of information are used by Finnish technical communicators. Agreeing to this request

was appropriate in two senses: firstly, following the train of thought in chapter 3 about who the beneficieries of research are, there was a unique opportunity to gain information which could also be of interest to professionals. The respondents thus became involved in the research process through their suggestions.

Secondly, since one of the aims of this study is to find out more about research utilization among technical communicators, it is also appropriate to do this on a grass-root level: it is relevant to know which forums are considered important by technical communicators when they want to find out about research carried out in technical communication. The examples provide interesting information about which Finnish sources and which international sources are used.

The examples that the respondents gave after checking one or more alternatives in Question 8 were varied. In the following, I will provide the answers in the order of popularity, also including some examples of those sources that were reported only once.

The most frequently mentioned example was the Society for Technical Communication originating in the United States and its different aspects: conferences, web pages, journals, conference materials and membership letters. The second most popular example was the Internet, about which the respondents reported the following types:

- matters related to terminology
- pages of various documentation societies
- information related to tools
- pages of Finnish and foreign universities
- pages of the Finnish Centre for Technical Terminology (Tekniikan sanastokeskus)
- news and discussion groups
- the technical communication pages of the IEEE
- the Techwr-l mailing list
- Online Help mailing list
- dictionary addresses
- American pages on education
- searching with words related to the field.

The respondent (R63) who mentioned dictionary addresses also gave an extensive list of Internet addresses that were related to technical communication. The publication Technical Communication (published by the STC) was the next most popular example, followed by sources from the literature (Horton, Schriver, Marchionini, Hackos, Marcel). Next the respondents mentioned the Finnish Technical Communications Society, Intercom (also published by the STC), the Journal of Technical Writing and Communication, Tekniikka&Talous, the Technical Communications Programme, IEEE Transactions on Professional Communication, Language International, Helsingin Sanomat, Kääntäjä and Terminfo.

Here are some examples of sources that received only one mention:

- Kauppalehti
- Kielikello
- Näkymä
- Talouselämä
- Tietoviikko
- Advanced Course on HCI[23] (Tampere University)
- Document World
- Helsinki Open University
- Information Mapping course
- Institute for Extension Studies at the University of Tampere
- Journal of Computer Documentation
- LSP-symposiums
- Multilingual Computing and Technology
- Online Help Europe Conference
- SGML User Club seminars
- SGML/XML-seminars[24]
- SIGCHI Bulletin
- SigDoc's publications
- TAG
- TC Forum
- the most common HCI-magazines
- Rastori's course on technical editing.

Some of these sources presented above are targeted at technical communication professionals, such as *Näkymä* and *Intercom*, while others are more general, such as *Kauppalehti*. Some of them are also familiar from the list of publications and

[23] HCI = Human-Computer Interaction
[24] SGML = Standard Generalized Markup Language, XML = Extensible Markup Language

organizations mentioned at the end of chapter 2. The sources also reflect the observation about *research* mentioned in the introduction: the understanding of research in this context deviates slightly from its traditional sense.

At the beginning of this study, I mentioned that some of the information sources through which research is disseminated to technical communicators make use of popularization. Of course, no empirical data to support this exists, but overall, many of these sources do "try to place scientific knowledge within a new discourse" as I quoted Myers in chapter 4 (see page 80). The sources also demonstrate his notion that popularization covers a wide range of texts.

In addition to these clear references to individual societies, journals, conferences, etc., the rest of the responses can be divided into forms of in-house training and forms of interaction with colleagues. Forms of in-house training that the respondents reported were varied:

- the company's development and cooperation forums
- meetings, seminars and courses
- desktop publication courses
- courses in technical writing and marketing communications
- computer courses
- Customer Documentation Board once a month
- Documentation Researcher in the workplace
- foreign lecturers such as John Kirkman
- the company's intranet
- Nokia Global Documentation Meeting
- other documentation projects of an international conglomerate.

In other words, the workplace is an important source of information, and this source is a combination of different interaction forms.

The respondents reported the following forms of interaction with their colleagues in the workplace:

- we rotate professional magazines to which the company subscribes, and compare books that colleagues have read in meetings
- colleagues bring in magazines to read as well as conference materials from conferences they have attended
- colleagues who have attended conferences have briefings and distribute material

- a colleague finds a useful article and takes a copy for everyone
- we have discussions with colleagues about something somebody has read or heard.

In chapter 3 it was noted that sorting utilization of research from other influences is highly difficult and that we employ information gathered from various sources all the time. This is true in light of these results, too. However, I would again like to see utilization in a continuum and interpret these findings as follows: although the research that is being disseminated in the workplace comes from articles, books, conference materials, etc., colleagues act as disseminators and secondary sources of that information. And this is why colleagues were the most often selected category in Question 8. This type of dissemination and discussion is also vital if we consider the different roles that technical communicators assume as popularizers, as first commented on in the introduction.

In Huberman's collection of research utilization variables briefly addressed in chapter 3 (see page 69), interpersonal contacts also played an important role, and he gives one example: in an analysis of the use of psychotherapy research by professional psychologists, the most useful source was discussions of clinical cases with colleagues (1994: 22). Weiss' interactive model is also appropriate here: research is only one element in the search for information, which is also sought through practitioners, for example. Love's report about high-utilization factors are equally relevant: when considering the transfer mechanisms, he reports that knowledge utilization is greater when it is transmitted through personal interaction over time. The questionnaire responses also support this finding: personal interaction, colleagues, were rated at the top by the respondents as a source of knowledge.

The answers to Question 8 along with the examples paint a multi-faceted picture of research utilization among technical communicators: no respondent checked only one category, but several. The knowledge that technical communicators use in their work comes from a variety of channels and sources. Colleagues are the most important source of research, but in the background there are often written sources of information, such as journals. Thus, verbal communication seems to be an important means of processing information. Exchanging information in

conferences and through societies also works toward this aim. Overall, Weiss' enlightenment model can be applied: research finds its way into the practical setting through manifold channels.

In chapter 3, access to and retrieval of information were mentioned as being important in research utilization. An interesting detail connected to this appeared in one response: a respondent hoped that information about research would be sent direct by email or mail, after which the informant could find out more if the information seems interesting (see page 130, Example 5 a.). In this area there seems to be a need for negotiation and cooperation between universities and professionals. I wonder if Carliner's suggestion reported on page 39 about establishing intermediary publications for the dissemination of pure research would be intended for this type of dissemination.

I have now examined how technical communicators follow research and which sources they use. In the following subsection, I will look at the actual use of research that the respondents reported in the questionnaire.

5.2.3 How Research Is Used

In this subsection I will examine the answers to Question 9, which appeared to be one of the most challenging ones to both answer and analyze. Question 9 reads: "Mitä teknisen viestinnän tutkimustiedon seuraaminen on antanut sinulle?". There were four alternatives, one or more of which the respondents were asked to check:

- Siitä on ollut konkreettista käytännön hyötyä työhöni liittyvien ongelmien ratkaisussa. Anna esimerkki.
  (*It has been of concrete, practical use in solving problems related to my work. Give an example.*)
- Olen saanut siitä uusia näkökulmia työhöni. Anna esimerkki.
  (*It has given me new perspectives into my work. Give an example.*)
- Siitä on ollut muuta hyötyä, mitä?
  (*It has been of other use, what?*)
- Ei mitään
  (*Nothing*).

