Tarja Tiainen

Information System Specialist Predispositions

ACADEMIC DISSERTATION

To be presented, with the permission of the Faculty of Information Sciences of the University of Tampere, for public discussion in the Auditorium I of the University on March 8th, 2002, at 13 noon.

DEPARTMENT OF COMPUTER AND INFORMATION SCIENCES
UNIVERSITY OF TAMPERE

A-2002-1

TAMPERE 2002

Supervisor: Professor Pertti Järvinen
Department of Computer and Information Sciences,
University of Tampere

Opponent: Professor Kari Kuutti
Department of Information Processing
University of Oulu, Finland

Reviewers: Professor Andrew Clement
Department of Information Studies
University of Toronto, Canada

Doctor Christina Mörtberg
Division of Gender and Technology
Luleå University of Technology, Sweden

Department of Computer and Information Sciences
FIN-33014 UNIVERSITY OF TAMPERE
Finland

Electronic dissertation
Acta Electronica Universitatis Tamperensis 163
ISBN 951-44-5310-7
ISSN 1456-954X
http://acta.uta.fi

ISBN 951-44-5298-4
ISSN 1457-2060

Tampereen yliopistopaino Oy
Tampere 2002

Tiainen, Tarja (2002), **Information System Specialist Predispositions**
Department of Computer and Information Sciences, University of Tampere, Finland.

Abstract

This dissertation discusses predispositions on two levels: First, three main types of predispositions are outlined and discussed on a broad level. Second, predispositions among information system (IS) specialists, in particular, are made explicit and some dominant types are clarified. Predispositions are unquestionable assumptions, beliefs that are taken for granted, common sense and normal ways of behaviour. The central theme on which this dissertation concentrates is IS specialists' predispositions. IS specialists are persons who design, create and mediate IS and ICT (information and communication technology) and so influence the working environment of others in significant ways.

IS development is group activity in which people from several occupational groups work together - IS specialists comprise one of those groups. IS specialists not only work with other occupational groups in IS development; some of them work with users in their everyday IS use; for example, when users encounter problems in using an IS or ICT. There are challenges in multi-occupational groups working together, as several studies confirm. Predispositions have effects on group activity; it is easier to work with people who share the same predispositions. Predispositions have effects on what problems are noticed and on what possible development paths are identified. Furthermore, predispositions influence which issues can be negotiated and the negotiation process, i.e., determining which arguments are relevant.

In this dissertation IS specialists' predispositions are studied by using an interpretative approach applied to two text sets. Both text sets have been produced by IS specialists and their topic was envisioning the future. The first text set includes 31 essays, which were written by computing pioneers, industry observers, and technical leaders in the IS and ICT fields. The essays were published in the *Communications of the ACM* in 1997. The second text set consists of 24 interviews of Finnish IS specialists. They describe their visions of the future from several perspectives. The analysis of the text sets focuses on cultural aspects by using discourse analysis.

The text sets portray the future from a technology-centred perspective; for example, technology is presented as the most important - or even the only - driving force of development. Furthermore, the text sets include a masculine world view, in which women are presented as problems. In any case, the text sets portray a one-sided view of people. They do not wholly ignore people but their view of people is reductionist, underrating people's knowledge and possibilities. The results not only describe the individuals' predispositions but also the predispositions of the community of IS specialists and the IS field, as well.

Keywords: information system, technology shaping, views of technology, technology-centricity, future visions, predisposition, IS specialists, computing professionals, masculinity, gender studies, interpretive IS research

Acknowledgements

The process of preparing this dissertation has been a long journey for me. I have gone a long distance, since I took several detours through other disciplines. The journey has been long also because the steps of the process have taken a long time. During this journey I have met several people who have helped me and tried to guide me in the right direction. I am grateful to all of them. Some of them I have to mention by name.

I started to study computer science at the University of Tampere in the early 1980s and soon thereafter I started to work at the department. Already at that time Prof. Pertti Järvinen had faith in me and encouraged me to continue my studies. Later he became the official supervisor for my doctoral dissertation. There are three reasons why I want to thank Pertti. First, he patiently read and commented on dozens of versions of my texts. He tried to guide me towards orthodox or at least more common styles of scientific writing without destroying my original ideas. Second, Pertti's post-graduate IS seminar gave me a good basis for studying in the IS field. In the seminar we became familiar with the remarkable researchers and research questions of mainstream IS studies and we learned how IS studies are done, can be done and should be done.

The third reason I want to thank Pertti is that he understands the important role of community for developing from a novice to a capable researcher. Pertti's seminar group shapes a local community of IS post-graduate students and critical IS practitioners. In addition, Pertti led me to the international community of IS researchers by inviting foreign IS researchers to visit Tampere and helping me to participate in international summer schools and conferences.

The most important IS conferences in which I have participated are the ICIS and the IRIS. Particularly significant for me was the ICIS Doctoral Consortium in Helsinki in 1998. There I had interesting discussions with IS professors and post-graduate students. The working group in which I participated, was led by Prof. Izac Benbasat from Vancouver, Canada, and Prof. Sirkka Jarvenpaa from Austin, Texas, USA. I want to thank them for their positive and encouraging attitude towards us, novice researchers. From among the group members I have kept contact with Dr Roman Wong, Florida, USA, who has helped me to put my maverick ideas into the framework of IS studies. The other IS conference that I want to highlight here is IRIS. I have been in the IRIS several times. The IRIS is not only a conference for mainstream IS studies but there is also space for alternative IS studies. The IRIS is a splendid situation in which to present first draft of research papers and to get support from other researchers - both post-graduate students and professors.

One of the foreign IS researchers Pertti Järvinen invited to visit Tampere Dr Andrew Basden from Salford, UK. Later, in the summer of 1999, I visited the University of

Salford for three months and we wrote a paper together, which was a useful lesson in how to write a scientific paper. Also Andrew commented on my dissertation manuscript. I would like to thank him for his useful comments and for the particularly nice way in which he gives critique.

During the entire dissertation process I was connected to the Department of Computer and Information Sciences of the University of Tampere. It gave me the physical place to with this dissertation – an office and a computer – but also there was space to study the IS field critically and against the mainstream of IS studies. I want to thank the whole staff of the department. Especially Tuula Moisio, Marja Liisa Nurmi, Marko Junkkari, and Juhani Paavilainen have made my everyday life nicer. Furthermore, I must mention Dr Seppo Visala, the formed director of the department. He did everything he could to create a good working atmosphere.

Whereas Pertti Järvinen and the Department of Computer and information sciences represent the mainstream of IS studies, Prof. Marja Vehviläinen guided me to see alternative views on the IS field. Marja studies the IS field from gender and cultural perspectives. Also, Marja helped me when I faced dead ends in the analysis of the empirical material and she commented on my drafts and papers. Furthermore, she helped me to find useful national and international contacts. For example, Marja arranged for me to participate in some events of the Nordic research network, Information Technology, Transnational Democracy and Gender. In them I had a chance to participate in stimulating discussions with several researchers. I have continued the discussions with some of them; for example, with Dr Christina Mörtberg from Luleå, Sweden; Pirjo Elovaara from Ronneby, Sweden; and Sari Tuuva and Johanna Uotinen from Joensuu.

It was also due to Marja that I got a relationship to the Work Research Centre at the University of Tampere. I have been a member of the Mobile Boundaries of the Information Society project for the last five years. This is a multidisciplinary project, financed by the Academy of Finland. It gave me an alternative context that helped me to see the limits of the IS field. I want to thank the project leader, Dr Tuula Heiskanen, and the project members, Riikka Kivimäki, Dr Sirpa Kolehmainen, Dr Päivi Korvajärvi, Dr Riitta Kuusinen, Dr Riitta Lavikka, and Dr Marja Vehviläinen for instructive discussions about the information society, gender structures, expertise and ICT in work. In addition, Tuula Heiskanen gave me personal guidance for finding the most interesting points in my empirical material and for presenting them in a comprehensible way. Moreover, the project invited Prof. John Law from Lancaster, UK, and Dr Jeff Hearn from Helsinki to participate in our seminar. I am grateful on them for their comments to my manuscripts.

The Mobile Boundaries of the Information Society project also supported other kinds of assistance in my research. Hanna Mari Ahvenjärvi and Eveliina Vuolli (at that time: Keskipoikela) worked as my research assistants. Joan Löfgren helped me to make my English more readable. Besides Joan, Paula Autio and Marjukka Virkajärvi checked the language of some manuscripts and separate papers. Actually, Joan, Paula and Marjukka have taught me how to write in English. I want to say to all of them: Thank you for helping me.

A considerable part of this dissertation is based on the analysis of interviews with IS specialists. I am grateful to those IS specialists who let me come to interview them. They presented to me many new ideas in the interesting discussions that I had with them. Since they are anonymous in this dissertation, I cannot thank them by name.

I find that the dissertation process is as a good period of life in which it is allowed to use time for reading and thinking. I have been lucky and I could share this time with my friends who are in the same position, like Hannakaisa Isomäki from the University of Jyväskylä and Leena-Maija Laurén from the Turku School of Economics and Business Administration. With them I have shared my sorrow and pleasure in work and private life. I do not often meet with Hannakaisa and Leena-Maija, but luckily, we have e-mail. It is the medium I use to keep in touch with most of my friends. Finally, Karin Filander's doctoral dissertation and Pirjo Elovaara's licentiate dissertation gave me the inspiration to complete my own dissertation.

Dr Christina Mörtberg from the Luleå University of Technology, Sweden, and Prof. Andrew Clement from the University of Toronto, Canada, were the external reviewers of this dissertation. I am grateful for their careful reading and their critique that forced me to rewrite the manuscript, since this process improved my text considerably.

For financing my research, I want to thank the Academy of Finland, the Tampere Graduate School in Information Science and Engineering (TISE), and the Work Research Centre and the Department of Information and Computer Sciences of the University of Tampere.

A great help to me in managing this long dissertation process has been my hobby, karate. It has kept my body in condition and, even more important, it has given me a break by taking my thoughts away from the dissertation project. I want to thank all my karate mates at Zenshindojo, especially my training partner, Pilvi Karjalainen, and my first sensei, Tommi Kutilainen.

Finally, I want to thank my family. My father, Aaro Koivunen, has always been proud of my choice of technology as my field. My mother, Mirja Koivunen (née Tiainen), has always been a fine example of a caring mother and independent decision-maker. My sister, Kristiina Koivunen, wrote her doctoral dissertation at the same as I, so we have discussed our studies a lot. My other sisters, Terhi Toivonen and Emma-Reetta Koivunen, live in different circumstances and we have had different things to share. My children, Joonatan, Aurora and Jutta-Noora Kuosa, have been my pleasure. Their thought-models differ from mine and it is so good to face alternatives. In addition, they have been very patient with an absent-minded mother – which I have been every now and then during this dissertation process.

Tarja Tiainen

Tampere, January 2002

CONTENTS

PART I

1. Introduction **1**

2. The Central Concepts **6**
2.1. Introduction 6
2.2. Predispositions 6
2.3. IS Studies 7
2.3.1. The Areas of IS Studies 8
2.3.2. The Features of IS Research 12
2.4. IS Specialists 14
2.4.1. Defining the Concept of IS Specialist 15
2.4.2. Studies of IS Specialists 17
2.5. Studies about Predispositions in the IS Field 20
2.5.1. Underlying Assumptions of IS Development Schools 20
2.5.2. Views of Technology 23
2.5.3. The Masculinity of the IS Field 26
2.6. Summary of this Chapter 29

3. The Perspectives Reflected in this Study **31**
3.1. Introduction 31
3.2. The Type of Study: Theory-creating 31
3.3. My Own Background 35
3.4. Using Individuals' Texts as Research Material 37

4. The Dissertation Research Process **40**
4.1. Introduction 40
4.2. Overview of the Two Text Sets 40
4.3. The Subject of this Study: Visions of the Future 41
4.4. The Type of Study: Interpretive Research 43
4.5. The Situation of the Text Sets 45
4.5.1. Geographical Situation 45
4.5.2. The Situation among IS Specialists 48
4.6. The Interview Part of the Study 49
4.6.1. The Themes of the Interviews 50
4.6.2. The Interviewees 51
4.6.3. Analysis of the Interview Material (text set) 53

5. The Papers in a Nutshell and the Integrating Thread **57**
5.1. Introduction 57
5.2. Presenting the Articles 57
5.3. The Limitations of this Study 60
5.4. Emerging Research Questions 62
5.5. Recommendations for Education 64

References **66**
Appendix 4.1: Background Information on User Interfaces **78**
Appendix 4.2: Request for an Interview **79**

List of publications

This dissertation includes the following articles[*]:

Chapter 6: **Kuosa**, Tarja[#] and **Basden**, Andrew (2000), Predispositions as Determinants of the Future. *Futures*, 32, pp. 833-852.[¤]

Chapter 7: **Kuosa**, Tarja[#] (1999), Technology, Human, and Society Centred Visions of the Future of Technology. *AI & Society* 13, pp. 176-192.

Chapter 8: **Kuosa**, Tarja[#] (2000), Masculine World Disguised as Gender Neutral. In **Balka**, Ellen and **Smith**, Richard (Eds.), Women, Work and Computerization. Charting a Course to the Future, Kluwer Academic Publishers, Boston, USA. *Proceedings of IFIP TC9 WG9.1 17th Conference on WWC2000 8 - 11.6.2000*, Vancouver, British Columbia, Canada, pp. 119-126.

Chapter 9: **Kuosa**, Tarja[#] (2001), Technological Determinism in IS Specialists' Talk. In **Björnestad**, Solveig, **Moe**, Richard E., **Mørch**, Anders I., and **Opdahl**, Andreas L. (Eds.), *Proceedings of the 24th Information Systems Research Seminar in Scandinavian (IRIS24)*, Ulvik, Norway, 11-14.8.2001. pp. 87-96.

Chapter 10: **Tiainen**, Tarja (forthcoming), Bounded or Empowered by Technology? Information System Specialists' Views on People's Freedom within Technology. A manuscript for a chapter in **Heiskanen**, Tuula and **Hearn**, Jeff (Eds.), *Information Society and the Workplace: Spaces, Boundaries and Agency*. Routledge, London, UK. 20 pages.

---

[*] The articles are reprinted with the permission of the original publishers.

[#] Tarja Tiainen's earlier name is Tarja Kuosa.

[¤] *Author's note:* The article in Chapter 6 is the only one of the articles that was co-authored. It was written with Andrew Basden of the University of Salford, United Kingdom. It is not possible to distinguish which part is mine and which is Andrew Basden's, since the article was created in co-operation to which we both brought our own knowledge.

1. Introduction

Typically information system (IS[1]) specialists' visions portray the future technology-centred. Below is an example in which José A. Corrales[2] describes his vision of work in 2015 [Corrales 2001, p. 50]:

> We'll likely to do a greater portion of our intellectual work from home, as practically all documents will be available to us wherever we may be. We'll finally see less and less paper in our offices. A keyboard, mouse, and flat screen hung on the wall might be all we need.

The above quotation is technology-centred not just because it describes the features of technology, but also intellectual work is described as technology-oriented, since needed information can be obtained by computer. These are examples of IS specialist predispositions. Predispositions are existing, self-evident truths, common sense and normal ways of behaviour. They vary between cultures and between individuals as well. This dissertation concerns the predispositions of one cultural group: IS specialists.

There are three types of predispositions: (1) a psychological attitude, such as a positive attitude towards computers and telework; (2) reduction, which is a one-sided interest, such as seeing just the explicit side of knowledge and ignoring its tacit side; and (3) a world view, such as a technological world view. Predispositions affect future-making. The effect can be positive, as enabling group activity when all group members share the same predispositions, in which case the group members have shared knowledge and values and the group activity is cohesive, efficient and effective [Kuosa & Basden 2000, p. 841; based on Arnold et al. 1998, Krech et al. 1962, McKenna 1994]. On the other hand, predispositions can hinder group activity; when group members have different predispositions, effective group activity is more difficult and less likely. Besides the effects of predispositions on group activity, predispositions take part in filtering out some options in certain situations. [Kuosa & Basden 2000] [3]

[1] The term IS is used in several ways. First, IS is used to refer to a system that includes information and the rules governing how the information is handled, e.g., governing a bookkeeping IS. In this dissertation I will use IS in this meaning. In addition, IS is used to refer to a specific organisational function and the staff doing them. The function includes acquiring (or developing and purchasing) and maintaining information and communication technology (ICT; which includes both hardware and software) that is needed for information processing. To refer to this meaning I will use either "IS management" or "IS function". Furthermore, IS is used as the name of an academic discipline. In that case I will use "IS studies" or "IS research".

[2] José A. Corrales is a professor of computer science at the University of Oviedo, Asturias, Spain. The vision is taken from an essay that was published in the *Communications of the ACM*. The ACM is the Association for Computing Machinery.

[3] I put the reference before a full stop when the reference is used in the sentence and I put the reference after a full stop when the reference is used in two or more last sentences.

Predispositions are not visible and some of them are not even known by their holders [Kuosa & Basden 2000], so it is not possible to negotiate about them. The opposite case is knowledge, which is formulated in texts, equations, and the like, and which can be discussed, criticised, amended, compared, and rather directly taught. Unlike predispositions, formal knowledge is "negotiable" knowledge, as it is created through social processes of justification, criticism, and argument. [Bereiter & Scardamalia 1993] Although predispositions are not negotiable, they are not stable; in contrast, they are constructed through people's actions. Activities in all situations have a role in renewing, strengthening or weakening existing predispositions, but the ways of influence are not always visible.