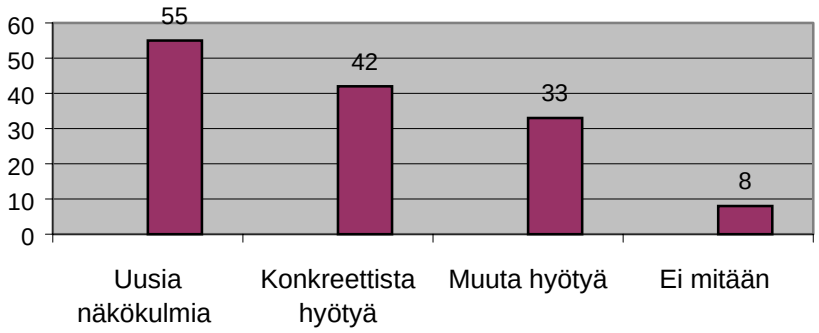
These categories were selected on the basis of the discussion in chapter 3: the use of research is a continuum, at the one end of which research offers concrete, tangible use (instrumental use), and at the other end it offers new perspectives (conceptual use). In addition to these two categories, the categories “other use” and “nothing” were included. Thus, as explained in 5.1.2., this question is a mixture of given categories and self-anchored conceptualization. The informants also had to actively consider what *tutkimustieto* could mean, although as mentioned earlier in this chapter, it was partly defined for them in the cover letter and a few other questions.

There were certain expectations for this specific question based on earlier feedback from working professionals. As mentioned earlier, one of the groups to whom the questionnaire was sent consisted of those who had participated in two continuing education courses organized by the Institute for Extension Studies and the Department of Translation Studies at the University of Tampere during 1998-1999 (Course feedback). Thirty-five participants filled in a feedback form about these courses.

The feedback was clear: the participants hoped for more concrete examples, exercises and advice that they could apply to their everyday work as technical communicators. They also wrote that there was too much theory, the relevance of which was difficult to place in practical settings. Of course, this feedback pertains specifically to these courses, but I think it suggests elements that professionals are looking for in further training and research in general.

The assumption concerning Question 9 was that the informants would primarily report using research instrumentally. In addition to the feedback just mentioned, this assumption was strenghtened by the practice-oriented history of technical communication discussed in chapter 2, and the study by Beard and Williams, who found that practitioners strongly preferred reading research that can be directly applied to their work (1992: 577). This expectation also applies to Question 12, which will be examined later in this chapter. Chart 3. presents the informants’ answers according to the number of responses (n=138).

Chart 3. Mitä teknisen viestinnän tutkimustiedon seuraaminen on antanut sinulle? (Question 9)



"Uusia näkökulmia" was checked most often. This means that research has given the respondents new perspectives for doing their work. The second most popular alternative was "konkreettista hyötyä"; in other words, the respondents have got something tangible from research, which they have used in their work. "Muuta hyötyä" was also quite a popular category, while few reported that research has given them nothing.

Thus, contrary to expectations, technical communicators first of all use research in a conceptual sense, which is only followed by instrumental utilization. However, these results and the popularity of the category "muuta hyötyä" reflect the argument presented in the introduction of this study: rapid technological development in the information society, gradual professionalization in technical communication and a lack of established routines in a collaborative work environment have created a situation where there is a manifold need for information. This information can turn into theoretical competence, which is then later reflected in the performance of technical communication professionals.

In addition to checking one or more alternatives, the respondents were asked to give examples of these. The examples were written from the questionnaire forms onto a Word file according to the code given to the respondents. The examples were then printed in order to examine them more closely. After close reading, some themes emerged from the examples. A theme in this context is formed when three or more examples can be counted as belonging under one theme. I will introduce the themes in the same order as the above results: new perspectives, concrete use,

other use and nothing. The examples will also demonstrate that distinguishing between new perspectives and concrete use was difficult for the respondents, as the same types of answers occur in both categories. This will be further discussed at the end of this subsection. The following will also provide more examples of what the technical communication knowledge being disseminated and utilized actually entails, which was addressed in chapter 2 (see pages 38-39).

New Perspectives

Seven themes emerge from the examples given in the "new perspectives" category. These are 1) the user's perspective, 2) perspectives on writing, 3) visualization, 4) similar problems, different solutions, 5) visions, 6) work profiles and 7) online help. Examples of these will be given in the following. To pinpoint some of the reasons why the examples, in my view, fall under a certain theme, underlining will be used where appropriate.

The first theme, "the user's perspective", includes the following types of examples:

> Example 1:
> a. Auttanut pohtimaan, miten loppukäyttäjän tarpeet tulisivat paremmin huomioiduksi käyttöoppaiden suunnittelussa. (R28)
> b. On selvinnyt hieman millaisille kohderyhmille dokumentaatiota tehdään ja siten myös on osannut arvoida minkätyyppistä dokumentaation tulisi olla. (R32)
> c. Käytettävyystutkimukset ovat auttaneet punnitsemaan oman työni arvoa lukijalle (dokumentin rakenne, navigoinnin suunnittelu, "selittämisen" syvyys jne.) (R84)

The respondents emphasize the user's point of view: how users use documents and how documentation can be made more user-friendly.

The second theme, "perspectives on writing", focuses on the actual writing process:

> Example 2:
> a. Uusien dokumenttien luomisessa olen saanut paljon apua erilaisten lähtökohtien arvioinnissa. On helpompaa kirjoittaa kun tietää minkä "näkökulman" on työhönsä valinnut (esim. 'task-oriented', 'minimalist'). (R15)

b. Käyttöohjeiden saama kritiikki (yleinen arvostelu alan kirjallisuudessa ja sanomalehdissä) on johtanut muutoksiin ohjeidemme sisällössä ja rakenteessa. (R39)
c. Olemme organisoineet manuaalimme uudella tavalla. Melkein kaikki kirjoittajat noudattavat samoja sääntöjä. (R78)

The respondents comment on the organization of their manuals as well as on the method of writing. They consider, for example, whether they should use the minimalist[25] approach. These results are in line with the findings of the study by Beard et al. reported in chapter 3: Finnish technical communicators also seem to have a particularly strong interest in research focusing on writing. The responses to Question 12 also revealed that many of their hopes concerning training in the field are related to writing.

The third theme, "visualization", is closely connected with the second theme, and they might be included under one theme. However, the second theme focuses on the structure and approach to writing, whereas the following examples reflect the overall visualization of a document:

Example 3:
a. Taitto- ja typografiatutkimukset. (R8)
b. Luettavuus- ja visuaalisuusseikat. (P9)
c. Miten ala yleensä suhtautuu esim. värin käyttöön teknisessä dokumentoinnissa. (R53)

Visualization refers to the appropriate use of typography, layout and colour in order to make a document more readable and user-friendly.

The fourth theme, "similar problems, different solutions", refers to work practices in the field of technical communication:

Example 4:
a. Usein huomaa, että asiat joiden kanssa pähkäilemme töissä ovat esillä muuallakin ja ympäri maailmaa. (P7)
b. Yleensä tieto siitä, että asiat voidaan tehdä monella tavalla ja silti oikein. (R23)
c. Lähinnä mielenkiinnosta seuraan 'tapahtumia', tekee hyvää huomata, että muuallakin on samanlaisia ongelmia kuin itsellä. (R80)

[25] Minimalism is a theory developed by John Carroll (e.g., 1998), where the emphasis is on users' goals and the aim is to motivate users through certain core tasks.

In other words, the problems in technical communication are similar in different parts of the world, and the respondents find it comforting to know that this is the case and that these problems can be solved in different ways.

The fifth theme, “visions”, reflects the future developments in technical communication:

> Example 5:
> a. Dokumentointiteknologiaa valitessamme päätöksentekoa auttoi visiot tulevasta. (R13)
> b. Mihin kannattaa keskittyä: online-informaatio, tulevaisuuden visiot, jatkosuunnitelmat omassa dokumentaatiossa. (R25)
> c. Auttaa suuntaamaan tulevaan, esim. sähköiseen julkaisumuotoon, lisätietoja SGML-ratkaisuista jne. (R66)

The decisions and solutions that are made today in the business of technical communication have to be visionary and carefully considered: the field advances quickly and making the right decisions can greatly affect a company’s future.

The sixth theme, “work profiles”, refers to the professional profile of a technical communicator:

> Example 6:
> a. On antanut käsityksen siitä, mitä kaikkea tämä työ voi pitää sisällään. (R18)
> b. Olen huomannut, kuinka spesifiä ja rajattua oma työni on verrattuna alan kirjojen antamaan kuvaan teknisestä kirjoittamisesta. (R54)
> c. Tek.viestinnän erikoistumisohjelman kursseilla opitut asiat auttoivat työhön orientoitumisessa. (R91)

These examples show that the respondents have analyzed their own work and compared it to the image painted in the literature on technical communication, for example.

The seventh theme, “online help”, concentrates on the production of online help systems:

> Example 7:
> a. Online Help Europe Conference antoi ajatuksia interaktiivisemman helppisysteemin luomiseksi. (R44)

b. Esimerkiksi mitä kaikkea hyvään Online Helpiin kuuluu laittaa; miten rakentaa informatiivisia message box-tekstejä. (R50)
c. Esim. online helpin kehittäminen käyttäjäystävällisemmäksi. (R56)

The respondents express concern about the quality of their online helps: are they good, interactive and reader-friendly? Examples (a) and (c) could also have been included under the theme "the user's perspective", but the focus in all of these examples is more on constructing an online help system.

In addition to these seven themes, there are a number of individual answers that do not fall under specific themes:

Example 8:
a. Konservatiivisten konventioiden kyseenalaistaminen. (P9)
b. Kontrolloitu kieli. (R36)
c. Asioiden tarkastelu korkeammalta tasolta lähtien, ei vain oma tuote vaan kaikki muu siihen liittyvä. (R16)

As these examples demonstrate, the themes are varied and very often vague.

Concrete Use

Three clear themes emerge from the examples given in the "concrete use" category. These are 1) usability and the user, 2) writing a document and 3) the documentation process. In addition to these, there are a number of individual examples which do not lend themselves to thematization. In the following, I will exemplify the three themes as well as some individual answers.

In the first theme, "usability and the user", I have included the following types of answers:

Example 1:
a. Käytettävyyden parantaminen dokumentaatiossa. (R57)
b. Käytettävyystutkimustietoa käytin taannoin yhden projektin käytettävyystestissä ja tulosten purkamisessa. (R39)
c. Käyttäjätutkimukset: raamien + ohjeistuksen määrittely. (R42)

The respondents reported that usability and user studies have, for example, helped them to carry out their own usability tests. The emphasis is on the usability of

documentation and the needs of the user. As we can see, this theme is very similar to the first theme in the "new perspectives" category; in fact, most of the answers could be integrated under one heading.

The second theme, "writing a document", includes a number of comments about the actual writing process:

> Example 2:
> a. Tekstin yksinkertaistus, substantiivitaudin välttäminen. (R16)
> b. Sisältösuunnittelu, kirjoittamisen tyyli ja selkeys. (R34)
> c. Se on tarjonnut teoriapohjaa jota vasten voi miettiä ratkaisuja vastaantuleviin ongelmiin esim. siitä, miten asiat kannattaa esittää, paljonko yksityiskohtia kannattaa sisällyttää tekstiin tai millainen rakenne olisi mitäkin tarkoitusta varten kirjoitettavassa dokumentissa paras. (R62)

The examples are concerned with two aspects of writing a technical document, namely structure and style: how to write clearly and what type of a structure is appropriate in different documents. Again, this theme is similar to the theme "perspectives on writing" in the first category.

The third theme, "the documentation process", reflects the rationalization of work processes:

> Example 3:
> a. Olen käyttänyt omien aikataulujeni suunnittelun pohjana tutkimusta, jossa käsiteltiin dokumentoinnin suunnittelun ja käytännön toteutuksen työvaiheita ja niihin keskimäärin käytettävää aikaa. (R84)
> b. Teknisen kirjoittamisen prosessin luonti. (R42)
> c. J. Ann Hackosin publications-development lifecyclen hyödyntäminen oman dokumenttiprojektin aikataulutuksessa ja suunnittelussa. (R64)

The respondents' comments deal with scheduling and planning the documentation process. Overall, managing processes is one of the core skills of technical communicators as noted in chapter 2, because communication products are typically produced within projects.

In addition to these three themes, there was a great number of examples which, in my view, do not form thematic categories:

Example 4:
a. Tietoa siitä, kuinka nopeasti käyttäjä lukee tietokoneen näytössä olevaa tekstiä. (R7)
b. Online-helppien tekoon vihjeitä. (R33)
c. Monikielisen dokumentaation tuottaminen ja siinä käytetyt ratkaisut. (P9)

The online help example (b) again demonstrates that there is overlapping between the first two categories.

Other Use

Only two themes emerge from the examples given in the category "other use": 1) keeping up with the field and 2) competence and self-reliance.

The first theme, "keeping up with the field", includes the following types of examples:

Example 1:
a. Pysyn ajan tasalla siitä, mitä alalla tapahtuu. (R31)
b. Pysyn kärryillä "maailman menosta" ja saan tietoa ajankohtaisista tapahtumista. (R77)
c. Käsitys alasta kehittyy. (RP6)

These examples reflect the fact that research acts as a source of information about developments in the field both generally and internationally, and this information contributes to an understanding of technical communication. This theme also reminds us of Sieber's list about how educators utilize knowledge mentioned in chapter 3 (see page 65): research keeps technical communicators current with what professionals in other countries are doing.