Different predispositions are one reason for the problems in co-operation between IS specialists and users. Users are asked to participate in IS development projects but they do not act as IS specialists do and in the end both IS specialists and users are dissatisfied. Furthermore, users find everyday working together with IS specialists difficult, since IS specialists see the situation in a different way than users. The case of Lotus Notes is an example that reflects the difference between IS specialists and users: IS specialists are caught up in the advanced capabilities of the technology, rather than focusing on its role as a means to some specific organisational end, whereas users want to understand what the technology is useful for [Orlikowski & Gash 1994]. This example is rather old but newer studies have resulted in similar findings [see, e.g., Davidson et al. 2001]. IS specialists and users both shape their own communities of practice. Sometimes, however, they work together to solve a particular design problem, as in IS development projects, thus shaping a common community of interest. [Fisher 2001] For solving problems together, they need some shared understanding. For getting it - and negotiating about it - both of these communities of practice have to strengthen their own perspectives and appreciate the perspective of the other - "perspective making and perspective taking" as Boland and Tenkasi [1995] call these processes.

In this dissertation I focus on perspective making among IS specialists. Before analysing this process, I must clarify who IS specialists are. In the early days of computerisation – that is in the 1960s and 1970s – it was easy to define who was an IS specialist and who was not. They were persons whose work was to influence the development of an IS, as analysing the requirements of a given IS, designing the system, programming and realising it, and also managing this process. Nowadays it is no longer easy to define the boundary between IS specialists and non-specialists. There are different kinds of users; some of them are highly skilled with computers and they construct their own IS - now we come to the concept of end-user-computing. A general change in the IS field is that there are now available various ready-to-buy software packages for several purposes and so IS specialists are no longer needed in all cases for mediating ICT to users. [Friedman & Cornford 1989] Generally speaking, the task of IS specialists is still to create and mediate IS or ICT to users, but any closer analysis of IS specialists shows that they do not form a uniform occupational group. The title "IS specialist" includes three groups: (1) programmers in the software industry; (2) support personnel in an IS function; and

(3) management and trade union consultants who use computer technology to change things [Dahlbom & Mathiassen 1997].

Normally predispositions are not stated, but nonetheless they are thought to be shared. The importance of dealing with predispositions in the IS field became evident to Orlikowski and Barley [2001], when they compared IS research[4] and organisation studies, and concluded that as researchers in those two fields share the same target of research, they could learn from each other. According to Orlikowski and Barley, one thing that IT research can learn from organisation studies is the importance of predispositions [Orlikowski & Barley 2001, p.154]:

> A world of global networking (both technological and organizational) raises issues of institutional interdependence whose understanding requires an appreciation for how prior assumptions, norms, values, choices, and interactions create conditions for action and how subsequent actions produces unintended and wide-reaching consequences.

Several studies of IS specialists concern IS specialist predispositions. Kumar and Bjørn-Andersen [1990] describe how IS specialist values[5] are formed: they are based on IS specialists' individual backgrounds and the present context, which both include other IS specialists and values in the IS field [Kumar and Bjørn-Andersen 1990]. In his fundamental study of IS development schools, Iivari [1991] analysed the underlying assumptions of the schools. He concludes, for example, that the IS development schools normally view IS as a technical system and information as descriptive facts [Iivari 1991, Iivari et al. 1998]. Furthermore, several studies describe the masculinity of the IS field [e.g., Camp 1997, Lie 1995, Vehviläinen 1997]. The studies of IS specialist predispositions are separate and they only deal with some aspect of the issue. The research questions, research method used, and level of analysis vary among these studies.

This dissertation focuses on IS specialist predispositions, so the target is to describe them as versatile. Instead of analysing IS research (as Iivari [1991], for example, did), I focus on the IS specialists in practical work. There is no explicit theoretical framework concerning the phenomenon - IS specialist predispostions - and prior knowledge of it was limited and fragmented. Qualitative and interpretative methods and new theories creating research are suitable in such a case [Järvinen 2001, p. 62]. I found two approaches possible: (1) ethnographic study, in which the researcher observes real working situations [Myers 1999]; and (2) analysis of individuals' texts, certainly not just in written form: texts can be spoken, as a narrative, speech or interview, and even technology can be seen as a text [Vehviläinen 2000]. I excluded ethnographic studies, since they are rather closely connected to the organisational context of observed IS specialists. I was more interested in IS specialists as

[4] Orlikowski and Barley [2001] use terms "research of information technology" and "IT research" but the content of them is the same as "IS research" in this dissertation.

[5] According to an English dictionary [Manser & Thomson 1995], values can have several meanings. First, it means the quality of being useful or desirable. I assume that Kumar and Bjørn-Andersen used value in this meaning; they describe the values which IS specialists find useful in there is development. Second, values are used to mean moral principles. Instead I use "world view" in Chapter 6. The third meaning of value is used in mathematics.

individual experts who belong to the community of IS experts. To focus on this task I chose text analysis.

The empirical material of this study includes two sets of texts. They both consider IS specialists' visions of the future. The first set of texts includes written essays that were published in the *Communications of the ACM* in 1997. The journal stated that the essays represent all the global views IS specialists have but, in fact, the collection is strongly US-dominated. The second set of texts includes interviews of Finnish IS specialists. On the one hand, this is local material that is situated in Finland, which is a small, geographically peripheral Western country. On the other hand, Finland is presented as a leading country of the future information society [Lyytinen & Goodman 1999].

The two sets of texts include visions of future technology described by specialists of technology. I focus on the predispositions that the visions include and I am not interested in whether or not the visions will ever come true. I view the position of texts as Grint and Woolgar [1997, p. 32] state: Discourse is not so much a reflection of material reality but a construction of it. Although individuals write and speak texts, the community in which they belong and to which they address the texts affects the texts. The social construction of texts is probably best seen in the case of an academic journal [e.g., Swanson & Ramiller 1993, p. 300]. However, not all the members of a community have a similar role in the construction of texts, as Grint and Woolgar describe with the knowledge of technology [Grint & Woolgar 1997, p. 33]:

> … our knowledge of technology - which also represents itself as the truth - is knowledge constructed by the powerful, not by the weak; and equally significant, by the collective, not the individuals.

The texts - or the visions - that I analysed, were produced by IS specialists. In the shaping of knowledge about technology, they belong to a powerful group, since they participate in the development of future ICT. Besides the individuals who produced the texts, their community participates in the construction of the content and the shape of the texts. The results I obtained in the analysis do not just represent the views of the authors of the essays or the interviewees, but they describe the broader situation in the IS field.

When I started the analysis of the empirical materials, my aim was to make visible the variety of views about the future among IS specialists. However, during this process I found similarity among IS specialists. I realised that IS specialists' view of the world were masculine and technology-centred. Such masculinity is not a big surprise, since it was reported in several earlier studies [e.g., Camp 1997, Lie 1995, Vehviläinen 1997]. Besides technology, science reflects a masculine view [e.g., Haraway 1991], so the masculinity of my first text set (essays in an academic journal) was almost to be expected. Whereas the masculinity of the second text set (interviews of Finnish IS specialists) was more surprising. Finland is normally shown as an exemplary country of gender equality [Korvajärvi 1998] and in Finland a female ICT user is not a curiosity, since women use ICT in work as often as men [Lehto & Sutela 1999]. Also the technology-centricity is somehow an expected

result. IS specialists' work is to shape and mediate technology, so it is understandable that they focus on it. Whereas IS specialists view technology in itself, it is not a remarkable issue for users and user organisation, rather a solution to their problems.

The results of the text analysis describe one aspect of the construction of IS specialist predispositions. Although, in the IS field, there have been for years appeals for human centricity [e.g., Nurminen 1986, Clement 1994] and for the broadening of perspectives [Adam 2000], the results describe the strengthening of existing predispositions. The problematic point in IS specialists' views is that their view of people is one-sided and uncomplicated. In their work context, IS specialists typically view people as the users of technology - that is how they are related to technology - and as individuals without social structures.

This dissertation consists of two parts. First, the introductory part unites the themes presented in the second part, which includes articles[6] based on empirical research. The introductory part starts by defining the key concepts: IS specialist, IS field, and predisposition. I continue by presenting what IS studies say about the themes of this dissertation in Chapter 2. In Chapter 3 I describe choices in the research process I have made for and during this study. In Chapter 4 I show how this study has been carried out by describing the research process and text sets that I used. In Chapter 5 I present an overview of the results of the research. I describe them in greater detail in the four published articles and one manuscript, but individually they describe just one limited perspective, so in Chapter 5 I try to outline a rich picture uniting the substance of the articles.

[6] By "articles" I refer to four published papers (two in journals and two in conference proceedings) and one manuscript, which will be published later.

2. The Central Concepts

2.1. Introduction

This dissertation deals with IS specialist predispositions, so the main concepts include both “IS specialist” and “predisposition”. Besides these two “IS research” is also one of the main concepts, since it is the context of IS specialists and this dissertation, as well. Now I describe their meanings and how they are dealt with in this dissertation.

First, I will discuss the term “predisposition”, since I will use this concept in presenting the others. This means that I will present not just what IS research and IS specialists are, but also what is said about their predispositions in earlier studies. Of these two, I will first deal with IS research, since it studies the field to which IS specialists belong. Generally, IS specialists have an education in IS[7] and they work in a community of IS specialists. They both - education and community - mediate and strengthen IS specialists' common way of thinking and unify IS specialists' predispositions.

Besides the main concepts, this chapter also presents the disciplinary context of this dissertation. The most important of them is indeed IS studies, but studies on science and technology, and gender studies also influenced my research.

2.2. Predispositions

According to Chambers English dictionary, “predisposition” means: “the condition of being predisposed” and “predispose” means “to incline (someone) to react in a particular way” [Manser & Thomson 1995]. This description is valid but it is too general for scholarly analysis.

As outlined in Chapter 1, we can identify three kinds of predispositions: psychological attitudes, reductions, and world views [Kuosa & Basden 2000][8]. The first type comprises psychological attitudes, which means to think, act, or feel a certain way towards a specific target. This can be someone’s positive (or negative) attitude towards tangible objects (e.g., one's own computer), people (e.g., one's

[7] In some Finnish universities the studies of IS and computer science are intertwined - as in the University of Tampere - some other universities focus on one of them – such as the Schools of Economics and Business Administration focusing on IS.

[8] This subsection of predispositions is based on Kuosa and Basden [2000]. It is included in this dissertation - Chapter 6: Predispositions as Future Makers. It broadly describes predispositions and the importance of studying them in thinking about and creating the future.

boss), environment (e.g., a town), hypothetical constructs (e.g., the information society) or even non-real things like virtual reality. I call this kind of predispositions psychological attitudes, since psychologists analyse and measure them. The measurement is almost always performed by using self-report questionnaires, so it is assumed that the holder is aware of holding the attitude [Arnold et al. 1998].

The second type of predisposition is reduction, which is to see a target in a narrowed way that reveals a true aspect of the target, but in such way that other valid aspects of the target are overlooked. For example, when IS specialists use the term "user", they view only one side of humans and that is their relationship to technology, and other human features are ignored [Nurminen 1986, Isomäki 1999b]. By using different terms to refer to the same people, we get different expressions. For example, "fisherman" and "net user" (fishing net, not Internet!) illustrate this difference; one focuses on the human task or role, the other, on the tool used in undertaking that task or fulfilling that role [Nurminen 1986]. Individuals do not normally notice their own reduction.

The third type of predisposition is a world view. It is the largest of these three kinds of predispositions. A world view is a coherent set of unquestioned and usually unrecognised assumptions about the nature of things and about their values that gives shape and stability to our thinking and living. We can describe a world view as spectacles through which we view all our experiences. For example, someone who has a technocentred world view, thinks of everything in terms of how it relates to technology and values most everything that is most related to technology.

The different types of predispositions are related to each other. For example, a technocentred world view would tend to reduce everything to how it relates to technology. However, the separation of predisposition types helps to understand what kind of phenomenon a predisposition is.

2.3. IS Studies

My dissertation belongs to the discipline of IS studies[9], so I describe what sort of discipline IS is and how my work is located in it. In this section, I will first present what areas IS research deals with, by outlining two new review studies of the IS field.

[9] Several terms are used to refer to the discipline of IS studies. One of them is "IS science" - Avgerou [2000], for example, uses it. Frances Grundy [2000] argues that the term "science" is connected to the natural sciences and it includes the idea of objectivism. I avoid using it in the case of IS, since I view such knowledge as situated. Sometimes the term "IS" is used on its own also by referring to the discipline, such as Management Information Systems (MIS) in America. I decided to draw a distinction between an artifact of IS and studies of IS and IS development. I chose the term "study", which is used with some other disciplines, as with "gender studies", for example.

I also describe here the features of IS research. According to Walsham [1995], there are differences between American and European IS research. I will deal with them in the second subsection.

2.3.1. The Areas of IS Studies

I present the IS field by using these IS review articles, although they do not include a model of IS research as, for example, Ives, Hamilton, and Davis [1980] did. Their model includes three IS environments, three IS processes, and the information subsystem itself, all of which exist within an organisational environment and an external environment (see Figure 2.1.). Although the model is rather old, it still describes the most common areas of IS studies.

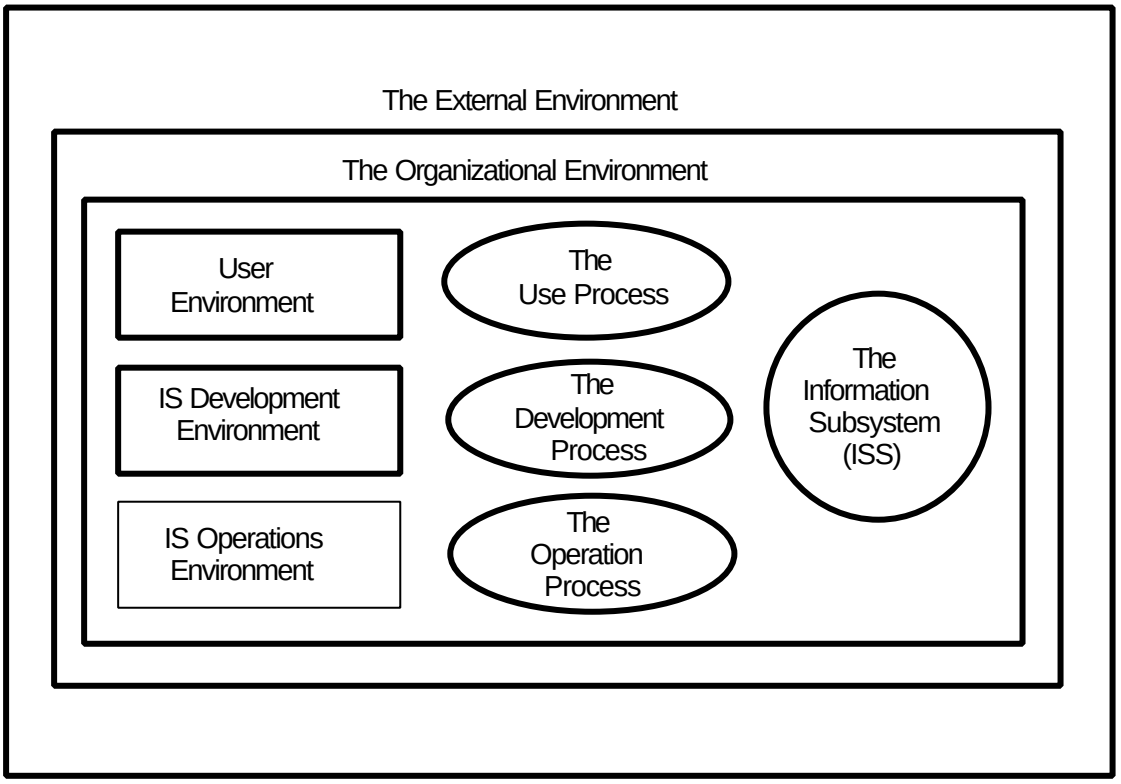


Figure 2.1: A model of IS research [Ives et al. 1980, p. 917]

However, the situation has somehow changed in the last 20 years. A remarkable change has happened with the boundaries of organisations: they have been obscured. Nowadays one IS can cross organisational boundaries. [Kuosa 1997, pp. 78-79] An example of this is a bank IS through which customers can themselves pay their bills via the Internet. Another point in the model that could be changed is the separation of IS use and development. Even now many IS researchers make the separation but at least feminist system design questions it [see, e.g., Vehviläinen 1997, Mörtberg 1997, and Karasti 2001]. Furthermore, end-user-computing crosses the boundary between development and use.

Instead of using the old model of Ives, Hamilton, and Davis [1980], I present the areas of IS research by using two new review studies. One is by Avgerou [2000], and the other by Claver, González, and Llopis [2000]. They aim at presenting all the areas of IS studies, although they do it from a mainstream point of view.