The second theme, "competence and self-reliance", is related to the respondents' professional image:

Example 2:
a. Pystyy seuraamaan alalla käytävää keskustelua. Se on auttanut syventämään kuvaa alasta opintojen jälkeen. Pystyy paremmin perustelemaan esittämiään asioita eli se on antanut lisää ammatillista "pätevyyttä" ja itsevarmuutta. (R20)
b. Ammattitaitoa luovaa. (R90)

> c. Olen saanut tietoa omaa ammatillista itsetuntoani ja toimenkuvaani varten. (R74)

Research has increased the respondents' feeling of professional competence and given them confidence in their own abilities. In other words, research carried out in technical communication can also be one of the factors that is involved in the forming of professional identity, as suggested in the introduction. Technical communicators are a relatively new group of professionals with different backgrounds, and people in general know little of what they actually do. Their collective identities are gradually evolving, and research dissemination and utilization plays a role in this process. Again there is a similarity with an item in Sieber's list (see page 65) and also with Hayhoe's arguments (see page 67): research helps technical communicators win arguments at work, and it helps increase professional value and credibility.

Some of the ideologies behind popularization addressed in section 4.1 on page 83 also seem to apply here: in their responses, the technical communicators commented that research helps them perform their duties appropriately and correctly, and ensures them that they are on the right path. Research, in other words, guides their work processes, enhances their professional status and self-assurance, thus decreasing uncertainties related to their work.

The number of individual examples given in this category was high and they were extremely varied:

> Example 3:
> a. Lohduttaa tieto siitä, että muutkin alan ammattilaiset ponnistelevat samojen ongelmien kanssa. (R19)
> b. Koulutus ja tutkimustiedon seuraaminen parantavat työmotivaatiota. (RP4)
> c. Tein yhden dokumentaation laatuasioihin liittyvän esityksen rungon Webistä löytämäni konferenssiesityksen perusteella. (R61)

As we can see, example (a) could also fall under the theme "similar problems, different solutions" in the "new perspectives" category, but the respondent chose to report it under this category. Similarly, example (c) could well belong to the

category “concrete use”, as the respondent has clearly been able to perform a concrete action with the help of a conference paper.

Nothing

Only 8 respondents reported that research has been of no use to them. Surprisingly, three respondents had also given an example to this fourth alternative:

> Example 1:
> a. Lähinnä kyse on mielenkiintoisista “uutisista” ja tiedonjyvistä, mutta varsinaista hyötyä siitä ei ole ollut. (R65)
> b. Toivon löytäväni oikeita ratkaisumalleja käytännön tilanteisiin. Mitä löydän, on akateemista pohdintaa ilman käytännön koetuloksia. (R92)
> c. En osaa sanoa mitään konkreettista, miten se olisi auttanut työssäni, mutta totta kai oman alan uusin tutkimustieto kiinnostaa ja joskus voi myös auttaa ihan käytännössäkin omassa työssä. (P11)

In example (a) the respondent admits that there is some interesting information available, but it has not really been useful. In example (b) the respondent clearly criticizes what research can offer, as suggested in section 3.2 (see page 47): the respondent hopes to find solutions to practical problems, but research has not fulfilled this need. Here we could also perhaps talk about alienation which was brought up in chapter 4. In example (c) the respondent admits that research might be useful in the work and that there is interest in it, but is unable to give a concrete answer. Here we see a typical example of how difficult pinpointing utilization can be. This answer might be described as a type of metatext from the respondent: the respondent comments that it is difficult to say anything concrete, but still gives an answer. This is perhaps also an indirect comment about the alternative categories that were given. Some other respondents had done similarly: they had grouped together, for example, “concrete use” and “new perspectives”, and given a joint answer for them. Some respondents did not check any category, but gave an example anyway (two of them had removed all the categories in the email message).

After this examination of all the examples to Question 9, we can review the original categories. Firstly, the respondents gave similar types of thematic answers in both categories “new perspectives” and “concrete use”. Secondly, some

respondents commented on the categories as described above. Clearly, distinguishing between “new perspectives”, “concrete use” and “other use” was difficult for the respondents, because no definitions for them were given in connection with the question. The respondents were left with the responsibility to determine what conceptual, instrumental, other and no use could actually mean. Although this method is widely used in utilization research, it has, in fact, been found to be problematic (Oh and Rich 1996: 17).

Instead of using a mixture of given categories and self-anchored conceptualization, perhaps a more consistent approach would have been preferable. Either the informants could have been asked to report freely about their use of research, or they could have been provided with a comprehensive list of categories accompanied by definitions. With either of these approaches, testing and interviews about utilization would have to accompany self-reported data. As mentioned before, there is no clear consensus in research utilization studies about which strategy is best. Despite the difficulties in the method used here, the responses do show that research utilization can be seen in a continuum where some points are clear, whereas others are fuzzy. The results also provide support for what Weiss and Bucuvalas noted as early as the 1970’s: the complexity of concepts such as *use* and *research* is one of the most important factors when research dissemination and utilization is studied (1977: 213-214).

The issue of reliability also arises in connection with Question 9, because of the difficulties involved in defining utilization. The categories are not standardized and researchers might not categorize in the same way. The respondents also understood the alternatives differently and there is some uncertainty in interpreting the results. (See Silverman 1993: 147-148.)

The responses demonstrate that utilization is a complicated issue. Researchers in general often assume that practitioners only want findings that can be used instrumentally, as was found by Weiss and Weiss. I also expected instrumental use to dominate, as mentioned earlier. In the study of Weiss and Weiss, social scientists and decision-makers were found to have different expectations about how the value of social science would be realized: the social scientists thought that research is

useful only when it can be used instrumentally, in other words, when it gives a clear, practical prescription for action. The decision-makers, on the other hand, gave a longer and richer list of ways to use research, including bringing new ideas to public attention, conceptualizing problems, keeping up with professional developments, finding out what is happening in other states and lobbying for new programmes. (Weiss and Weiss 1981, also Weiss 1977.) Similarly, based on the data gathered for this study, the technical communicators also see use as a rich and wide-ranging phenomenon, as the examples above demonstrated. We could perhaps talk about a visionary use of research. Professionals use technical communication research as a guide to reinforce their sense of the world and make sense of that part of it that is still unmapped or confusing (see Weiss & Bucuvalas 1977: 17).

A further finding in the same study by Weiss and Weiss was reported in chapter 3 (see pages 56-57): the two communities existed primarily in the minds of the social scientists, and the social scientists and decision-makers, in fact, evaluated research along the same lines. For example, both groups mentioned the same factors concerning the way in which research can be more useful. (Weiss and Weiss 1981: 845.) According to Weiss and Weiss, this similarity reflects the professionalization of the field of mental health: most of the decision-makers had some exposure to research and many of the social scientists knew much about mental health policy (Weiss and Weiss 1981, also Weiss 1977). The notion of professionalization can also be considered in connection with technical communication: professionalization, namely Finnish technical communicator's being trained in the field and becoming more familiar with technical communication research, is on the increase at the moment. Undoubtedly this will also have an effect on the utilization of research in the long run, and increase familiarity with research topics and methodology as suggested earlier.

The responses to Question 9 lend themselves to a further issue: the responses are self-reports of what the technical communicators find useful; it is another matter, however, what actually happens in reality. There is thus a certain problem with validity in this question. James Ciarlo (1981: 13) and Conner (1981: 70), for example, have paid attention to the truthfulness and validity of reporting, and

Weiss and Weiss even tested this aspect by using actual pieces of research, asking the respondents to read them and evaluate them according to their usefulness. The results were then compared to the self-reports (1981: 844). This issue also reflects the limitations of using surveys as a strategy when potential users are examined. As mentioned in chapter 3, these limitations include misreporting and respondents' poor memory of the research that has influenced them.

Connor calls for more studies which would have a present or current time orientation rather than a post hoc quality; in other words, utilization should be studied while it was in progress instead of after it has occurred (1981: 68-70). However, this would require a separate study of its own where complete attention would be paid to details of utilization. Despite some of the problems in this question, I do not think there is reason to doubt the accuracy or honesty of the informants' responses. The pilot study, in my view, also gave support for the reliability of the questionnaire. I will briefly return to this in chapter 6.

5.2.4 Hopes for the Future

Question 12 continues the theme of Question 9 in asking the respondents what they desire from university research and education in technical communication ("Mitä toivot teknisen viestinnän yliopistotutkimukselta ja -koulutukselta Suomessa?"). As was suggested earlier, feedback from the field can give valuable information as to what type of research and training would be relevant from the professionals' point of view. It is also important if we aim at bringing theory and practice closer together, both in terms of research, and the relationship between the research community and the world of practice.

Question 12 elicited a wide range of answers (10 respondents left the question unanswered). However, this study focuses on the utilization of research, and therefore, presenting detailed answers, for instance, about the types of courses that the informants would like to have does not fall under the scope of this study. In fact, when question 12 was selected for the questionnaire, it was hoped that it would elicit information that could be used in other contexts as well: for planning

training programmes and continuing education courses for technical communicators. The responses can also benefit students and researchers who are in the process of choosing topics for their theses and studies. The same applies here as in research utilization studies in general: it is highly important to find out and diagnose what the real needs of practitioners are (Sieber 1974: 66-67).

For the purpose of this study, the same type of a thematic approach is appropriate as in the analysis of the responses to Question 9. It suits the aim of this study and provides technical communicators with the type of information that they might find interesting. The same analysis procedure was used as in Question 9. According to my interpretation, the following themes emerge from the individual answers:

1. Pragmatic suggestions
    a. Cooperation between universities and industry (*yritysyhteistyö*)
    b. Orientation to practice (*käytännönläheisyys*)
    c. Usefulness and adaptability (*hyöty ja sovellettavuus*)
2. Visibility and publicity (*näkyvyys ja tiedotus*)
3. Keeping up to date (*ajantasaisuus*)
4. Finnish technical communication (*suomalainen tekninen viestintä*)
5. Versatility (*monipuolisuus*)
6. Technical communication research (*alan tutkimus*)
7. Contents of training (*koulutussisällöt*)

In addition to these, there were some individual answers which do not fit any of these themes, and they will be left out of the analysis. In the following, I will exemplify these themes.

1. Pragmatic suggestions

The most popular hope of the respondents can be crystallized as “pragmatic suggestions”, which I use to refer to answers that can be divided under three subthemes: (i) cooperation between universities and industry, (ii) orientation to practice, and (iii) usefulness and adaptability. The examples given in the following are extracts from the respondents’ replies.

Under the subtheme (i) cooperation between universities and enterprises, I include the following types of replies:

Example 1:
a. Tiivistä yhteistyötä alan yritysten kanssa. (R54)
b. Yrityskontaktit, jotta käytäntö ei unohtuisi. (R91)
c. Yhteistyötä alalla työskentelevien kanssa, sillä Suomessa alan osaamista löytyy vain työpaikoilta (toistaiseksi). Tekninen viestintä on nopeasti kehittyvä ala, joten ilman tätä yhteistyötä voi käydä niin, että tutkimus ja koulutus eivät vastaakaan alan tarvetta. (R27)

As the examples demonstrate, some of the answers are brief (a and b), while other respondents also argue why cooperation with companies is important, as in case (c): it argues that unless research and training keep up with the quickly developing field, they may not respond to the true needs of working life. Interestingly, the respondents in the study by Beard and Williams also saw a need for fostering joint-research relationships between industry/government and universities (1992: 579).

Under the second subtheme, (ii) orientation to practice, we find the following types of answers:

Example 2:
a. Käytännönläheisyyttä. (e.g., R7, R17, R33)
b. Konkreettisuutta, ympäripyöreät nollatutkimukset eivät hyödytä. (R55)
c. Konkreettisempaa ja maanläheisempää asennetta, kuitenkin unohtamatta teorian tärkeyttä. (R15)

These examples are self-explanatory and reflect the fact that the respondents want training and research that comes near to the practical reality of technical communication.

The subtheme (iii) usefulness and adaptability did not elicit as many answers as the two previous subthemes, but falls clearly under pragmatic suggestions, as the following examples demonstrate:

Example 3:
a. Hyötyä. (R78)
b. Tuloksia, joista on konkreettista hyötyä työssäni, käytännön esimerkkejä. (R8)
c. Käytännön sovelluksia, yhteistyötä yritysmaailman ja teknisten oppiaineiden kanssa. (R77)

As we can see from case (c), the theme of university–enterprise cooperation is also mentioned, and thus, it might have also been included under the first subtheme. This also reflects the difficulty of interpretation. But for the purpose of this thematic analysis, we can also accept grey areas between the themes or subthemes, especially when these grey areas may be interpreted to support two other subthemes.

Although based on the answers to Question 9, utilization is seen as a wide-ranging phenomenon among professionals, the above hopes that the informants expressed suggest a more concrete, instrumental attitude: professionals want concrete examples and applications from universities in training and research. I think there is one main reason for this: Question 12 dealt with both training and research, whereas Question 9 only asked about research. Many responses to Question 12 contained suggestions for training, and it is natural that technical communicators would like something tangible that can help them with their work. Here we also see the traditional practice-orientation of technical communication.

The “pragmatic suggestions” theme also concerns a broader issue: research is found to be most useful when it deals with a topic of relevance to the professionals and when it is oriented to action. These were two of Love’s variables related to high levels of research utilization reported in chapter 3. In their study of social scientists and decision-makers, Weiss and Weiss also found that both groups thought that research was most useful when it deals with a topic of particular relevance to decision-makers (1981, also Weiss 1977).

It is quite natural that the relevance of a piece of research is an important factor in research dissemination and utilization. Sieber calls relevance “the basic prerequisite for ultimate use of information”. However, the entire concept is a multifaceted one: for instance, relevance can mean applicability to a particular need or problem, feasibility of implementation, or acceptance under local conditions. (Sieber 1981: 128.) Therefore, it is not enough only to know whether a study or topic is relevant; it is also important to specify what professionals themselves mean by relevance in their unique situations. In this case it would seem that applicability to a particular need or problem would be at the top of the professionals’ list.