The Areas of Avgerou's Study

Avgerou [2000] describes the features of IS studies by outlining the IS field in terms of its main thematic areas, theories, and investigation approaches, and discussing its institutional characteristics. The main focus in IS studies is on organisational need for and use of IS. Avgerou [2000] categorises the object of IS studies into five classes. I present these classes and comment on them by drawing on the results of other studies.

1. Applications of IT to support the functioning of an organisation

Application areas have included database technology, transaction processing systems, decision support systems (DSS), expert systems, electronic data interchange (EDI), multimedia systems, and computer supported co-operative work systems (CSCW). This has been the work of technological experts with an enthusiasm for building and refining intricate artefacts. Within IS, a great deal of research has been devoted to understanding the domains of applications and to developing models that provide the basic logic for combining sophisticated technical components in order to form a useful application. [Avgerou 2000]

2. The process of systems development

The second area of IS studies is the practice of systems development. The aim has been to develop reliable and effective systems in cost-effective ways. [Avgerou 2000] The process of systems development is very central in all descriptions of the IS field [see, e.g., Ives et al. 1980 and Davis 2000], but there are different views of the details. I deal with three of them.

The first difference of opinion deals with the human aspect of IS. Avgerou [2000] explains that early engineering conceptions of the process of systems development was enriched by the recognition of the “soft” social and human aspects of IS. Even if Taggart and Tharp's categorisation of information requirements analysis technique, published in 1977, represents the old “engineering conceptions”, then it is still not far away from the situation nowadays. They describe the process of information requirements analysis as follows [Taggart & Tharp 1977, p. 275]:

> They [manager-users and information analysts] are making attempts during the systems development process (1) to identify the information (2) that managers need to support their decision making (3) and to achieve the objectives of their organization (4).

The above quotation from Taggart and Tharp shows that people are not ignored in IS design, as managers and their needs are mentioned. Nevertheless, the understanding of the human aspects of IS has been insufficient [Nurminen 1986] and a better understanding of workers' knowledge and role has been sought in the approach of participatory IS design [see, e.g., Greenbaum & Kyng 1991, Ehn 1988]. In the mid-1990s, Clement [1994] argued that IS could be used for empowering users. Despite the call for human centricity and continuous discussion of users' importance [see, e.g., Mackay et al. 2000], IS specialists' understanding of the human aspect of IS is in many cases still limited. In the end of the 1990s, IS specialists avoided talking about people in the context of IS development [Isomäki 1999b].

Another issue in IS development deals with software engineering. Avgerou [2000], for example, separates software engineering from IS: The former is dedicated to the development of robust software applications in cost-effective ways, while the latter is more concerned with getting value from information and telecommunication technologies in organisations. This interpretation is not indisputable, as Iivari [1991], for example, classified software engineering as one school of IS development.

The aim of mainstream IS studies is to develop reliable and effective IS in cost-effective ways, as Avgerou [2000] describes. However, there exists other aims among IS studies, as well. For example, Scandinavian approach to IS development aims to increase workers' democracy and workers' possibilities for shaping their own working conditions [Bjerknes & Bratteig 1995].

3. IS management

The issues explored in this stream of studies partly reflect the evolution of information technologies, and partly the learning process organisations have undergone regarding the management of IT and their information resources. IS management (or IS function) is concerned with issues such as the formation of strategy regarding IS, aligning IS development with business objectives, using IT to achieve desirable organisational change, and using IT to manage multinational corporations in the emerging global economy. [Avgerou 2000]

4. The organisational value of IS

Although IT and telecommunication networks are now undoubtedly considered fundamental for the running of all contemporary organisations, questions about the value organisations get from investment in these technologies continue to be as relevant and pressing as when computers were first introduced in business and administration. At an early stage, IS was evaluated with cost-benefit analysis techniques. [Avgerou 2000] Certainly, this kind of IS study is still done. Dos Santos and Sussman [2000], for example, analysed why organisations' return on ICT investments is low and found as answers failure in strategic thinking and failure of senior management to overcome resistance to change [Dos Santos & Sussman 2000]. However, it was noted that not all benefits are easily or legitimately quantifiable in monetary terms. In the 1990s, the value of IT in organisations is

closely linked with the perception of IT as an enabler of organisational transformation. [Avgerou 2000]

5. The societal impact of IS

From a very early stage of the field's development, IS researchers showed interest in studying the impact of new technologies on wealth creation, working life, and social life more generally. According to Avgerou, IS studies have a great deal to contribute towards avoiding the pitfalls of technological or economic determinism so often encountered in the contemporary "globalisation" literature. [Avgerou 2000]

A Comparison of the Areas of these Two Review Studies

Claver, González, and Llopis [2000] also studied the areas of IS research and reached quite similar results. They analysed articles published in two academic journals of IS (*Management Information Systems Quarterly (MIS Q)* and *Information & Management*) during the time period 1981-1997. They divided the research topics into five classes, or areas, of IS research: *(1) IS management; (2) IS development / IS life cycle; (3) Information technology; (4) IS usage; and (5) Others, which includes IS research*. The classification is based on Barki, Rivard, and Talbot's classification [1993].

Most of the articles that Claver, González, and Llopis classified belong to the class of *IS management* (32 %). This class is the same as the third class by Avgerou. In the analysis by Claver, González, and Llopis, the second favourite is the class of *Information technology* (26 %). This class is quite similar to Avgerou's first class, *Applications of IT to support the functioning of an organisation*. Claver, González, and Llopis named this differently and it is possible that they put here, besides applications, also more technology-oriented studies. The third favourite is the class of IS development or IS life cycle (24 %). It is the same as Avgerou's second class, *The process of systems development.* According to Claver, González, and Llopis, there is decreasing interest in subjects focusing on systems development.

There are some differences between Avgerou's two last classes and Clever, González, and Llopis's last ones. Avgerou's classes are The *organisational values of IS* and *The societal impact of IS*. There is no class of social studies of IS in the classification of Claver, González, and Llopis. If they encountered some such IS studies, they probably put them in the class of *IS usage.*

However, social studies are not common in IS research. This is also seen in the lists of the most referenced information systems studies [see, e.g., Walstrom & Leonard 2000]. Nevertheless, there are some exceptions. An old, but still remarkable one is Kling's social analysis of computing, in which he classifies existent empirical IS research that considers social structures. He outlines two major perspectives: systems rationalism and segmented institutionalism [Kling 1980]. Later, Kling

collected articles that deal somehow with ICT and society into the books *Computerization and Controversy* [Dunlop & Kling 1991, Kling 1996].

2.3.2. The Features of IS Research

Above I described the areas of IS studies, giving an overview of the discipline. Besides the areas of IS studies, we can characterise IS research by its features - or we can even call them the bias of IS research. I deal with two features: (1) the geographical aspect - that is, the difference between American and European IS studies; and (2) the status of IS research among all disciplines.

First I deal with the geographical aspect of IS research. The two above review studies of the IS field presented the IS fields as America-dominated. Claver, González, and Llopis [2000] noticed that most of the authors who publish in *MIS Quarterly* and in *Information & Management* come from US universities. Their conclusions are based on the articles in two journals, whereas Avgerou [2000] analysed widely published IS studies. She reached the same conclusions: in ICIS and in the journals widely considered to represent the field "internationally", most of the editors and contributors are researchers in the North American business schools.

The American-centricity of the IS field is pondered by IS researchers who come from outside this mainstream area. Chrisanthi Avgerou comes from Greece and currently she works in London, UK. Besides Avgerou, also Geoff Walsham [1995] deals with the American-centricity of the IS field. He, as well, comes from outside of American business schools. He is a British IS professor working in Lancaster and Cambridge, UK.

Walsham [1995] showed that there are differences between the research presented in mainstream IS publications and alternative IS publications. For the mainstream IS publications, he chose *MIS Quarterly (MIS Q), Communications of the ACM, Proceedings of the ICIS Conference*, and *Information Systems Research (ISR).* He chose for alternative IS publications *Accounting, Management and Information Technology, the Journal of Information Systems, the Journal of Information Technology*, and *the European Journal of Information Systems.* According to Walsham [1995], the difference between the mainstream and alternative IS publications is that the alternative journals publish more interpretive studies than the mainstream publications. Avgerou [2000], as well, noted the difference in methodologies. She linked it to the geographical aspect. In the USA, positivistic methods continue to be prevalent, though journal editors tend now to state their journals' methodological openness. In Europe IS research is indeed pluralistic; qualitative and interpretative methods are as accepted as quantitative ones. Australian IS research is somewhere between American and European IS research.

The difference between American and European IS research is not only in research methods, but also their situation among all disciplines differ as well. According to

Avgerou [2000], IS studies are connected to business studies, especially in North America. This is how Avgerou [2000, p. 574] describes the situation:

> By far the most dominant institutional setting for the IS field is the North American business school. […] The dominance of the business school context has had a strong influence on the international profile of the research agenda and the curriculum of information systems. The main international journals and conferences of the field suggest that the mission of IS research is to produce knowledge on IT which is useful for business management. This is a particularly biased focus for a field studying the use of a technology as pervasive as information and communication technologies, which has implications on all forms of organised human activity.

In Europe the IS field is more diverse in terms of institutional setting. Besides business faculties, IS studies - as carried out in an independent department or as part of another department - are hosted in information and engineering faculties as well as in various faculties of the social sciences. The diverse socio-cultural features of the European context are reflected in the IS research of the region. For example, in Scandinavian countries, within a distinct culture of industrial democracy during the 1970s and 1980s, IS research addressed issues regarding the introduction of computers in the workplace, in particular their impact on work conditions and the rights of people to control the means of their work. In contrast, the German IS field, "Wirtschaftinformatik", has pursued more of a technology orientation, linked as it is with the country's continuing significance attached to engineering as a means for economic growth. [Avgerou 2000, Avgerou et al. 1999]

Gordon Davis [2000] defines three possibilities relative to the conceptual foundations for the academic field of IS. First, a continued expansion of conceptual foundations is occurring as more intersections develop with other disciplines. The interesting problems and issues for a field such as IS are at the intersection with other disciplines and bodies of knowledge. For example, group decision systems can be better implemented based on research that considers underlying research on group decision processes. Consumer psychology research becomes important when studying e-commerce systems. In this scenario, each new area of applying IS in organisations may bring with it underlying concepts and a body of research, so there will be continued expansion of conceptual foundations. [Davis 2000] The dominant context is the business school. It has a strong influence on the international profile of the research agenda and the curriculum of information systems. The main international journals and conferences in the field suggest that the mission of IS research is to produce knowledge on ICT which is useful for business management. Little attention, for example, has been given to issues concerning the absorption of new information and communication technologies in public sector institutions, or information-intensive organisations which are not typical business concerns, such as cultural institutions or community centres. Issues such as accountability, security, public accessibility to services, the quality of social services, and sovereignty, which are relevant to state and community institutions, have not been addressed by IS management research. [Avgerou 2000, p. 574]

Davis [2000] mentions as a problem of the intersection approach that it dos not outline the boundaries of IS research and thus unconstrained expansion of the IS

field would be possible. In such a case the result might be that IS research becomes unfocused and disconnected. For preventing this, Davis suggests the second possible development path; defining the core concepts of IS research. The core concepts explain why IS studies differ from other fields, by defining the IS field narrowly in terms of core activities and unique contributions. Davis [2000] admits that this approach excludes many interesting intersections with other fields. European diversity in the IS field can be understood through this approach, as well. In such a case, different European countries have made their own choices as to the core for IS and their choices are different.

Davis [2000] presents the evolutionary approach as the third approach to the development of the IS field. It means the narrowing of focus with more emphasis on the core, but still includes important intersections with other fields. A redrawing of the map of conceptual foundations can define the core but still include bodies of knowledge that clearly underlie IS studies. There can be a recognition that the core can incorporate clearly understood concepts without reference to other disciplines that may also use the same concepts. [Davis 2000] Davis views that the current set of conceptions is too large, because some of them are not robust in providing explanations [Davis 2000, p.79]. Gordon Davis is an American IS researcher, so he comes from the context of business studies and as shown above the American IS field is more coherent than the European.

Whereas Davis views the field of IS studies as too large, Alison Adam finds the viewpoints of mainstream IS studies too narrow and she asks for more intersection with other disciplines as it is done in feminist studies of IS. She argues [Adam 2000, p. 103]:

> Such work [gender and information technology] largely remains outside the IS canon, finding its voice, rather, within education, psychology, sociology, business studies, women's studies, indeed almost anywhere but computing discipline. It is a pity that the mainstream continues not to hear the feminist voice because there are a number of successful examples of information systems projects built with emancipatory design aims in a feminist tradition which could provide useful lessons and empirical examples for critical IS.

I agree with this critic of IS studies. In my dissertation, the main discipline is IS but, in addition, other disciplines influenced me. At the beginning of the dissertation process, future studies had a remarkable role in opening new perspectives for me. Later, important disciplines for me were sociology, especially the studies of science and technology, and studies on gender and IT.

2.4. IS Specialists

In this section, I will define what I mean by the term "IS specialist" and why I chose to use it. I also present what existing studies tell us about IS specialists. I base this presentation on IS studies of specialists, although some other disciplines deal with IS specialists, as well.

2.4.1. Defining the Concept of IS Specialist

The name used for persons, whose work is to create and mediate ICT and IS use varies. I will start with professional titles used in the IS area and then I will move to the names that are used to refer to the groups of different professions within the IS field. While presenting them, I also deal with the terms I used in the articles included here.

In the early days of computerisation, the professional titles used somehow differed from current titles. At the beginning of the 1960s a list of titles in the Finnish journal *Tietokone* (Eng.: Computer) included: department manager, programmer, operator, keypunch operator, technical assistant/support, mathematician, and office designer [according to Vehviläinen 1999]. A new Finnish list of professional titles was taken from a web page of the Tietotekniikan liitto (TTL; Finnish Information Processing Association in English[10]). The list includes: manager/chief, designer, programmer and operator[11], consultant, expert, technical assistant/support, instructor/teacher, financial/personnel staff, sales staff, engineer/technician, and researcher. Designer was the most common position, held by 21 per cent of the members. [TTL 1998]

The name by which all those people are called also varies. In an old report in *Tietokone* they were called "data processing professionals" [Vehviläinen 1999]. This term is understandable, knowing that computer science is translated into Finnish as data processing science.

In academic literature in the IS field, the term "computing professional" is generally used. For example, it is used in *the Code of Ethics and Professional Conduct* of the ACM [Anderson et al. 1993]. Furthermore, Denning [2001] uses the term "IT professionals" and finds that three groups belong in it: The first category comprises the major technical areas of IT and spans the intellectual core of the field. The second category comprises other well-established fields in which there are intensive users of IT. The third category comprises areas of skill and practice necessary to support the IT infrastructures that everyone uses.

Although computing professionals is a common term, I find some problems with both words in this term. The beginning of the term, "computing", puts the computer in the centre, and the beginning of "IT" does the same. In the early days of computerisation, the situation was like that: computers were in the centre for those workers. This can be seen by comparing software and hardware costs: before the 1970s the costs of hardware were bigger than those of software but after that time the share of software has increased significantly [Friedman & Cornford 1989, p. 110]. However, I am not the only one who avoids giving the central place just to computers. Kling and Allen [1996], for example, wrote that those who study

[10] The Finnish Information Processing Association unites several Finnish associations that support the design and use of ICT. Anyone can join the association.
[11] These two titles are put into the same category in the table on the web page of TTL.

information and computer sciences learn to solve computational problems, but the systems that are useful for organisations such as banks, hospitals, schools and government agencies are different. They ask for education in "organisational informatics", as they call it. Elsewhere in *Computerization and Controversy,* Kling [1996, e.g., p. 847] uses the term "information and computer science professionals". Instead of these terms, I chose to use "information systems" or IS, since it is quite short and it has an established meaning. Furthermore, it is a wide concept that includes, besides a technical subsystem - that includes hardware and software - also a social subsystem.

Also the second part of the term "computing professional" is problematic. Although Denning [2001], for example, calls for using the term "professional", I decided to avoid it. I find that his use of the term is due to wishful thinking that one day there will be a profession in this field. I decided to call them IS specialists, since they are specialised in something that is connected to IS or ICT. I do not find them to be professionals, since normally the term professional refers to doctors, lawyers and others whose vocational action is based on combined education, institutional status and control. IS specialists differ from the traditional professions, since IS specialists have various educational backgrounds. Besides the background differences, their organisational status is not as stable as that of traditional professions. Like many professionals, IS specialists have, as well, adopted codes of ethics. Historically, professional associations have viewed codes of ethics as mechanisms to establish their status as professions [Anderson et al. 1993]. However, ethical codes in the IS field differ from the ethical codes of other fields, as Bjerknes and Bratteteig state [1995]:

> The snag here is that the individual system developer should undertake a rather impressive personal responsibility for the systems s/he is developing, without a professional organisation to support them when running into problems or conflicts (unlike e.g. physicians or trained nurses).

The other reason why I avoided using the term professional, is that it figuratively increases the position of those called as professionals and lower the position of those who are not - in this case, the users of ICT. Vehviläinen [1994b] noted that one aim in using professional ethical codes is to make a sharp distinction between experts and non-experts. I decided to avoid calling any of them as professionals, whereas Sanna Talja [1998], for example, found the opposite solution by calling also the users professionals.

My understanding of the meanings and feelings behind the term developed gradually during the dissertation process. For example, reading about discourse analysis [e.g., Suoninen 1997] helped me to realise the role of words used and to actively ponder which words I want to use. This development can be seen in the published articles, for I have called the target group by different names. In my two oldest articles (Chapter 7: Technology, Human, and Society Centred Visions of the Future of Technology and Chapter 8: Masculine World Disguised as Gender Neutral) I use the term "computing professionals". In the newer articles (Chapter 9: Technological Determinism in IS Specialists' Talk, and Chapter 10: Information System

Specialists' Views on People's Freedom within Technology) I started to call them IS specialists.

2.4.2. Studies of IS Specialists

IS specialists are not a common research topic in the IS field. Nonetheless, there are some studies that deal with them. I will start by presenting Dahlbom and Mathiassen's study [1997], since it describes the situation in general. Then I will present studies about IS specialists and users. There exist several IS studies that concern IS specialist attitudes towards users or differences between IS specialists and users. I present these studies by using Isomäki's study as a framework in which I put the others.

Bo Dahlbom and Lars Mathiassen view the IS field from a Scandinavian perspective. In their article they analyse IS specialists ("our profession" and "computer profession" are the terms they use). They develop a framework that shows the variety among IS specialists (see Table 2.1.). The framework can be used to identify three different kinds of IS specialists: (1) programmers in software industry, engineering programmes; (2) support personnel in the IS function, relying on an evolutionary approach to help people use computers; and (3) management and trade union consultants who focus on power when they use computer technology to change things. However, Dahlbom and Mathiassen suggest another way to use the framework [Dahlbom & Mathiassen 1997, p. 81]:

> It is more interesting, however, to use the framework to question such simple labeling, crossing the column boundaries, perhaps arguing that engineers ought to take more active interest in questions of power, and that consultants should know more about artifacts.

Table 2.1: Competing conceptions of IS specialists [Dahlbom & Mathiassen 1997, p. 81]

Slogan	I build things	I help people	I change things
Focus	Artifact	Culture	Power
Approach	Construction	Evolution	Intervention
Role	Engineer	Facilitator	Emancipator

Dahlbom and Mathiassen [1997] argue that the mechanistic world view dominates among IS specialists. The mechanistic world view is powerful in producing and characterising a machine, but it is not when the machine should be taken into use. A mechanistic world view contains all the elements that we have come to associate with a scientific attitude [Dahlbom & Mathiassen 1997]:

- truth as the mapping of the world,
- the use of mathematics as an exact language of representation,
- the idea of methods,
- of formulisation and rules for calculation and deduction,

- the view of thinking as the competent manipulation of symbols,
- a penchant for rational means-end thinking, for planning, analysis, and final solutions.

Dahlbom and Mathiassen [1997] argue that also the romantic world view is needed in the IS field. The romantic philosophers were not interested in taking the universe apart like a machine, in analysing it into its smallest atoms. They wanted to contemplate, understand, interpret, feel, and see through the world to its meaning, as with a poem or a painting. Whereas mechanists saw structures and systems, the romantics saw processes and change.

Regardless of the fact that Dahlbom and Mathiassen's article was published in a highly ranked journal - the *Communications of the ACM* - its scientific background seems to be quite weak. It is more like a (normative) future-oriented essay for IS specialists. I find that publishing such an article in an academic journal is linked to two shortcomings in IS studies: the lack of focusing on IS specialists and the lack of using a future perspective [the latter was noted by Swanson and Ramiller 1993]. Despite studying IS specialists on their own, IS specialists are studied in the terms of their relationship with users. I present such studies by using Hannakaisa Isomäki's study [1999] as a framework. She interviewed IS specialists in order to discover what kind of conceptions of humans they have. She asked the interviewees about users and in their answers few of the interviewees talked about people. In any case, she categorised five types according to which users were described.

First, “a business point of view” means that IS specialists talk about money and saving it when they describe the benefits of new IS [Isomäki 1999]. This is a common view also in IS studies.

Second, “the IT point of view” means that just technical issues are talked about and users are seen as a component of the system [Isomäki 1999]. IS specialists in Wanda Orlikowski and Debra Gash’s study about technological frames belong to this category. In it, IS specialists talk about Lotus Notes with its technical issues, whereas users are interested in the usefulness of Lotus Notes in their everyday tasks or business in doing [Orlikowski & Gash 1994]. Also Ann Locke Davidson, Janet Schofield, and Janet Stock [2001] encountered a similar difference in IS specialists' and users' orientations towards technology in their study of education. IS specialists value innovation and technology itself highly, whereas teachers are highly pragmatic, viewing technology as tools.

Third, “the work process point of view” includes two issues. According to it, work processes are viewed as objective, which includes the view that there exists an ideal model of work process and people should follow it. In this point of view the system is built for those people who control and manage work processes, not for the users of the system. [Isomäki 1999]

In the final two categories, IS specialists talked about human users, but the view of them was limited. The users in the fourth category were seen as persons without any IT skills. They are described by their enthusiasm or fear towards IS. [Isomäki 1999]

A similar IS specialist attitude is described in Davidson, Schofield, and Stock [2001]: IS specialists see user-friendly interfaces as "cosmetics", "unnecessary" extra work in IS development projects that even causes harmful effects. I take a quotation from Davidson, Schofield, and Stock [2001, pp. 25-26] to illustrate how an IS specialist presented this view:

> I do not believe in making systems easy enough for an idiot to use. I'm a firm disbeliever in that, because if you make it that easy, people will learn nothing and you will be stuck supporting them for the rest of their lives. That is a problem… big problem.

In the fifth category, IS specialists view users as their own self-reflection. IS specialists design and implement IS in the same way as they themselves like to use. [Isomäki 1999] Similar views are found in other studies, as well, such as Jerome McDonough's [1999] study describing virtual environments. He asserts that the designers of virtual environments[12] think that the users of their systems are young, male, white Americans. Another example of the view that users are men is shown in Els Rommes' [2000] study of Digital City[13] in the Netherlands. She noted that the designers made the system for people like themselves, for hackers, and this was one reason why women had little interest in using the system.

IS specialists are not a common topic in IS studies. Some IS studies have opened a discussion of IS specialists' ethics and morals [e.g., Gattiger & Kelley 1999, Parker et al. 1996]. In addition, gender studies of ICT concern IS specialists. I do not deal with them here, but I do so later in this chapter, in Section 2.5.3, which concerns the masculinity of this field.

IS specialists are also studied by researchers in other disciplines. I present three examples of them. The oldest of them is anthropologist Gregory's study of IS specialists in Silicon Valley, California, published in 1983. The second study is Hofstede's international study of IBM [Hofstede 1991]. The last is Finnish sociologist Ylijoki's study of university education in different disciplines [Ylijoki 1998].

Kathleen Gregory studied "native" views on IS specialist culture. By culture, she meant learned ways of coping with experience. She found some widely shared values, for example, innovation in general and new products in particular are highly valuated. However, there also exists segregation. For example, engineers and scientists express in different ways the positive value placed on innovation. Engineers concentrate on developing new products, specifically on "getting it out the door" (releasing it to the market), whereas scientists emphasise developing new technology. [Gregory 1983]

Geert Hofstede studied the values of IBM workers in different countries. In 1968 and 1972 he collected information from 72 IBM offices, in 20 languages, and obtained 116 000 questionnaires. Unlike Gregory [1983], he used the empirical

[12] By "virtual environment", McDonough [1999] means 3D environments where users can chose avatars, human figures to represent themselves.
[13] Digital City is a system for information and communication needs based on the Internet.

material for studying how national features are seen in individuals' values. He focuses on the features of different countries, and he uses an empirical material about IS specialists to study countries. [Hofstede 1991]

Sociologist Oili-Helena Ylijoki studied education in different disciplines at the University of Tampere, including computer science. She defined the moral order of the studied disciplines. The moral order of computer science is shown in Table 2.2. It describes which things are found to be worth achieving (called “Virtues” in Table) and which ones are to be avoided (called “Vices” in Table) among the teachers and students. [Ylijoki 1998] I find it interesting that university students and teachers find learning-by-doing as a good thing and academics as a bad thing - by “academics” is meant science and theories being the opposite of practical knowledge.

Table 2.2: The moral order of computer science [Ylijoki 1998]

VIRTUES	VICES
Well-paid job	Unemployment
Hard knowledge	Performing
Enterprise’s best	Academics
Usefulness	Useless
Learning by doing	Book-based wisdom
Computer enthusiasm	Computer addiction
Dynamics	Regression

In this section I presented studies of IS specialists. These give some information about what kind of people IS specialists are; now I turn to their predispositions.

2.5. Studies about Predispositions in the IS Field

In the section above I dealt with IS specialists. Besides defining who they are, I am also interested in their predispositions, as far as they are known according to earlier studies. In this section, I will describe what is said about the predispositions of the IS field in earlier studies. In the first subsection, I show what kinds of assumptions underlie IS development schools. In the second subsection, I deal with views of technology. In the last subsection, I deal with the masculinity of the IS field, which is discussed in the studies concerning gender and IT.

2.5.1. Underlying Assumptions of IS Development Schools

In this section, I present the findings of studies on the underlying assumptions of IS development (ISD) schools. Juhani Iivari studied them at beginning of the 1990s [Iivari 1991] and later he continued the analysis with Rudy Hirschheim and Heinz K. Klein [Iivari et al. 1998]. These two are the rare studies within the IS field that make a fundamental analysis of predispositions. Certainly these studies concern just

one part of the predispositions in the IS field. The two studies deal with underlying assumptions of ISD schools, which means that they are assumptions held by the researchers who created and defined the principles and methods of the studied ISD schools. In any case, they give a good starting point to study predispositions in greater depth.

In his earlier analysis, Iivari studied the underlying assumptions of seven IS development schools: *Software Engineering, Database Management, Management Information Systems (MIS), Decision Support Systems (DSS), Implementation research, Sociotechnical approach,* and *Infological approach*. First, Iivari created a framework, and then he used it for analysing the ISD schools. [Iivari 1991]

The framework includes four paradigmatic constituents: ontology, epistemology, methodology, and the ethics of research. The framework is presented in Figure 2.1. The findings about ontological assumptions were that the ISD schools were quite similar. Iivari could not define the views on data/information of all the ISD schools. In the cases in which he could do so, he found that the schools view it as comprising descriptive facts. The ISD schools view IS as a technical system as well as a social system in most cases to some extent. Likewise, the view of human beings, usually, includes both alternatives - voluntarism and determinism. There is general agreement among the ISD schools that technology is a matter of human choice and organisations are viewed according to structuralism. [Iivari 1991]

The next issues Iivari analysed are epistemology and methodology. The ISD schools indicate a uniform adherence to the positivistic epistemology of regularities, causal laws and explanation. Although the ISD schools reflect epistemological monotony, there also exists methodological pluralism: Iivari [1991] looked for several methods and he found all he looked. However, the framework did not include all methods used in the IS field [Järvinen 1994].

Concerning ethical assumptions, all the ISD schools are focused on organisation and economic goals. Besides this, Software Engineering focuses on IS specialists, but all others view users as the most important. [Iivari 1991]

Later Iivari, Hirschheim, and Klein [1998] used the same framework in the analysis of alternative ISD approaches: *Interactionist Approach, SA-Based Approach, Soft Systems Methodology (SSM) Approach, Trade Unionist Approach,* and *Professional Work Practice Approach*. There were some clear differences between these alternative ISD approaches and the mainstream ISD schools of Iivari's earlier analysis. The most remarkable differences are [Iivari 1991, Iivari et al. 1998]:

- The mainstream ISD schools view information as descriptive facts, whereas the alternative ISD approaches view information as ambiguous.
- The mainstream ISD schools view IS as a technical system, whereas the alternative ISD approaches view IS as a social system.
- The mainstream ISD schools are oriented toward organisations, whereas the alternative ISD approaches have a means-end focus.

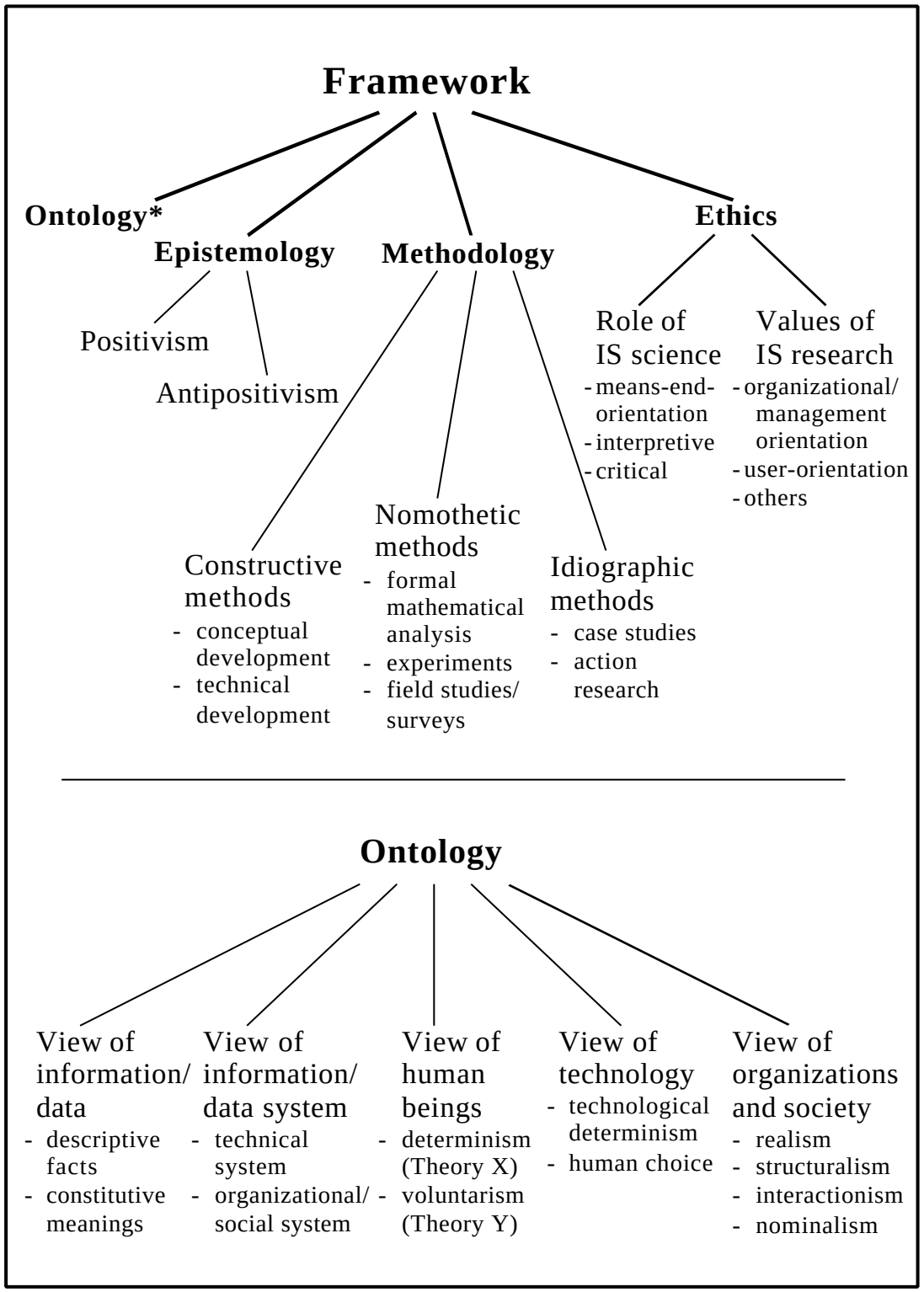


Figure 2.1: A framework for the analysis of the ISD schools [Iivari 1991, p. 258]

I return now to views of data/information. The contrasting views presented by Iivari [1991] are descriptive facts and constitutive meanings. Their difference is whether one believes that a data model "reflects" a reality or consists of subjective meanings and thereby constructs reality. Iivari argues that the mainstream ISD schools believe in descriptive facts and this interpretation gets support from Wilson [1999]. He states that the dominant paradigm in ISD is "the realist perspective" which "suggests that the external world consists of pre-existing hard, tangible structures which exists independently of an individual's cognition." [Wilson 1999, p. 162] Wilson presents SSM as holding an opposite view: SSM does not believe in universal truth but it focuses on situational understanding.

The difference between the mainstream and alternative ISD schools is not limited to practice; there are differences in the research, as well. In the research following the mainstream ISD schools a positivist orientation is used, whereas some of the alternative ISD approaches use an interpretive orientation - or "antipositivist orientation" as Iivari calls it [Iivari 1991, Iivari et al. 1998].

2.5.2. Views of Technology

Above I described Iivari's studies about the underlying assumptions of ISD schools. In the ISD schools' ontological assumptions one view consists of technology, by which Iivari means the view of creating and shaping technology [Iivari 1991, Iivari et al. 1998]. Before dealing with it, I first focus on technology itself.

Definitions of technology alter through time and place. For the ancient Greeks, technology meant "practical arts", as opposite to science or even art itself. During the twentieth century, the term was expanded to include the tools, the process of work and even the total work organisation. One of the definitions of technology nowadays separates three different meanings: (1) physical objects, such as a computer; (2) objects in conjunction with related human activities, such as a software; and (3) knowledge, such as skills to use a computer. [Grint & Woolgar 1997, p. 9] I find this definition of technology useful in the case of IS.