2. Visibility and publicity

The second theme has two parts, which represent two sides of the coin: visibility of technical communication as a field which can be achieved by raising its profile, and informing about it. Examples of visibility and profile are:

> Example 4:
> a. Aiempaa enemmän julkista näkyvyyttä (ehkä myös muissa kuin alan julkaisuissa, päivittäislehdet, TV yms. hyviä) → alan yleinen arvostus ja tieto asioiden tärkeydestä lisääntyisi. (R39)
> b. Tutkimuksella olisi hyvä pyrkiä myös kohottamaan teknisen viestinnän profiilia ja tunnettavuutta. (R35)
> c. Ammattikunnan profiilin nostoa, ts. tekninen viestintä on oma alansa eikä jotain semmoista, mitä kuka tahansa tekee (pienellä palkalla) ennen siirtymistä haastavampiin tehtäviin. (R48)

From these examples we can see that visibility is connected with the esteem of the profession: by raising the profile of technical communication, it is hoped that the regard for these language and communication professionals will also increase.

Publicity was the second part of this theme, referring to informing about technical communication:

> Example 5:
> a. Henkilökohtaisesti toivoisin, että tutkimuksista tulisi tietoa esim. meilitse tai postitse, ja sitten tarvittaessa voisin itse kysellä syvällisemmän tiedon perään. (R58)
> b. Tutkimuksesta tiedottaminen ja artikkelit alan lehdissä. (R91)
> c. Liike-elämää, yrityksiä liki tulevaa tiedotusta. (R78)

The examples refer to two types of dissemination: firstly, to dissemination of knowledge to professionals, and secondly, to dissemination of knowledge to society in general. Overall, it is hoped that technical communication would have more visibility both professionally and on a higher social level, and the key to this visibility is the dissemination of knowledge. Thus, there is a need for popularization.

3. Keeping up to date

Technical communication is a rapidly growing and changing field. Therefore, it was not surprising that the respondents hoped research and training would keep up

to date with the latest developments in new tools, for example. The respondents also hoped for a general survey of what the situation with research and training is in Finland. This also demonstrates the need for further studies about Finnish technical communication.

4. Finnish technical communication

Technical communication in Finland seems to revolve around the English language; in other words, the majority of technical communicators write technical documentation in a foreign language, which was discussed in chapter 2. It was thus a pleasant surprise to find examples to Question 12 which spoke for Finnish technical communication, both in terms of language and geography:

> Example 6:
> a. Suomenkielisen teknisen viestinnän määrittelyä ja tutkimusta; tätä tietoa olisin tarvinnut tutkielmaa tehdessä. Kaikki tekninen viestintä ei tapahdu Suomessa englanniksi! Teknistä viestintää käsittelevää kirjallisuutta, joissa Suomessa käytettävät työkalut ja metodit on otettu huomioon. (P5)
> b. Suomen erityisolosuhteiden huomioiminen (dokumentoijat kirjoittavat enimmäkseen vieraalla kielellä, englanniksi). (P9)
> c. Tutkimuksen osalta odottaisin kokonaiskuvaa alan kehityksestä Suomessa, tietoja kirjoittajien palkkauksesta jne. (R59)

As was also mentioned earlier in this chapter, there is clearly a demand for information about the field, its development and professionals in Finland (a and c) as well as about the Finnish language within technical communication (a). Case (b) also notes writing in a foreign language, which could be one of the contributions of Finnish technical communication research, as suggested earlier.

5. Versatility

The respondents hoped that research and training in technical communication in Finland would be versatile and wide-ranging: combining various disciplines and the views of different companies, and providing the kinds of skills that enable one to choose different careers and tasks. The respondents seem to agree with Hayhoe's remark presented on page 67 that research can help technical communicators to respond to new challenges and tasks.

6. Technical communication research

Many of the hopes referred to above are general, thematic hopes that have to do both with research and training. In addition to them, separate themes can be found for research and training (themes 6 and 7). The respondents expressed the following types of specific hopes or observations concerning research in technical communication:

- it should be multidisciplinary (cooperation with psychology and technology, for example)
- concepts and the entire field should be defined
- know-how and discussion should have a stronger theoretical base
- research should aim at improving the quality of technical documentation and creating general standards
- there should be more research overall and it should be encouraged.

Some of these factors were commented on in chapter 2 as being areas where more surveys and research are needed, especially in Finland. This feedback also suggests that the attitude toward research is positive among professionals, which is an important variable in research utilization, as suggested earlier.

7. Contents of training

The largest portion of the answers to Question 12 dealt with training in technical communication. The respondents presented detailed hopes about what kind of basic and further education and courses they hoped universities would organize. As stated above, examining them here is not relevant; it suffices to say that the hopes concerned both communicative skills and technical / technological know-how.

6 In Conclusion

> An instruction accompanying a handbook for a gentlemen's club: in order to save room in your briefcase, you can throw away the old handbook and replace it with this new one. – HS, 23 July 1998

This study has been a first step to learning more about technical communicators as a fairly new, growing group of professionals in Finland. It has focused on how they relate to and use research carried out in technical communication. This study began with a set of questions, some of which have been answered, but it has also raised a few more.

As in user studies in general, this study has revealed a number of characteristics about Finnish technical communicators, who have not been studied in detail before. Finnish technical communicators are typically women in their thirties, and they have a variety of job titles, which also suggests that the tasks they perform are varied. They have mainly been trained in the humanities, and the majority has five or fewer years of experience in working in the field. In other words, we are dealing with young professionals, and long work histories are rare at present.

These results reflect the short tradition of training and research in technical communication in Finland. The background in the humanities, in turn, demonstrates the unique multilingual and multicultural element in Finnish technical communication: many technical communicators write in a non-native language, and in the increasingly globalizing world, audiences for whom they write are becoming more and more international. It is important for these professionals to be able to place themselves in the position of a target audience, whose knowledge, language and cultural background may vary.

Carrying out research in technical communication is rare among technical communicators themselves, but they follow research fairly actively. The high number of responses and the results suggest that there is a fairly high degree of interest in and receptivity to technical communication research, and that

professionals want to contribute to developing the field as a whole. The results overall indicate a positive attitude toward research.

In the introduction, I gave some reasons why I expected technical communicators to utilize research. These included rapid technological development in a collaborative work environment, professionalization and a lack of established routines. These factors were expected to create a need for information, which can help technical communicators cope in this environment. The information, the source of which can be research, can also act as an element in building professional identity and recognition. During the research process, additional reasons arose as to why technical communicators could be expected to utilize research: we are dealing with eager, young professionals and a field where long careers are rare. Based on the data gathered in this study, the expectation was supported: the technical communicators reported using research in their work occasionally.

Considering technical communication as a multidisciplinary "studies" area in the context of research utilization, the field seems to have a pragmatist research tradition, which indicates that the level of utilization of research is high. The findings of this study also point at some of the high-utilization factors reported by Love, namely relevance, action orientation and a positive attitude toward scientific research. Based on the self-reports of the respondents, there is naturally little basis for concluding whether utilization overall is high or low in the absence of comparative data, but this is a good starting point. We need more empirical data about the variables involved in research utilization in this field to be able to draw more solid conclusions.

As Hayhoe noted, knowledge of research concerning one's own field is important for meeting new challenges, but also for the value and professional credibility of technical communicators. This was also reported by the respondents. As in any relatively new profession, technical communicators are struggling with their professional identity and the image that prevails concerning their role, knowledge and skills both within organizations and more widely in society. Furthermore, knowledge about technical communication research can be an incentive for

technical communicators themselves to conduct research, which increases the probability of utilization in general, as was mentioned in chapter 3.