According to Grint & Woolgar [1997, pp. 9-10], common to all different definitions of technology is the attempt to distinguish between its human and non-human elements. "Non-human" tends to be associated with the material, intrinsic, technical content, whereas "human" tends to connote the (merely) circumstantial context (social factors). However, despite the implicit tendency of many authors to fashion their discussions of technology in terms of this dichotomy, it is difficult to sustain the boundary between human and non-human. Humans do not act without some form of "artificial" (i.e. humanly constructed) construction (clothes, tools, machines, etc.) and non-humans in this "artificial" form do not function in the absence of humans. [Grint & Woolgar 1997, pp. 9-10]

The interactivity or intertwining of humans and technology is seen also in the views of technology creating and shaping, discussed in this section. In his earlier study, Iivari found that the ISD schools view technology as a matter of human choice. He

criticised the view as being too simplistic, since it omits the significance of historical commitments [Iivari 1991, p. 268]. However, Iivari, Hirschheim, and Klein [1998] use exactly the same framework in the later study. Instead of Iivari's two alternative views of technology (technological determinism and human choice), Vehviläinen [2000] presents four alternatives: technological determinism, social shaping of technology, actor-network theory (ANT), and technology as textuality. Grint and Woolgar [1997, pp. 18-22] put the social shaping of technology, ANT and moreover social construction of technology (SCOT) into the same category, which they call "various social constructivist approaches to technology". Next I outline and discuss these three alternatives: (1) technological determinism; (2) social constructivist approaches to technology; and (3) technology as textuality.

A common way of thinking about the relationship between technical and social issues has been technological determinism. Technological determinism portrays technology as an exogenous and autonomous development, which coerces and determinates social and economic organisations and relationships [Grint & Woolgar 1997, p. 11]. Especially sociologists of technology avoid and counter technological determinist analysis of the capabilities and characteristics of technology and their effects on work, organisations and society. Whereas, in practitioner and popular thinking technological determinism is followed; technological innovations and their supposed transformative effects are presented as the solutions for existing problems. [McLoughlin 1999, p. 4-5] Experience supports this interpretation. Computers, electronic networks and mobile phones, for example, have evidently changed people's practices in work places and in everyday life. It seems that technology shapes society and our way of living and thinking; our practices. [Vehviläinen 2000] Markus and Robey's [1988] re-structuring of studies about the relationship between IT and organisation, shows that technological determinism is a common way in which the relationship is viewed in IS studies.

However, there are different interpretations of technological determinism. Bimber [1996] distinguished three meanings:

1. *Normative account* comes from norms of practice. According to it, technology can be considered autonomous and deterministic when the norms by which it is advanced are removed from political and ethical discourse and when goals of efficiency or productivity become surrogates for value-based debate over methods, alternatives, means, and ends.

2. *Nomological account:* technological determinism can be seen as the view that, in light of the past (and current) state of technological development and the laws of nature, there is only one possible future course of social change. The technology-driven society emerges regardless of human desires and values.

3. *Unintended Consequences account:* even wilful, ethical social actors are unable to anticipate the effects of technological development. For this reason, technology is at least partially autonomous. Technological

> developments have a role in determining social outcomes that is beyond human control.

In his framework for studying ISD schools, Iivari [1991] set "technology as a matter of human choice" as the opposite of technological determinism. In this case, the humans whose choices determinate the technology, are the designers of technology. This view is presented in other IS studies, as well. According to Markus and Robey [1988], some IS studies addressing the relationship between technology and organisation state that organisational determinism exists by which they mean, regardless of the name, that systems designers – as individuals – can manage the impacts of IS. Nevertheless, according to Markus and Robey [1988] empirical support for this view is limited.

Iivari's [1991] choice for the opposite of technological determinism – technology as a matter of human choice – can be seen as social determinism, which means that humans or social structures determinate the technology. However, this view is against our everyday experiences; computers, electronic networks and mobile phones have evidently changed people's practices in work places and in everyday life. Iivari himself criticises that the view of technology as a matter of human choice is too simplistic, since it omits the significance of historical commitments [Iivari 1991, p. 268].

Above I outlined the deterministic views of technology development. Now I leave these extreme views and move on to various social constructivist approaches to technology. These approaches evidence a general commitment to "opening the black box" of technology for sociological analysis [Grint & Woolgar 1997]. In the IS field, Markus and Robey found, in 1988, an emergent perspective from which to think about the relationship between technology and organisation. It assumes that the situation develops unpredictably from complex social interaction. [Markus & Robey 1988] Orlikowski and Robey [1991] continue this line when they present the structurational model of technology. According to it, the technological practices in an organisation are created by interaction among human agents, technology, and organisational properties [Orlikowski & Robey 1991]. This view resembles the view of the social shaping approach to technology, which emphasises the social, political and economic construction of technology. Besides this, it shows that technology is not just constructed during its development, but also during its marketing and use. [Vehviläinen 2000] Usually IS studies focus just on the development process, but Orlikowski [2000] is an exception, focusing on the users' role in shaping technology.

Besides the dualism between developing and using technology, the other dualism is between "the social" and "technology" – or human and non-human elements, as Grint and Woolgar [1997, pp. 9-10] call it. In the IS field, Orlikowski's [1992] adoption of Giddens' [1984] structuration model is a sophisticated attempt to transcend this dualism. The principle is "that human actions are enabled and constrained by structures, yet these structures are the result of previous actions" [Orlikowski 1992, p. 404].

Actor-network theory (ANT) differs from other approaches by making no distinction between human and non-human actors. ANT stresses the contingent nature of networks and network-building. Networks consist of both humans and non-humans and networks are shaped by negotiation [Grint & Woolgar 1997] Latour, one of the developers of ANT, challenges our dichotomous thinking, in terms of the categories human and non-human [Latour 1988, Latour 1993]. The problem of such dichotomous categories appears in thinking of intertwined items, such as a cyborg, which is "a hybrid of machine and organism, a creature of social reality as well as a creature of fiction", as Haraway [1991, p. 149] describes. The idea of cyborgs is not anything new, but rather the opposite; old myths include several hybrid creatures, such as the centaur, which is a hybrid of a man and a horse. Science fiction stories present one idea of cyborgs, and there the view is based on technological hype. In those stories the cyborgs are created in science laboratories and the results are abnormal individuals with non-human skills or features, such as extraordinary power and tirelessness. An extreme example is the man in Terminator; he could turn into a form of fluid metal. Besides these imaginary views of cyborgs – hybrids of technology and human – there exist cyborgs also in real life. Persons with heart pacemakers and artificial legs are extraordinary examples, but persons with contact lenses or tooth fillings are more general. A cyborg is an object that crosses the boundaries of dichotomies: Haraway [1991] uses it for crossing the gender boundary so that cyborgs are neither male nor female. "The cyborg is a creature in a post-gender world, " Haraway [1991, p. 150] writes.

Besides deterministic and social constructivistic views of technology, the third way views technology as textuality. The focus in such studies is on the processes of construction (writing) and use (reading) of technology texts, and the material and social organisation of these processes. Computer programmes, computers, e-mail messages, databases, manuals, and ICT journals are texts, which are produced and interpreted by people. The production and interpretation take place in the socially organised and materially based activities and practices of actual and particular people. ICT textuality consists of texts, the practices related to them, and the social material-based relations embedded in those practices. The interpretations and production of IS texts are concrete practices among people's daily activities. [Vehviläinen 2000]

2.5.3. The Masculinity of the IS Field

The third type of predisposition that deals with in IS studies is gender bias or the masculinity of the IS field. This issue is dealt with in gender or feminist IS studies, which are far from the mainstream of IS studies. Vehviläinen [2000] presents three approaches for understanding gendering in the context of ICT. These main lines commonly referred to are the liberal feminist approach, the eco-feminist approach and the approach that views gender as a cultural and relational phenomenon. I deal with them one by one.

First, the liberal feminist approach views a career within ICT as a question of women's individual choices if women have equal access to education and

technology use [Vehviläinen 2000]. According to this view, as women are no longer prevented from getting an education because of their gender, then the low percentage of women among IS specialists probably depends on women's attitudes towards ICT. Nevertheless, the possibilities for using ICT are different for men and women. Although it is not formulated that being female prevents women from using ICT, there are more chances for men (and boys) to use ICT than for women. For example, there are plenty of computer games for boys but few for girls.

Second, the eco-feminist approach looks for women's own technology, which is considered different from men's technology [Vehviläinen 2000]. For example, women's data cottages and women's groups have been used to give women an opportunity to develop technology on their own terms, as Marja Vehviläinen organised a study circle for female office workers to define ICT of their own [Vehviläinen 1994a].

The third approach views gender as a social and cultural relation. It sees knowledge itself as gendered, distinct from the liberal approach assumptions. Furthermore, there are differences among women and in women, and thus there cannot exist essential women's knowledge, as eco-feminists claim. The cultural view of gender states that gender is a process and a verb rather than a noun, so that means: "Gender is done", as Vehviläinen [2000] puts it.

Next, I discuss this cultural view of gender. Harding [1986] outlines three levels from which gender and technology can be analysed: (1) gender structure, based on a division of labour; (2) gender symbolism; and (3) individual gender concerning gendered identity and behaviour. These levels are not independent of each other. [Harding 1986] In this subsection presenting the studies of gender and technology, I use this model, although many studies do not belong to only one type.

Inequality among female and male specialists in the IS field can be seen in statistics. They show that the field is male-dominated. The situation in Finland can be seen, for example, from the members of Tietotekniikan liitto (the Finnish Information Processing Association). In 1998 the association had 14 000 members; of them 24 % were female and 76 % male (TTL 1998). There are more men than women in the field, but it is also easier for men to rise in their careers [Camp 1997]. An empirical study in the UK shows that women in the IT industry do not receive equal pay for equal work [Pateli et al. 1999]. This issue can be called a gendered division of labour or labour market segregation (as Kolehmainen [1999] put it).

Technology and masculinity are connected on a symbolic level [Wajcman 1991]. According to Merete Lie [1995], exploring this connection does not imply that all men are equally attached to technology, or that one can prove empirically that a majority of them are. Lie [1995] presents a concept of masculinity as an abstract frame of reference; a kind of standard one refers to in the articulation of one's own as well as other people's gender. The point is that the cultural ideals of masculinity need not correspond to the actual personalities of all men - or not even of the majority of men. The hegemonic model is more often a norm, that ordinary men are not expected to fulfil, but to support as an ideal. Symbols may not be reflections of

the capacities of "real" men, but more probably images of hegemonic masculinity. Gendered symbols and behaviour are not stable. They are not just presented but they are continuously in the making. [Lie 1995]

Masculine identities of technology are described in feminist studies of the computing history. The history has been described as a male victory [e.g., the analysis of the case of Finland by Vehviläinen 1999], although there have been also female pioneers in computing. A mathematician, Augusta Ada Byron Lovelace[14], (1815-1852), was one of them. She developed the "loop" and "subroutine" concepts a century before electronic computing machines appeared. When the first computers were created there was another female pioneer: Grace Murray Hopper[15], (1906-1992). She worked with programming languages. She is often referred to as the grandmother of Cobol. She is known for her contribution to ideas about tools and techniques of compiling and programming, such as subroutines, translation of formulas, relative addressing, and code optimisation. [Gürer 1995]

The masculine identity of technology is remarkably clear in the portrayal of the mastering of technology. The characteristic image of a person interested in ICT is a hacker. Two features are connected to the typical hacker: (1) they are interested in nothing but computers; and (2) they are young men. Furthermore, a hacker is an extreme example of masculine technological culture [Håpnes & Sørensen 1995].

Some studies try to explain the reasons for the gender bias of the IS field. I take two examples. First, Peiris, Gregor and V [2000] display it with a cycle of imbalance including the following steps:

- Computers seem like male things.
- Few women study computing.
- Few women work in the computing industry.
- Few women design computer systems.
- Computer-interfaces are produced from a male perspective.

This cycle model is too simplified, but it includes something essential of this phenomenon. The relative absence of women in technical fields can be seen as an active protest by women, not as a failure [Grint & Woolgar 1997]. As the cycle of imbalance described by Peiris, Gregor and V [2000] explains the visible part of gender bias, Frances Grundy [2000b] analyses the invisible part. She studies the symbolic level in the connection between gender and IT when she analyses if university prospectuses for computing include a hidden message for women. Her answer is that the texts and pictures in prospectuses have a masculine message.

Nevertheless, some women have tried and succeeded in making a career as IS specialists. Some feminist IS researchers find it important to make these "boundary-breakers"[16] visible so that young female novices can have female role models.

[14] For more about Ada Byron, see: http://www.agnesscott.edu/lriddle/women/love.htm (obtained 8.5.2001).
[15] For more about Grace Murray Hopper, see: http://www.agnesscott.edu/lriddle/women/hopper.htm (obtained 8.5.2001).
[16] This term is taken from Christina Mörtberg [1997].

Pringle, Nielsen, von Hellens, Greenhill, and Parfitt [2000] describe successful women in IT in Australia. They report how those women have acted to make their careers in a male environment. Christina Mörtberg [1997] studied a case of IS development in Sweden. In the results of her study she argues [1997, in the abstract]:

> … the category "woman" is not something which is stable or uniform. In the narratives, female system developers are shaped through doing and acting in ways that, at times, make them feel, in comparison, a kinship with other women, while in other contexts they feel they share more with men, specially, perhaps, with those who have similar occupations and walks of life.

Designing and managing ICT is viewed as a male issue, whereas the use of ICT is somehow not so masculine. Lie [1995] describes that not all men find computers as real (or male) technology, but as office equipment. The users of computers in Finland nowadays are as often women as men [Lehto & Sutela 1999]. Some women find it a pleasure to use new ICT in work, as Korvajärvi describes in the case of call centres [Korvajärvi forthcoming].

Nevertheless, there exists an area of computer use that is characterised as a male area. This area comprises new systems made for use in leisure time. I take here two examples of such systems. The first digital city in the Netherlands - that is an Internet IS - was designed by male hackers and they portray of masculine, highly competent and technologically interested users [Rommes 2000]. The other example concerns graphic, multiuser virtual environments. The designers characterised their users as primarily male, relatively young, and economically in the middle class or higher. [McDonough 1999]

2.6. Summary of this Chapter

The central concepts in this study are predisposition, IS research, and IS specialists. Defining the concepts was not an easy task, since they do not have any unambiguous, commonly accepted meanings. My understanding of them has developed during the dissertation process. In this chapter I have mainly described my understanding after writing the articles included as chapters in this dissertation.

I also described what IS studies tell about predispositions. It is an issue that is seldom dealt with in IS studies. Nevertheless, I found some studies that deal with predispositions and I presented them above. Now I outline the main characteristics of them by using the framework that categorises predispositions into attitudes, reductions, and world views.

This chapter describes two world views. It argues that the IS field holds a masculine world view. A lot of researches, analysing the situation on different levels, shows the male bias. The other world view that I dealt with is a mechanistic world view that was presented by Dahlbom and Mathiassen [1997] in Section 2.4.2. The existence of the mechanistic world view is not presented in other studies and the

justification Dahlbom and Mathiassen [1997] give is not completely convincing. Nevertheless, the features others have shown are not in contradiction with this world view.

This chapter describes several examples of reductions, which means that just one side of the phenomenon is seen. This view of IS is limited in two ways: (1) IS is seen as a technical system and as a social system it is less interesting and rarely debated. (2) IS is analysed from the business point of view, whereas other possible points of view are ignored - such as the point of view of state and community institutions, and the one of citizens. Furthermore, the view of technology - or IS - creation underlines the role of IS development but the users' shaping of technology is mostly forgotten. The view of humans is a reduction, in which humans are just seen as users of ICT. This means that humans are seen in relation to technology and other human features are ignored.

The third type of predispositions is attitudes. They were hardly dealt with in the studies I presented above. In addition, Ylijoki presented some attitudes that are commonly held by IS specialists. They are characterised as having a positive attitude towards ICT, innovations in general and new technical products, and in contrast, a negative attitude towards book-based wisdom and regression.

3. The Perspectives Reflected in this Study

3.1. Introduction

I presented the key concepts – predispositions, IS specialists, and IS research – and the studies about them in Chapter 2. It showed that there are few studies of IS specialists and especially their predispositions. My aim is to address this deficiency of knowledge by answering the question:

What kinds of predispositions are shared by IS specialists?

In this chapter I focus on research decisions I have made before and during this study. These are not only practical decisions but also concern my view of scientific knowledge and research work. First, I will describe what kind of research this is by presenting what kind of results I tried to achieve. I believe that the actor - the researcher - has influence on the research process and its results; so, second, I will describe my own background. It will inform the reader from which stance I see the situation. The stance has not been unchanged during the dissertation process, as is seen in Section 3.3. Finally, I will describe what kind of information I think I got about individual IS specialists and for which purposes I see it as useful.

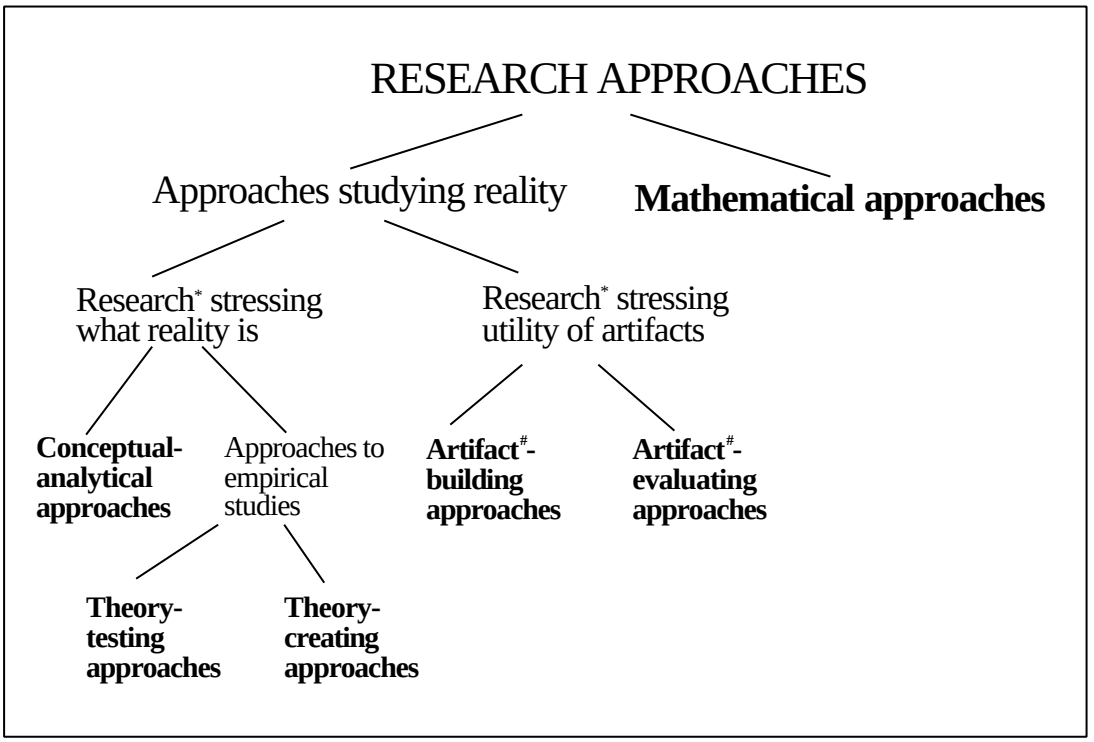
3.2. The Type of Study: Theory-creating

The special feature of IS research is that scholars "…must address the design task faced by practitioners", as March and Smith [1995] put it. Thus, in addition to other types of studies, also design science is a part of IS research. March and Smith's [1995] research framework would be one possible frame for describing my study. In this frame, my research topic, IS specialist predispositions, belongs to the cell of theorising a construct (see Table 3.1).

Table 3.1: A research framework [March & Smith 1995, p. 255]

	Design science		Natural science	
Research Activities Research Outputs	Build	Evaluate	Theorize	Justify
Constructs				
Model				
Method				
Instantiation				

While March and Smith's framework is useful, I find that Järvinen's [1999, 2000, 2001] taxonomy of research methods gives more information to the reader about the idea and type of my study. The strengths of Järvinen's taxonomy are novelty and coverage in the IS area. Järvinen's taxonomy is based on the outcome of the research process. The taxonomy is a tree-type classification of research methods (see Figure 3.1). Its first distinction is between *mathematical approaches* and *approaches studying reality.* In my case, the study deals with reality. I am studying predispositions in the IS field and I am doing it from a practitioners' point of view. To do it I need empirical material about IS practices.



*[sic] "researchers" in origin; #[sic] "artifacts" in origin.

Figure 3.1: Järvinen's taxonomy of research methods [Järvinen 2000, p. 8]

The class of *approaches to empirical studies* is separated into two types: *Theory-testing* and *theory-creating approaches*. In using theory-testing approaches (e.g., laboratory experiments, surveys, and field experiments) the theory, model or framework is either selected from literature or refined for a particular study [Järvinen 2001]. The literature does not include enough promising theory or models about the phenomenon I study to be useful for testing. Before creating and testing my own model, I needed more information about the essence of the phenomenon, so I examined *theory-creating approaches*. They include case studies, the ethnographic method, grounded theory, phenomenography, contextualism, discourse analysis, phenomenological study, hermeneutics, etc. They are suitable for exploratory investigations, i.e., when there is no tentative theory of a part of reality or a

phenomenon. These studies consider past and contemporary realities. [Järvinen 2000]

Järvinen calls this category *theory-creating approaches*. The research output of theory-creating studies is the following [Järvinen 2000b]:

> Based on observations on a certain part of reality a new (preliminary) theory, descriptive model, positive method or construct is derived, or that part of reality is described.

The research output of this dissertation is a description of reality. Besides characterising the kinds of predispositions IS specialists have, I also create a typology of them. Before it is possible to evaluate whether or not this study is theory-creating, we need a clear picture of the essence of theory.

Järvinen based his view on theory upon Dubin [1969], from which he gets four items that a theory should include [Järvinen 1999, p. 13]:

1. a boundary that describes the domain of interest,
2. key constructs within that domain,
3. the values those constructs can take on,
4. the relationships among key constructs.

Walls, Widmeyer, and El Sawy [1992], as well, based their study of theory on Dubin, but on a newer version of his book [Dubin 1978]. According to Dubin, the purpose of a theory is prediction or explanation of a phenomenon, or both. Natural science theories pertain to the physical or biological world and explain relationships among certain aspects of the natural or biological world and/or predict the behaviour of certain aspects of that world. Social science theories perform the same function for the behaviour of people either individually or in groups. [Walls et al. 1992] Certainly, as Järvinen [1999b] states, the social sciences do not generally give a basis for prediction, since human behaviour, for example, cannot be predicted with one hundred percent certainty.

Walls, Widmeyer, and El Sawy [1992] build a design theory for systems design. They state that goal orientation, which is the key element required in design theory, is missing in the theory defined by Dubin [1978], for example. Goals are meaningless in natural science theories – electrons, for example, do not have a goal of changing energy levels. Social science theories, however, deal with goals as objects of study. They categorise theories into explanatory, predictive, normative and design theories [Walls et al. 1992, p. 41]:

> While explanatory theories tell "what is", predictive theories tell "what will be", and normative theories tell "what should be", design theories tell "how to/because". Although normative theories are also concerned with goals, they are distinct from design theories. Normative theories contend that an agent should strive toward a particular goal (e.g. a firm should maximize profit) while design theories deal with how to achieve a goal.

Järvinen [1999, p. 61] states that Walls, Widmeyer, and El Sawy [1992] did not clearly notice the difference between, on the one hand, the natural and social

sciences and, on the other hand, design science. The former asks: "What is the world?" but the latter asks: "Can we build a construct, model, method, or instantiation to be utilised?" Clearly, the two research questions are different.

Sutton and Staw's view of theory follows the same lines as Järvinen's and Dubin's. Sutton and Staw dealt with the question of theory by negation. They formulated their question as: "What is theory not?" According to them, it is easier to identify features that are not theory than it is to specify exactly what good theory is. Their answer is that references are not theory, neither are data, lists of variables, diagrams, nor hypotheses. They state [1995, p. 378]:

> … theory is the answer to queries of why. Theory is about the connections among phenomena, a story about why acts, events, structure, and thoughts occur. Theory emphasizes the nature of causal relationships, identifying what comes first as well as the timing of such events.

All the above researchers state that one element of a theory is that it explains relationships of the phenomenon. In that sense, my work is not theory-creating. I am not trying to explain reasons for predispositions in the IS field but I do try to describe the phenomenon. My case deals with people's thought-models and it is not reasonable, or even possible, to make a causal model that could be used for forecasting how these models will change.

According to Dubin's [1969] criteria I define a boundary that describes the domain of interest and key constructs within that domain, but I do not define the relationships among key constructs. Nevertheless, Järvinen [1999, p. 59-68] showed that Dubin's definition of theory poorly fits design theory. So the views of what theory is, are not all alike. I continue to look for more divergence of opinions about theory.

Besides describing what theory is not, Sutton and Staw [1995] say that more theory is needed in quantitative research, but qualitative research needs more emphasis on data. Especially as we are studying a new phenomenon, the field first needs more descriptive narratives, as van Maanen [1989] states. This view comes near to my view. Furthermore, it gets support from Walsham [1995], who states that Sutton and Staw's description of theory above is positivistic, whereas in interpretive studies theories are ways of making sense of world, rather than truthful mirrors of reality.

March and Smith [1995] deal with research activities and outputs (see Table 3.1). One of the activities they mention is theorising. The first of its outputs comprises constructs or concepts which form the vocabulary of a domain. Conceptualisations are extremely important, since they define the terms used when describing and thinking about theorising domain. However, conceptualisations can blind researchers and practitioners to critical issues. According to March and Smith, one task in theorising is to create a new concept.

March and Smith define the other research outputs as follows [March & Smith 1995, p. 256-257]:

> A *model* is a set of propositions or statements expressing relationships among constructs.
> A *method* is a set of steps (an algorithm or guideline) used to perform a task.
> An *instantiation* is the realisation of an artefact in its environment.

The research task I set out for myself is something like that: to open a discussion in the IS field. To do it, I define concepts and some relationships between them which can be seen as the first phase in the creation of a model. In any case, I can describe my research approach through the theorising process. Weick [1995] underlines that products of the theorising process seldom emerge as full-blown theories, which means that most of what passes for theory consists of approximations. DiMaggio [1995] continues the same line: theory creating is a social process in which the author and the readers are involved. In that sense, I can say my dissertation is theory-creating. It does not describe a strong theory, but it is mid-range theorising. It starts a process of theorising about predispositions in the IS field.

3.3. My Own Background

The mainstream IS studies assume that scientific knowledge ought to be "objective" [Walsham 1995]. Haraway [1991] calls this kind of view the God-trick, since it includes the idea of seeing everything from nowhere by nobody in a given situation. I do not believe in such a view of scientific knowledge, but – as feminist researchers [e.g. Haraway 1991, Vehviläinen 1997] suggest - I see that knowledge is situated also in the case of scientific research. Since it matters who the knower is – the researcher who studies and interprets the situation - I describe here the point from which I observe the IS specialist predispositions. This means that I describe my background and my learning process during this study.

I have studied computer and information systems science at the University of Tampere. In my master studies the focus was on computer science, especially on programming and databases. There were few courses on IS and they followed its mainstream, as business centricity, for example. Alternative methods for systems design were not taught. At that time – in the 1980s - there was a Scandinavian approach that focused on democracy and users' participation [e.g., Bjerknes & Bratteteig 1995] but it was not taught to us. Maybe the reason was that there were too few courses on IS and there was no time for dealing with exceptions. Later, in the 1990s, during my doctoral studies, I participated in seminars in IS studies. In them the main focus was how to study IS in organisations. Still, in it we followed the mainstream of IS studies. However I accept this focus, since understanding it is necessary before one can criticise it. Nevertheless, seeing alternative ways of thinking (or doing, like IS design) helps people to see the limits of their own way and to accept alternative ways.

My starting point as an IS researcher was seeing the world through the world view of the mainstream of IS. This includes seeing information as descriptive facts and technology as a matter of human choice, and believing in positivism in doing research [Iivari 1991; Walsham 1995]. Especially my view of research has been affected by the view of IS studies which assumes that scientific knowledge is objective and value-free [Iivari 1991].

The first time I faced something that challenged the thought-model of IS studies was when I became familiar with gender studies. When I started my dissertation process I did not intend to analyse the material from a gender perspective. However, during the dissertation process my working environment was the team of a project called Mobile Boundaries of Information Society: Restructuring Practices of Working Life (INFOSOC)[17] at the Work Research Centre, University of Tampere. Other researchers in the project analysed their empirical materials from a gender perspective and so I also got to know something about gender studies. They are critical towards "normal" science since it is often presented as objective knowledge [e.g., in general, Haraway 1991; the case of computer science is one example Grundy 1998]. As Haraway puts it [1991, p. 184]:

> Social constructionists make clear that official ideologies about objectivity and scientific method are particularly bad guides to how scientific knowledge is actually made.

While I noted the views that challenge the objectivity of research and I encountered interpretive studies in the Mobile project, I found some of them also among IS studies. Walsham describes interpretivism in IS research [Walsham 1995, p. 376]:

> Interpretive methods of research adopt the position that our knowledge of reality is a social construction by human actors. In this view, value-free data cannot be obtained, since the enquirer uses his of her preconceptions in order to guide the process of enquiry, and furthermore the researcher interacts with the human subjects of the enquiry, changing the perceptions of both parties. Interpretivism contrasts with positivism, where it is assumed that the "objective" data collected by the researcher can be used to test prior hypotheses or theories.

According to Klein and Myers [1999], IS research can be classified as interpretive if it is assumed that our knowledge of reality is gained only through social constructions such a language, consciousness, shared meanings, documents, tools, and other artefacts. I find this kind of research epistemology as useful in studying predispositions.

[17] The leader of the Mobile Boundaries project is Tuula **Heiskanen**, Ph.D. (she is a co-editor of the book *Gendered Practices in Working Life* with Liisa Rantalaiho [Rantalaiho & Heiskanen 1997])). Besides myself, the other project members are Riikka **Kivimäki** (writing her dissertation on telework in sociology), Sirpa **Kolehmainen** (Ph.D. in sociology on labor market segregation), Päivi **Korvajärvi** (Ph.D. in social psychology on gendering dynamics in work organizations), Riitta **Kuusinen** (Ph.D. in educational psychology on co-operation), Riitta **Lavikka** (Ph.D. in sociology on women workers in the clothing industry), and Marja **Vehviläinen** (Ph.D. in computer science on gender and expertise). More specific information about the dissertations is presented in References.

3.4. Using Individuals' Texts as Research Material

There are special features of empirical material consisting of individuals' texts. The first of my text sets includes essays that were published in an academic journal, the *Communication of the ACM.* Academic literature is a social construction of its community. The articles of a journal characterise the norms of the field, but at the same time the articles also construct the thought-model of the field, as Swanson and Ramiller [1993] stated in their analysis of manuscripts submitted to the journal *Information Systems Research (ISR).*

This view argues that knowledge is a social product rather than something generated through the operation of privileged scientific methods [e.g., Haraway 1991, Garcia & Quek 1997]. Actor-network theory (ANT) - that is one approach of social constructivism - views knowledge as a product or an effect of a network of heterogeneous materials [Law 1992]. The network includes human and non-human actors - such as technology, organisations and standards. Certainly, ANT is criticised for paying too little attention to broader social structures and moral and political issues [Walsham 1997].

The social construction of knowledge approach does not consider just scientific knowledge but also more practical knowledge, such as used by IS specialists. The thinking or acting models of one group have certain features that differ from other groups. One such group comprises IS specialists. They shape their own society with knowledge and ways to present the knowledge. The society consists of individuals and they do not all think, speak, and act in the same way. However, there are similarities among them and they are the cultural features of the society. Studying culture through individuals, it is important that individuals in the study situation consider themselves members of the studied culture and behave as such, since the same individuals behave in different ways in different situations. My aim is to find out something about IS specialist culture, so when I am studying individuals, they must be situated in the context of the IS field as IS specialists.

I have observed IS specialist culture through individuals' talk or writing – some texts or discourses[18]. To make this solution more understandable I discuss the concept of discourse. Grint and Woolgar link discourse to the social context. They argue that discourse is not so much a reflection of material reality but a construction of it; a particular way of representing the world through language and practice [Grint & Woolgar 1997, p. 32]. Furthermore, Suoninen states that language is not a neutral, equitable tool for describing issues and actions; rather language is an interpretational resource from which the user of language chooses most suitable cultural tools and other co-actors search for interpretions through cultural understanding [Suoninen 1997]. So language – text and discourse - is useful for studying cultural issues, such as predispositions.

[18] I do not draw a distinction between texts and discourses – whether the material is written or spoken. But when I analyse the material, it is in written form, e.g., interviews that have been transcribed.

Discourse is socially constructed, thus the role that people have in its construction varies. Grint and Woolgar deal with the case of knowledge of technology. They state that our knowledge of technology is knowledge constructed by the powerful, not by the weak; and, equally significant, by the collective, not individuals. The text sets of this dissertation are produced by the powerful, so they have a remarkable role in producing the knowledge of technology. In this case, the powerfulness of the text producers can mean two things; first, the power difference between users and IS specialists; and second, a powerful situation among IS specialists.

Once the empirical material is organised into text sets, then the next step is to analyse them. In the analysis I use discourse analysis. Alvesson and Karreman [2000] separated discourse analysis methods using two dimensions. One is based on discourse and meaning. Its opposite views are discourse determination – in which discourse directly implies or incorporates social and psychological consequences - and discourse autonomy – in which discourse stands on its own or is loosely coupled to the social. The other dimension concerns the formative range of discourse. One opinion is to take an interest in discourse at close range, considering and emphasising local, situated contexts. The other extreme sees discourse as a rather universal set of vocabularies referring to or constituting a particular phenomenon. [Alvesson & Karreman 2000]

With these two dimensions, I can describe what kind of research I am doing. In the dimension of the meaning, my aim is to study "discourse determination", which means that my interest is in dealing with social reality. In the other dimension, which concerns the range of discourse, my aim locates to none of the extremes, but it is more in the local, situated context. The situation is not geographical but occupational. I analyse the situation from IS specialists' points of view.