The results about research utilization among technical communicators are also connected with the different roles that technical communicators assume as popularizers. They popularize for clients, colleagues and the public, as well as for various target groups who need technical documents. It is important that technical communicators are active in following research and in using it in their work, because research can provide a good arsenal for this.

Colleagues and the Internet are the main sources from which technical communicators get information about the field. Interpersonal contacts seem to play a major role in research dissemination and utilization in this case. Professional journals, books, congresses and seminars, as well as different forms of further training, are also important means for keeping up with recent research. Further training emerges as a major theme from this study: there is need for more training in general and, what is more important, there is need for competent educators who know the special needs of technical communicators. However, the cycle from practice to theory and vice versa has not yet emerged in Finland. The universities and professionals can work together to develop this cycle, along with their professional society.

Determining and analyzing the actual nature of research utilization proved to be problematic in this study, because of the conceptual complexity of utilization as well as the reliability and the validity of the categories. However, based on the strategy used in this study, technical communicators seem to view utilization of research as a rich phenomenon: in addition to instrumental use and conceptual use, other types of use were reported by the respondents: they reported, for example, that research helps them keep up with recent developments in the field. As noted in chapter 3, we can talk about a visionary use of research.

Thus, the expectation concerning the type of utilization that the respondents would report was not supported; in other words, technical communicators do not use research primarily in an instrumental fashion. Looking at the results concerning

utilization as a whole, we can go back to Weiss' models of research utilization. Three of them seem to apply to the responses in this study.

Firstly, the enlightenment model comes out most clearly: concepts and ideas from technical communication permeate to the practical setting through manifold channels, such as professional journals and conferences.

Secondly, the interactive model, where research is only one part of an interactive search for knowledge, was clearly visible in the responses: information is also sought through other practitioners and interest groups. Research is only one part of a process that also uses experience, for example.

And thirdly, the responses reflect the problem-solving model: the findings of a study have provided a solution to a pending problem. Considering these three models, Weiss' notion of a "knowledge creep" is especially appropriate.

Of course, it must be borne in mind that the responses are self-reports and the next step would be to verify whether or not utilization actually happens in the way that the informants reported. However, as noted in chapter 5, despite some of the problems in the questionnaire, I do not think there is reason to doubt the accuracy or honesty of the informants' responses.

Overall, the selected approaches and strategies from the research utilization field provided fruitful tools for examining how technical communicators use research in their work. I think one reason lies in the nature of research utilization: there is no general theory, but different perspectives and approaches. Therefore, the tools offered by the field seem to apply particularly well to a multidisciplinary work such as this.

In the introduction I stated having two target groups in mind while writing this study: professionals and the research community. In retrospect, I would like to suggest that this thesis has brought some new information to both groups. This study has provided preliminary information about the background of Finnish technical communicators, which I hope has responded to a real need and interest

among professionals. Hopefully, this information generates discussion, and perhaps even contributes to building and reinforcing the image, value and identity of Finnish technical communicators. However, one survey of this type will not be sufficient in the long run: I agree with Beard et al. who note that the entire profession could benefit if surveys of practitioners were done periodically (1989: 193).

In the research community and especially in translation studies, on the other hand, I suspect this study will be considered an oddity at present. In my view, the main general contribution of this work is that it has introduced the field of technical communication to the research community on a wide scope. This has been a challenging task in itself. Another major challenge in the actual research process has been the multidisciplinary nature of this study. Both of these challenges have required an approach that starts from central concepts and their definitions, as mentioned in the introduction.

Since there is much in Finnish technical communication that is uncharted, topics for further study seem endless. Some suggestions came from the informants themselves during the research process. Based on this initial work, it would be interesting to make a cooperative survey together with practising technical communicators about different aspects of the profession, which would comprise a similar survey strategy as in this study but with a more wide-ranging approach. The historical development of technical communication in Finland and its role in the information society would be another challenge for future research. With regard to research utilization, this study only scratched the surface and raised more questions than it was able to answer, both concerning material and methods.

To develop the Finnish technical communication scene holistically, interaction between researchers and professionals is needed, which is also an important variable in research utilization. At the pilot stage of this study, a dialogue was opened with practising professionals, and in my experience, this type of cooperation is worthwhile exploring to a greater extent in the future. In cooperative projects, the needs of professionals and aims of researchers could interact in more ways than they have done in this study. If technical communication achieves a

more established position in Finland in the future, which I sincerely hope will occur, one of the main considerations should be to build bridges between theory and practice.

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Appendix 1

30.7.1999

Hyvä vastaanottaja

Teen lisensiaatintyötäni Tampereen yliopiston käännöstieteen laitoksessa. Aiheeni käsittelee tutkimustiedon välittymistä teknisen viestinnän alalla. Olen kiinnostunut erityisesti siitä, hyödyntävätkö teknisen viestinnän ammattilaiset työssään tutkimustietoa. Tutkimustieto voi olla peräisin esimerkiksi ammattilehdistä, erilaisista dokumentointi- ja kirjoitusoppaista, konferenssijulkaisuista tai koulutustilaisuuksista.

Tutkimukseni tavoitteena on kartoittaa teknisten kirjoittajien (dokumentoijien jne.) ammattikuntaa Suomessa ja saada lisää tietoa siitä, miten teknisen viestinnän tutkimusta ja koulutusta voitaisiin maassamme kehittää. Työni liittyy vuoden mittaiseen Tekesin rahoittamaan projektiin "Ihminen, kone ja tekninen viestintä" (http://www.uta.fi/~trtysu).

Lähetän ohessa kyselyn, johon toivon Sinun vastaavan. Panostuksesi on ensiarvoisen tärkeää niin työlleni kuin teknisen viestinnän tutkimukselle Suomessa yleensä. Vastaukset käsitellään luottamuksellisesti. Tutkimus valmistuu keväällä 2000 ja tuloksista tiedotetaan mm. Tekes-projektin elokuussa valmistuvilla kotisivuilla, joilla raportoidaan myös muista projektin töistä.

Toivon että lähetät vastauksesi oheisessa palautuskuoressa 18.8.1999 mennessä.