However, a possible problem in using texts as research material is that informants' knowledge of the phenomenon can be defective or they might intentionally distort [Klein & Myers 1999]. People may produce politically correct opinions in interviews or conversations without any particular feelings or convictions being involved [Alvesson & Karreman 2000]. I do not find this as a big problem in my study. My first material includes essays that were published in the *Communication of the ACM.* Many of the authors are well-known in the IS or computer science field. If they wrote essays that they did not believe at all, they would face uncomfortable situations in the IS community when others would ask about their visions. In this sense, it would be easier to describe something unfounded in the interviews since only I know exactly what they said. The truth or falsehood of facts mentioned in the interviews is not crucial or important.

According to Mingers [2001] communicative action as real, purposeful pragmatic interaction between social subjects contains four validity claims. One of them is truth and the others are comprehensibility, rightness, and sincerity. Comprehensibility simply means that the utterance be understandable to a competent speaker of the language. The other three refer to relations between the utterance and three different worlds – the objective world of actual and possible states of affairs,

the social world of normatively regulated social relations, and the subjective world of personal experiences and beliefs, respectively. [Mingers 2001]

In the case of the two text sets, the essential claims are rightness and sincerity. Rightness is connected to the social world of IS specialists, which means being, acting and speaking as IS specialists are supposed to do. Sincerity is connected to persons' subjective worlds. In these senses, it was practically impossible to "lie" about themselves – they would have had to pretend to be someone entirely different - for example, instead of being an IS specialist, to be a housewife or a detective. It would not be enough to act as a housewife or a detective but the one being interviewed should change his/her way of thinking from the IS specialists' way to the way of the presented one.

In interpretive studies it is assumed that research materials are socially constructed through the interaction between the researcher and participants and that the researcher's preconceptions guide the research design and actual findings [Klein & Myers 1999, principles 3 and 5]. I find that this cannot be avoided completely, but critical analysis also from this point of view reduces this problem. In addition, it is important that the researcher's role is visible. Above in Section 3.3, I described my background.

The results of this dissertation do not follow my preassumptions but my conceptions have been changed during this process. The change is seen best in my discussion of the masculinity of the IS field. At the beginning of the process I knew that only few IS specialists are women, but I had not realised that the thought-models in the IS field include some male bias. However, some interviewees had such a strong male bias in their narratives - ignoring all women - that I became interested in the gender aspect and I had to analyse it. At that stage, I did not have sufficient concepts to deal with gender issues.

4. The Dissertation Research Process

4.1. Introduction

In this chapter I present how I studied IS specialists' predispositions in practice and describe the steps of the research process. Here the focus is on how I chose, collected, read, interpreted and analysed the text sets. In the next two sections I give an overview of these two text sets. They include IS specialists' visions of the future. In Section 4.4 I deal with the principles of interpretive studies, since they have guided this research process. In Section 4.5 I touch upon the discussion of global and local perspectives, since the difference between the text sets can easily be explained by that discussion.

The first text set includes essays published in the *Communication of the ACM*. This text set is only considered in Chapter 7, and that chapter includes the description of the text set and its analysis. I do not address it in this chapter. The second text set consists of the interviews, and is used in several chapters (Chapters 8, 9, and 10), but is not thoroughly described in any of those. In the present chapter, after the descriptions and comparisons of the two sets of materials, I describe the interview material in depth.

4.2. Overview of the Two Text Sets

In this dissertation I have used two text sets, which both include IS specialists' descriptions of their visions of the future. The first text set consists of essays that have been published in the *Communications of the ACM*. The second text set is composed of interviews of IS specialists.

The first text set includes 31 essays on the future. They were published in an academic computing journal, *Communications of the ACM*, in its 50th Anniversary issue in February 1997. Most of the essays had one author, but some had several, up to nine authors, so the total number of the authors was 49. The length of an essay varies from one to six pages. The lists of the essays and the authors are in Appendices at the end of Chapter 7. That chapter describes the essays, my analysis of them, and the results of the analysis.

This text set contains visions of future technology. The editor of the *Communications of the ACM*, Diane Crawford, describes the types of visions in the essays as follows in the Editorial Points [Crawford 1997, p. 5]:

> We decided rather than ask them to predict what the next 50 years will bring, we were interested in more personal essays. We wanted to know their *hopes* for the future of technology.

I decided to get another text set, as well, since there were some biases in this first text set. One bias was that the perspectives used in essays are different from IS studies in general: the organisational perspective is missing in these visions. The other biases were based on the choices made by the *Communications of the ACM*: there were few women and few non-Americans among the authors (more in Chapter 7).

The second text set includes 24 interviews of IS specialists. In the interviews they told me their visions of the future. The interviews were open and they discussed with me from one to two hours. I interviewed them separately and asked their personal views, not the view of the organisation, for example. The interviews were carried out during 1998. They are presented in great depth in Section 4.4.

I wanted the interviewees to tell me their visions of the future and also to evaluate the visions and to visualise a desirable direction of development. In this case the task of an interviewee was quite similar to essay writing, although the form of the outcome was different. A written essay is shorter and more compact than ex tempore talking in an interview.

The other similarity in the text sets is the target group. In both cases the visions were presented by IS specialists. The editor of the *Communication of the ACM* said that "past, present, and future computing pioneers, industrial observers, and technical leaders" [Crawford 1997] were asked to write essays. I chose that kind of people to be interviewed, although the profile of the IS specialists chosen was a little different: all of the interviewees were Finnish and among them were more women.

4.3. The Subject of this Study: Visions of the Future

Both text sets contain visions of the future. I had two reasons for dealing with them. The first one comes from inside the IS field: it is future oriented. There are expectations that the exponential growth of ICT would continue in the future (see, e.g., in Chandra et al. [2000] visions about the changing of IS frontiers). It includes the idea that when computer hardware became more powerful, it provided new opportunities for software and IS. According to Friedman and Cornford [1989], hardware costs and limitations of capacity and reliability constrained the development of IS from 1940 to 1960. After that there was a phase of software constraints. Such as the productivity of systems developers and difficulties in delivering reliable systems on time and within budget. At the beginning of the

1980's we passed this phase, as well, and moved on to the phase of constraints in user relations. [Friedman & Cornford 1989]

The other example of the future orientation of the IS field is that the *Society for Information Management (SIM)* has surveyed its members to determine the most critical issues in IS function from the 1980's onward. The surveys were done using the Delphi method[19] and the results have been published in the *MIS Quarterly* [Ball & Harris 1982; Dickson et al. 1984; Brancheau & Wetherbe 1987; Niederman et al. 1991; Brancheau et al. 1996]. The latest list of the top 10 key issues in the IS function is the following [Brancheau et al. 1996, p. 229]:

1. Building a responsive IT infrastructure;
2. Facilitating and managing business process redesign;
3. Developing and managing distributed systems;
4. Developing and implementing an information architecture;
5. Planning and managing communication networks;
6. Improving the effectiveness of software development;
7. Making effective use of the data resource;
8. Recruiting and developing IS human resources;
9. Aligning the IS organisation within the enterprise;
10. Improving IS strategy planning.

In the discussion part of their article, Brancheau, Janz, and Wetherbe comment on technology infrastructure's high position on the list as follows [Brancheau et al. 1996, p. 234]:

> In ranking technology infrastructure so highly, these executives are trading off the importance of business relationship issues. Many of the business relationship issues […] have declined in importance over the past two studies. This does not imply that these issues are not important, but only that the executives participating in the study are focused on "implementing and delivery" more than on "planning and alignment".

Besides the fact that the IS field is future-oriented, also the society around the IS field expects that the IS field will develop and play an important role in future making. This is seen in the discussions of the information society starting from 1993. In that year, President Bill Clinton and Vice-President Al Gore linked America's destiny with the creation of the national information infrastructure (NII)[20] and around NII a strategy was created to network the nation [Iacono & Kling 1996, NII 2001]. Later similar strategies were created for the European Union [Bangemann 1994], Finland [e.g., SITRA 1998] and Finnish cities [e.g., Eriksson 1999].

[19] The Delphi method is used in futures studies. The Delphi method employs a series of linked questionnaires. Successive rounds of questionnaires summarise subjects' responses to the preceding questionnaire and ask respondents to re-evaluate their opinions based upon the summarised results. [Brancheau et al. 1996]

[20] For more information on NII, see web page http://nii.nist.gov/nii/niiinfo.html (obtained 18.4.2001).

4.4. The Type of Study: Interpretive Research

My dissertation belongs to *theory-creating approaches* in Järvinen's [1999, 2000, 2001] taxonomy of research methods. In Järvinen's taxonomy the basis of classification is research outcome. The type of research can also be described by the essence of (scientific) knowledge and the process, by which the knowledge is achieved. In this basis of classification, my dissertation belongs to interpetive studies. Next I deal with the principles of interpretive studies, since they have guided the research process.

Klein and Myers [1999] identified seven principles of interpetive studies. The principles are interdependent. The aim of Klein and Myers' article is to address the quality standards for interpretive research in order to aid authors and reviewers. The scope of the Klein and Myers [1999] article is interpretive field studies, which, according to the authors, include in-depth case studies and ethnography. Although my dissertation is neither of those, rather discourse analysis, I find that the principles are quite useful in my case.

Klein and Myers [1999] state that it is incumbent upon authors, reviewers, and editors to exercise their judgement and discretion in deciding whether, how, and which of the principles should be applied and appropriated in any given project. I present briefly the principles and how they are related to this dissertation.

1. The fundamental principle of the hermeneutic circle

This principle suggests that all human understanding is achieved by iterating between considering the interdependent meaning of parts and the whole they form. This principle of human understanding is fundamental to all other principles. [Klein and Myers 1999, p. 72]

This principle describes the main idea underlying this dissertation. I analyse concrete texts and their limited perspectives, at first separately, but through the analysis getting a larger understanding of the phenomenon. In Chapters 7-10, I describe the separate perspectives, on the one hand from the point of view of the empirical material, and on the other hand from the point of view of theoretical discussion. I then describe in more detail, with the case of interview analysis, how I have followed this principle in Subsection 4.6.3.

2. The principle of contextualisation

This principle requires critical reflection of the social and historical background of the research setting, so that the intended audience can see how the current situation under investigation emerged [Klein and Myers 1999, p. 72].

In the case of this dissertation, the research setting is how the two text sets have been shaped and from what kinds of situations the texts come from. The context of the first text set is a journal and so also the IS community. The contexts of the second text set are Finnish society and the IS community but also the interviewing situation. I compare the situations of the text sets in Section 4.5 and I describe the text sets separately (the essays in Chapter 7 and the interviews in Subsection 4.6).

3. The principle of interaction between the researcher and the subjects

This principle requires critical reflection on how the research materials were socially constructed through the interaction between the researcher and participants [Klein and Myers 1999, p. 72].

In the case of this dissertation, the interaction between the researcher and participants differs from the case that Klein and Myers describe. In my case, the interaction is remarkably limited. In the case of the essays, there was no mutual interaction, only parallel. I did not meet the authors and they did not even know me or my interest in their texts. The interaction that did exist, was my interpretation of their texts. I did it from my situation, that is, in the IS field, and I tried to get a picture of the authors' situation. The other text set in this dissertation includes interviews. In that case, there was interaction between me and the interviewees, which I describe something about it in Section 4.6.

4. The principle of abstraction and generalisation

This principle requires relating the idiographic details revealed by the data interpretation through the application of principles one and two to theoretical, general concepts that describe the nature of human understanding and social action [Klein and Myers 1999, p. 72].

In this dissertation, I discuss the abstraction and generalisation of the findings separately in the articles.

5. The principle of dialogical reasoning

This principle requires the researcher to confront his or her preconceptions (prejudices) that guided the original research design (i.e., the original lenses) with the data that emerge through the research process [Klein and Myers 1999, p. 76].

I described my background in Section 3.3. It shows that my starting point for this dissertation process was mainstream IS studies. During this process my views (or preconceptions or lenses) have changed because of the empirical materials (i.e., text sets) but also because of the Mobile Boundaries project in which I worked and the theoretical literature I read. The biggest change in my views was in the case of the

masculinity of the IS field. When I started the dissertation process I was not interested in gender studies, but the masculinity was so strong in some interviews that I could not ignore it in the analysis. At that point, I did not have sufficient concepts to analyse the gender issue, so I needed to read gender literature and try the analysis again later. I describe the process of analysing the gender aspect of the interviews in Chapter 8. Also other articles include description of the dialogical reasoning of my theoretical understanding and the content of the text sets.

6. The principle of multiple interpretations

This principle requires sensitivity to possible differences in interpretations among the participants as are typically expressed in multiple narratives or stories about the same sequence of events under study. Similar to multiple witness accounts even if all tell it as they saw it. [Klein and Myers 1999, p. 72]

In this dissertation, the multiple interpretations are visible in the case of the interviews. I wrote three articles about them and they all concern interpretations from different perspectives.

7. The principle of suspicion

This principle requires sensitivity to possible "biases" and systematic "distortions" in the narratives collected from the participants [Klein and Myers 1999, p. 72].

In this dissertation I am analysing IS specialists' predispositions, which include the biases they have. So the whole dissertation concerns this principle.

4.5. The Situation of the Text Sets

Klein and Myers' [1999] second principle states that the social and historical background should be described in interpretive studies. I do it in two ways. First, I describe the geographical situation of the text sets, that is, the countries in which the producers of the texts live and the discussions of technology in those countries. Second, I describe the text producers' situation among IS specialists, especially how the interviewees differ from the mainstream of the IS field.

4.5.1. Geographical Situation

My two text sets follow somehow a division into global and local. The essays published in the *Communications of the ACM* represent the global. The interviews represent the local, situated in Finland, since it consists of Finnish IS specialists'

views. In fact, global and local perspectives exist somehow in the both text sets but their emphasis is different.

In discussion of globalisation it is often argued that local differences will disappear. The same things (e.g., Nike products) and the same language (that is, English), will be used all around the world, the same firms (e.g., McDonalds) will operate everywhere, and all people will watch the same American television series [Beck 1999]. It might be true that this may lead to a situation in which all people think in the same way. Ulrich Beck [1999] agrees that some international companies operate all over the world but he does not accept that the same models are taken everywhere. He states that all global issues are situated to the local culture. One example he uses is the comics of Donald Duck, which are rewritten to fit local situations with local names all over the world. Beck calls this action localisation. Also technology is localised; for example, there are different versions of Nokia mobile phones for different geographical areas[21].

Table 4.1: The countries where the authors of the essays are living

Country	USA	France and USA	Japan and USA	Canada	German	Not mentioned
No of authors	24	1	1	1	1	23

The *Communications of the ACM* chose for the authors of future essays "past, present, and future computing pioneers, industrial observers, and technical leaders" [Crawford 1997]. The journal gave the impression that the authors are from all over the world as the journal is international, and so is the association (ACM). Still, the mainstream of IS studies is American [e.g., Walsham 1995] and it is seen in the text set, as well. The essays include authors' self-descriptions and half of them include the author's country. I present the numbers of authors per country in Table 4.1. Only a few mentioned coming from outside the USA. The problematic point is those who have not mentioned where they come from. I assume that most of them (maybe all of them) come from the USA, since deviation from the American mainstream would have probable been mentioned. In any case, only three mentioned coming from outside America but two of them mentioned two places of residence; one in the US and the other abroad.

The other text set consists of interviews. I interviewed 24 IS specialists about their visions of the future. All interviewees live in Finland and are Finnish ethnically, so the Finnish society is their context. This text set is located to Finland and Finnish culture. Next I compare if the geographical difference could be remarkable.

First, I use Hofstede's [1991] comparison of national cultures. In this case I put the text set of essays as American, although it is not such completely. According to

[21] Although the Internet is said to be global, there are separate Nokia phone www pages for different continents: Asia: http://www.nokia-asia.com/nokia_apac/asia_pacific/current_models; Europe and Africa: http://www.nokia.com/phones/index.html; United States: http://www.nokiausa.com/ (the pages are obtained 12.12.2001).

Hofstede [1991], the biggest difference between Finnish and American culture is that Finland is more "feminine" than the USA. In “masculine” countries the important things are [Hofstede 1991, pp. 81-82]:

- Earnings: Have an opportunity for high earnings.
- Recognition: Get the recognition you deserve when you do a good job.
- Advancement: Have an opportunity for advancement to higher level jobs.
- Challenge: Have challenging work to do - work from which you can get a personal sense of accomplishment.

For the opposite, “feminine”, pole [Hofstede 1991, p. 82]:

- Manager: Have a good working relationship with your direct superior.
- Co-operation: Work with people who co-operate well with one another.
- Living area: Live in an area desirable to you and your family.
- Employment security: Have the security that you will be able to work for your company as long as you want to.

I find the labels that Hofstede selected (“feminine” and “masculine”) are not particularly apt. Still, I present Hofstede’s description, since it argues that there are some differences between Finland and the USA.

Although the interviewees live in Finland, they are not isolated from global situations. They have personal contacts abroad. Five of them have lived abroad, studying or working there. The countries where they lived are Sweden, Germany, United Kingdom, and the USA. Many of them also have other international contacts, like foreign friends.