Ystävällisin terveisin,

Tytti Suojanen

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Tampereen yliopisto
Käännöstieteen laitos
PL 607
33101 Tampereen yliopisto

1. Sukupuoli

- ❑ Mies
- ❑ Nainen

2. Ikä

- ❑ 20-29
- ❑ 30-39
- ❑ 40-49
- ❑ 50-59
- ❑ 60-

3. Ammattinimike

- ❑ Tekninen kirjoittaja
- ❑ Tekninen dokumentoija
- ❑ Dokumentointispesialisti
- ❑ Projektipäällikkö
- ❑ Lokalisoija
- ❑ Muu, mikä? _____

4. Koulutus

- ❑ Humanistinen koulutus, tutkinto? _____
- ❑ Tekninen koulutus, tutkinto? _____
- ❑ Muu, mikä?_____

5. Olen toiminut dokumentointitehtävissä teknisen viestinnän alalla

- ❑ 1 vuoden tai vähemmän
- ❑ 1-3 vuotta
- ❑ 3-5 vuotta
- ❑ 5-10 vuotta
- ❑ 10-20 vuotta
- ❑ 20 vuotta tai enemmän

6. Tarvitsen teknisen viestinnän tutkimustietoa työssäni (alan ammattilehtiä, oppaita jne.)

- ❑ Erittäin paljon
- ❑ Jokseenkin paljon
- ❑ Silloin tällöin
- ❑ En tarvitse

7. Seuraan teknisen viestinnän tutkimusta (esim. luen artikkeleita ammattilehdistä)

- ❑ Usein
- ❑ Joskus
- ❑ Harvoin
- ❑ En koskaan

8. Saan teknisen viestinnän tutkimustietoa

- ❑ työtovereilta ja kollegoilta
- ❑ työpaikan koulutustilaisuuksissa
- ❑ työpaikan ulkopuolisissa koulutustilaisuuksissa (esim. täydennyskoulutus)
- ❑ kongresseissa, seminaareissa ja kokouksissa
- ❑ suoraan tutkijoilta
- ❑ ammattilehdistä
- ❑ tieteellisistä aikakauslehdistä
- ❑ alan kirjoista
- ❑ tutkimusraporteista
- ❑ konferenssijulkaisuista
- ❑ sanomalehdistä, tv:stä, radiosta
- ❑ internetistä
- ❑ alan yhdistysten kautta
- ❑ muualta, mistä? _____

Anna esimerkkejä:_____

_____

_____

9. Mitä teknisen viestinnän tutkimustiedon seuraaminen on antanut sinulle?

- ❑ Siitä on ollut konkreettista käytännön hyötyä työhöni liittyvien ongelmien ratkaisussa. Anna esimerkki.

- ❑ Olen saanut siitä uusia näkökulmia työhöni. Anna esimerkki.

- ❑ Siitä on ollut muuta hyötyä, mitä?

- ❑ Ei mitään.

10. Olen itse tehnyt tieteellistä tutkimusta teknisen viestinnän alalla (seminaarityöt, tutkielmat jne.)

- ❑ Kyllä
- ❑ En

Jos vastasit edelliseen kysymykseen Kyllä, vastaa myös seuraavaan kysymykseen; mikäli vastasit Ei, siirry kysymykseen 12.

11. Olen julkaissut tai esitellyt tutkimustani teknisen viestinnän foorumeilla

- ❑ Kyllä
- ❑ En

12. Mitä toivot teknisen viestinnän yliopistotutkimukselta ja -koulutukselta Suomessa?

_____

_____

_____

_____

_____

13. Missä yrityksessä työskentelet?

_____

Kiitos vaivannäöstäsi!

1. Sukupuoli

- ☐ Mies
- ☒ Nainen

2. Ikä

- ☒ 20-29
- ☐ 30-39
- ☐ 40-49
- ☐ 50-59
- ☐ 60-

3. Ammattinimike

- ☐ Tekninen kirjoittaja
- ☐ Tekninen dokumentoija
- ☐ Dokumentointispesialisti
- ☐ Projektipäällikkö
- ☐ Lokalisoija
- ☒ Muu, mikä? System Specialist

4. Koulutus

- ☒ Humanistinen koulutus, tutkinto? Filosofian maisteri
- ☐ Tekninen koulutus, tutkinto? _____
- ☐ Muu, mikä? _____

5. Olen toiminut dokumentointitehtävissä teknisen viestinnän alalla

- ☐ 1 vuoden tai vähemmän
- ☒ 1-3 vuotta
- ☐ 3-5 vuotta
- ☐ 5-10 vuotta
- ☐ 10-20 vuotta
- ☐ 20 vuotta tai enemmän

6. Tarvitsen teknisen viestinnän tutkimustietoa työssäni (alan ammattilehtiä, oppaita jne.)

- ☐ Erittäin paljon
- ☒ Jokseenkin paljon
- ☐ Silloin tällöin
- ☐ En tarvitse

7. Seuraan teknisen viestinnän tutkimusta (esim. luen artikkeleita ammattilehdistä)

- ☐ Usein
- ☒ Joskus
- ☒ Harvoin
- ☐ En koskaan

8. Saan teknisen viestinnän tutkimustietoa

- ☒ työtovereilta ja kollegoilta
- ☒ työpaikan koulutustilaisuuksissa
- ☒ työpaikan ulkopuolisissa koulutustilaisuuksissa (esim. täydennyskoulutus)
- ☐ kongresseissa, seminaareissa ja kokouksissa
- ☐ suoraan tutkijoilta
- ☒ ammattilehdistä
- ☐ tieteellisistä aikakauslehdistä
- ☒ alan kirjoista
- ☒ tutkimusraporteista
- ☒ konferenssijulkaisuista
- ☐ sanomalehdistä, tv:stä, radiosta
- ☒ internetistä
- ☒ alan yhdistysten kautta
- ☐ muualta, mistä? _____

Anna esimerkkejä: STC:n julkaisu 'Technical Communication', mm. STC:n järjestämien konferenssien materiaalit, työpaikalla asiaan perehtyneet kollegat, dokumentoinnin työpaikan järjestämät kokoukset, työryhmät ja koulutukset. Internetistä erilaisilta nettisivuilta, mm. STC:n sivuilta.

9. Mitä teknisen viestinnän tutkimustiedon seuraaminen on antanut sinulle?

- ☐ Siitä on ollut konkreettista käytännön hyötyä työhöni liittyvien ongelmien ratkaisussa. Anna esimerkki.

- ☒ Olen saanut siitä uusia näkökulmia työhöni. Anna esimerkki.
  Uusien dokumenttien luomisessa olen saanut paljon apua erilaisten lähtökohtien arvioinnista. On helpompaa kirjoittaa kun tietää minkä "näkökulman" on työhönsä valinnut (esim. 'task-oriented', 'minimalist').

- ☐ Siitä on ollut muuta hyötyä, mitä?

- ☐ Ei mitään.

10. Olen itse tehnyt tieteellistä tutkimusta teknisen viestinnän alalla (seminaarityöt, tutkielmat jne.)

- ☒ Kyllä
- ☐ En

Jos vastasit edelliseen kysymykseen Kyllä, vastaa myös seuraavaan kysymykseen; mikäli vastasit Ei, siirry kysymykseen 12.

11. Olen julkaissut tai esitellyt tutkimustani teknisen viestinnän foorumeilla

- ☐ Kyllä
- ☒ En

12. Mitä toivot teknisen viestinnän yliopistotutkimukselta ja -koulutukselta Suomessa?

Konkreettisempaa ja maanläheisempää asennetta, kuitenkin unohtamatta teorian tärkeyttä. Vaikka kaipaan konkreettisia ohjeruoria, toivon niiden pohjautuvan suurempaan, kattavampaan teoriaan. "Mutu"-oppaita on muutenkin liikaa; ohjeiden/tulee nojata teoriaan ja pyrkiä konkretiaan. /koulutuksen

13. Missä yrityksessä työskentelet?

Nokia Telecommunications

Kiitos vaivannäöstäsi!