The other level of international contacts is the organisational level. Some of them have worked or are still working in an international company; in a Finnish subsidiary of a foreign company or Finnish company, which has extended to other countries, as Nokia for example. Besides of this kind of international contact, several of them mentioned that the organisation where they work uses international software products, most often Microsoft products.

The third level of interviewees’ internationalism is the level of society. Finland is a country that is presented as a laboratory of the future information society [see, e.g., Kasvio 2000]. The discussion of the information society is international. The discussion started about thirty years ago, when Drucker's book, *The Age of Discontinuity* [Drucker 1969], was published in London. The discussion became more common, notable, and technology-centred in the 1990s. This discussion started from the USA; in 1993 President Clinton and Vice President Gore linked America's destiny with the creation of the National Information Infrastructure [NII 2001]. After that similar discussion gained momentum also in Europe [e.g., Bangemann 1994, Webster 1995, SITRA 1998, Karvonen 2000a, Karvonen 2000b].

The other relevant point here about the internationalism of Finnish society is the technology-centricity, and even technology determinism, of the Finnish discussion of the information society [Aro 2000]. Technology (in this case especially ICT) is an

international conception as is the information society. This is evident in the Finnish discussion, which brings up as Finnish excellence things that are not completely Finnish. I take three examples. First, the high numbers of Finns with Internet access or a cellular phone is underlined. The Internet is presented as a genuine example of joint artefact creation, regardless of the boundaries. The last two examples are Finnish technology creators, who are presented as heroes: Jorma Ollila, CEO of Nokia, and Linus Torvalds, the father of the operating system Linux [e.g., Lyytinen & Goodman 1999]. Nokia is originally a Finnish company but it has expanded and become a multinational company, which still operates also in Finland. The other hero, Linus Torvalds, was born and studied in Finland but nowadays he lives in the USA. Linux is another example of a jointly created artefact as is the Internet but Linux is notable in that it challenges the Microsoft monopoly.

4.5.2. The Situation among IS Specialists

Above I explained that the text sets are situated somehow in different places in the geographical world. The other perspective is how they are situated in the IS field.

The first text set consists of essays published in the *Communication of the ACM.* According to the editor, “past, present, and future computing pioneers, industrial observers, and technical leaders” [Crawford 1997] were asked to write essays. So in this case, the journal chose of the authors. As the role of an academic journal represents and also constructs its field [Swanson & Ramiller 1993], it is important what kinds of people are chosen. I find that the chosen authors belong to the category which editor Crawford defined. However, there were two biases: Most of the authors are from the USA and most are men (among 49 authors, just four are women). Most of the authors are from computer science or IS studies or industry in these fields, but there are some of the authors working outside those fields, as well. The outsiders' areas are future, democracy, environment, and brain studies. There is also a group of high school students. (More about the choices in Section 7.4.)

The second text set consists of interviews of Finnish IS specialists. The mainstream of IS studies is American, but Finnish practice somehow differs from it. I describe Finnish IS practice starting from the beginning of computing history. The first computers came to Finland at the end of the 1950s, which is later than in the USA. However, we can say that the beginning of IS development happened in Finland in the 1960s. At that time Finnish pioneers took examples from the USA and Sweden. American computer pioneers focused on programming; in addition, Finnish and Swedish pioneers focused also on IS development. The Finnish and Swedish pioneers created new professional practices that took into account not only technical progress but also the organisational activity as a whole. Otto Karttunen, one of the Finnish IS pioneers, describes IS design in the 1960s that our Finnish "…understanding of systems design was much broader, even so that it influenced the restructuration of work processes and organisational changes." [Vehviläinen 1999, p. 47]

Finnish IS development differed from the American path from the beginning of computerisation and some kind of difference has continued. The difference is in the users' role in IS development; participatory design is more common in Finland and Scandinavia than in the USA. Clement and Van den Besselaar [1993] studied participatory design projects reported at conferences sponsored by IFIP WG9.1 (Computers and Work) and found that they were carried out in ten countries; besides Finland and Scandinavia (Sweden, Norway, and Denmark), also in Austria, Australia, Canada, Germany, Italy and the UK.

Participatory design has long traditions in Scandinavia, starting from the 1960s. The *Trade Unionist Approach* to IS development is the oldest one. Its goal is "to develop conditions for effective worker participation in order to support democracy at work and the quality of work" [Iivari et al 1998, p. 168]. Finland does not literally belong to Scandinavia, nevertheless, Finland is not so far from Scandinavian approaches to IS development. Users' participation is valued among Finnish IS specialists. Older examples of Finnish research projects involving participatory design are Pertti Järvinen and Pekka Tyllilä's action research on changes in office workers' posts with the introduction of a computer system [Järvinen & Tyllilä 1980] and Marja Vehviläinen's study circle for office workers [Vehviläinen 1991, 1994]. Newer examples are Hannakaisa Isomäki's study of IS specialists' concepts of human beings [Isomäki 1999] and Helena Karasti's doctoral dissertation about the sensibility towards everyday work practice in IS design. Besides participatory design, Karasti is inspired by feminist IS design, as well. [Karasti 2001] Participatory design is highly valued among some Finnish IS researchers, but some practitioners also aim towards user participation. Most of practitioners' experiments are not reported anywhere, but simulation games which make visible everyday work practices are reported [Piispanen & Pallas 1991, Piispanen 1995].

4.6. The Interview Part of the Study

In this section I describe the interview study, its text set and its analysis in more detail. I deal with them in several articles, outlining the interview study and its text set briefly. Here I do not deal with the first text set and its analysis, since it is well described in Chapter 7.

For interviews I chose IS specialists who are involved in making future technology. I discuss them in terms of two contexts: the context of Finnish society and the context of IS, as I described above. Their work can be characterised as participating in negotiating about coming developments. They do it at the level of Finnish society: they are visible in the Finnish public discussions of the future, they sell their ideas of future technology and its use as leaders, mentors, authors, experts, or political decision makers. Since an important part of their work is talking, it is useful to analyse their speech.

First, I describe the plan for interviews, what kinds of topics we dealt with in the interviews. Second, I describe what kind of people I chose for the interviews. I tell something about their background, but the description will be at a general level, since I do not want the interviewees to be identifiable. Some of them wanted to remain anonymous, since they told me their own opinions, which might differ from their organisations' official views. However, some of them said that they would like it if I mentioned their names. Among those were consultants and managers of small units who said that their opinion is the official view of the unit. On the one hand, some of the interviewees appear in public Finnish debates and so mentioning their names would make it possible for a Finnish reader to link background information about them. On the other hand, if only one wants to be anonymous, that is the way in which I will present them. I decided to handle all of them in the same way, so they are anonymous[22].

4.6.1. The Themes of the Interviews

Before the interviews I defined the topics to be discussed. The interviewing process was shaped during the interviews and the questions asked varied in different interviews; the questions were never structured but rather were open-ended.

The interviewing proceeded from smaller to larger sphere. At the beginning of an interview I asked some background information about the interviewee; her/his education, age, and work experience. Then I showed the interviewee two visions of future user interfaces and asked him/her to evaluate them. After that introduction to thinking about the future, the interview topics were focused on:

1. technology;
2. the individual's life;
3. groups or organisations;
4. the (Finnish) society;
5. the global situation.

When people think about the future, they normally think that most things will be similar to the way they are now. I wanted to help the interviewee to think about the changing future, so at the beginning of envisioning the future part I showed the interviewee a paper about user interfaces. The paper[23] includes some historical information about the time of milestones and, as well, two visions of future user interfaces. I took the visions from the essays appearing in the *Communications of the ACM* which are presented and analysed in Chapter 7. I showed two visions:

1. a user interface with natural language, pointing with sight and gesture (presented by van Dam [1997]);
2. a direct mind-to-machine interface (presented by Raskin [1997]).

[22] There is one exception where I use the interviewee's name. It is in Chapter 6: Predispositions as future makers, where I present an example told by one of my interviewees. He read and commented on the draft before it was published.

[23] The paper I showed to them, translated in English, is in Appendix 4.1.

I started the discussion by saying: “What do you think about these?” I had in mind that interviewees might evaluate how possible they think the fulfilling of the visions was and how desirable it was. After evaluating the shown visions, the interviewee had a chance to tell his/her own vision of future interfaces. Beforehand, I expected that they would tell me some possible, desirable and undesirable, development directions.

The next theme was technology. I did not define for the interviewee what I mean by technology, but I assumed that we were dealing with ICT. I wanted interviewees themselves to decide what kind of technology they considered most essential.

For the next theme I chose people's lives, since ICT is made for human purposes (see, e.g., March and Smith’s [1995] definition of IT). I wanted them to deal with people, to tell me their vision of how people's lives will be changed in the future. I thought it was best to ask it directly.

For the next theme I chose changes in working groups and organisations. Since information systems are most often built for organisations [Avgerou 2000], it is a common context for IS specialists. Since in the 1990s the coming of an information society was much discussed, I chose Finnish society as a theme. Furthermore, globalisation is a theme that is often discussed in connection with the information society, so I also chose it as a theme in the interview.

The target in the interviews was to get interviewees to talk about the future in their own way. I tried to support continuing the discussion about topics they chose and to avoid directing them and to avoid using fashionable terms, like 'teleshopping" and "virtual reality" – they were used only if the interviewee used them; then I did the same.

4.6.2. The Interviewees

In this subsection I describe how I chose the interviewees and what kind of people they are. The interviewed IS specialists were leaders, mentors, authors, experts, or political decision-makers in the areas of IS and ICT. I do not mean those people whose object of work is the concrete development of computer hardware or software, like programmers.

My aim in choosing the interviewees was to get those specialists who often appear in public discussions of the technological future. I also wanted to get such people who might have alternative opinions and broader views. One limitation I made was that I did not want researchers, but practitioners. This solution I reached already when I defined the research question. The researchers' point of view is present in any case, since I belong to that community. Other researchers' have influences on my views through conferences and seminars, and publications, which I read and refer to. Furthermore, there is competition among the researchers, so it is not certain

whether other researchers would have wanted to tell me their ideas about the future. In contrast, the practitioner point of view is not so well reported nor studied, neither am I their competitor. Since I am an outsider in a practitioners' world, from this position it is easier to perceive and analyse predispositions.

Some of the interviewees I found myself but also I got help from other researchers[24]. It was easy to find specialists who have appeared often in public. I also chose managers from different types of enterprises. Some of them are typical IS companies, like software houses, or users of ICT, like banks. Some interviewees I wanted from non-typical areas of ICT use, like new media and children's education, and from geographically peripheral areas.

I contacted directly the chosen IS specialist by sending an e-mail to her/him or phoning[25]. Most of them agreed immediately to be an interviewee, although some of them were busy and we reserved the date of interview for later - in some case up to two months later. There were two interviewees whom I had to persuade. One of them has appeared often in public in Finland and so he receives more requests for interviews than he can accept. It took a little while to persuade him. I am happy I got the interview with him, since he had some ideas that others did not tell me.

The other person who did not want to be interviewed suspected that she did not belong to the group of IS specialists; she defined herself as a female entrepreneur. Nevertheless, already in the 1980s she worked in a post where the task was to support the use of IT in the local area. Some years later she started as an entrepreneur to educate people and consult enterprises about IT issues. Later she started to sell software, as well.

Next I describe the characteristics of my 24 interviews. At the time of the interviewees, they all had positions in which they participate in negotiating future technology. Eleven of the interviewees worked in a company that makes or mediates software or ICT. Their positions were director, mentor or expert. Two of them worked in an association that supports IS specialists and ICT use. Nine of the interviewees worked in a (private or public) user organisation in the position of director (in the IS field), IS project leader or mentor. Four of the interviewees worked as independent consultants. At least 13 of the interviewees are visible in the Finnish public discussion about the information society. They are primary actors in future ICT, they give expert statements, or journalists write about them, since they are making new ICT or helping to use it. I find all of them to be skilled and proficient in speaking, presenting and arguing their opinions.

Almost all of the interviewees have an academic education. Seven of them have studied computer science, several have studied mathematics and some others have studied engineering. Also, among the interviewees there were degrees from several

[24] The other researchers in the project Mobile Boundaries of Information Society in which I work helped me, among others. They are Hannakaisa Isomäki from the University of Jyväskylä, Katriina Karkimo and Saila Ovaska from the University of Tampere, and Riitta Smeds from the Helsinki University of Technology.

[25] The letter, translated into English, is in Appendix 4.2.

other disciplines, like economics, social sciences, and political science. Two of the interviewees have taken two degrees, one of which was economics. There were three interviewees who have not yet finished their studies and one is an engineer who has studied in a short special program for switching to the ICT area.

There were also other differences among the interviewees, for example, age - the youngest of them was 22 years old, and the oldest 58. Both sexes were represented - there were nine women and 15 men.

All the interviewees are Finns and Finnish speaking[26]. They were born in Finland and lived all or the most of their lives in Finland. Most of them have studied in Finland, some have studied for short periods abroad and one studied for a degree in Sweden. Some interviewees have worked abroad and some of them have, in their present[27] job, close connections to some other countries. Most of them have moved during their lifetime. At the time of the interviews, they lived in the following areas of Finland: 14 interviewees in the area of the capital, six elsewhere in Southern Finland, two in Eastern Finland, two in Central Finland, none from Lapland.

In this section I have described the background of the interviewees, drawing a picture of interviewees in the context where they work. I hope it helps the reader to understand and interpret the quotations from the interviewees' visions presented in Chapters 6-10.

4.6.3. Analysis of the Interview Material (text set)

In the kind of interviews I conducted, one cannot separate collecting the empirical material and analysing it [Miles & Huberman 1994]. Such interviews are more like normal discussions, so the analysis starts during the interviews. When the interviewee answered something, my next comment or question depended on the interpretation I made of the answer. However, there were some differences from normal discussions. We were not equal partners in discussion; rather, I wanted them to set the direction and areas of the discussion. For example, I asked them to expand their answers and to explain what they meant by the terms they used. Furthermore, I tried to avoid pushing my own opinions into the discussions.

Although the interviewing frame was the same in all 24 interviews, the interviews were not similar. Besides interviewees' interests and knowledge influencing how interviews proceeded, I also learnt during the interview process. Intentionally I chose a method for data gathering that allows seeing things which are not known beforehand nor expected. When I encountered some interesting points in an interview, I was more careful with those themes in the later interviews. A concrete example is the gender issue, which I examined more closely after it arose in the interviews. Discussing with Interviewee No. 5, I got the feeling that he talked just

[26] There is, in Finland, a Swedish-speaking minority and there is academic education on information systems and computer science in Swedish, as well.
[27] With "present" I mean at the time of the interviews.

about men, and I felt annoyance when I thought that people like me did not exist in his world. When this doubt arose, in the subsequent interviews, I listened more carefully for indications of gender bias.

When I started to systematically analyse the interviews, I did not have any explicit frame in which I looked at the interviews, since I wanted to give space to the material. I tried several interpretations and I rejected some of them. The analysis work has been an interaction between empirical material, and theoretical thinking and reading. The interviews include details (e.g., some words the interviewee used) that made me think about their meaning and about the context they came from. To understand the interviews I had to read more scientific literature to find some framework, or even concepts, with which I could deal with them.

The method of analysis follows the fundamental principle of interpretive studies that Klein and Myers [1999] defined. That is, the principle of the hermeneutic circle, which suggests that all human understanding is achieved by iterating between considering the interdependent meaning of parts and the whole they form [Klein and Myers 1999, p. 72]. Newman and Boland describe the hermeneutic circle in depth [Newman & Boland 1996, p. 1]:

> "Hermeneutic circle" is the phrase for describing the structure of the interpretive act. It refers to the way that any act of interpretation is a simultaneous consideration of some detail (word, feature, event, characteristic) in light of some sense of the whole (intention, situation, relevant context). Interpretation is necessarily a union of both detail and sense of a whole, but the two stand in a tenuous relation of reciprocal validation. Each depends on the other in order to be plausible. A detail is understood in a particular way and is worthy of being attended to only because of the sense of whole with which it is approached, and the sense of whole is believable and deemed appropriate only in light of the details being attended to. Interpretation is a process characterized by a “tacking” back and forth between detail and whole, in which the appropriateness and plausibility of each is opened for questioning by the other.

The potential components of the hermeneutic circle are shown in Figure 4.1. *Textual criticism* means establishing an accurate version of the original text for subsequent analysis [Newman & Boland 1996, p. 3]. In my case this is the work done by a research assistant, Hanna Mari Ahvenjärvi. She transcribed the interviews. Mainly she typed only the words the interviewee and I said, but sometimes she also added some comments, like laughing, muttering, or a break. Ahvenjärvi added such comments in cases in which the interviewees' activity might change the meaning that the words literally give. In fact, it depended on her interpretations when Ahvenjärvi decided to write a comment. I read the written interviews and the interviewees had a chance to read and to correct their own interviews. Only two of the interviewees wanted to make some changes and those changes were small.

Linguistic criticism means establishing the accepted meaning of words and phrases in the community in which the text was produced at the time of its production [Newman & Boland 1996, p. 3]. To explain the meaning of this in my case, I take one example and use it also in some following criticism. The example is "an emperor", and it is taken from a quotation included in Chapter 8: Masculine World

Disguised as Gender Neutral, in Section 8.4. The interviewee meant by "emperor" as someone who plays computer games in a virtual world.

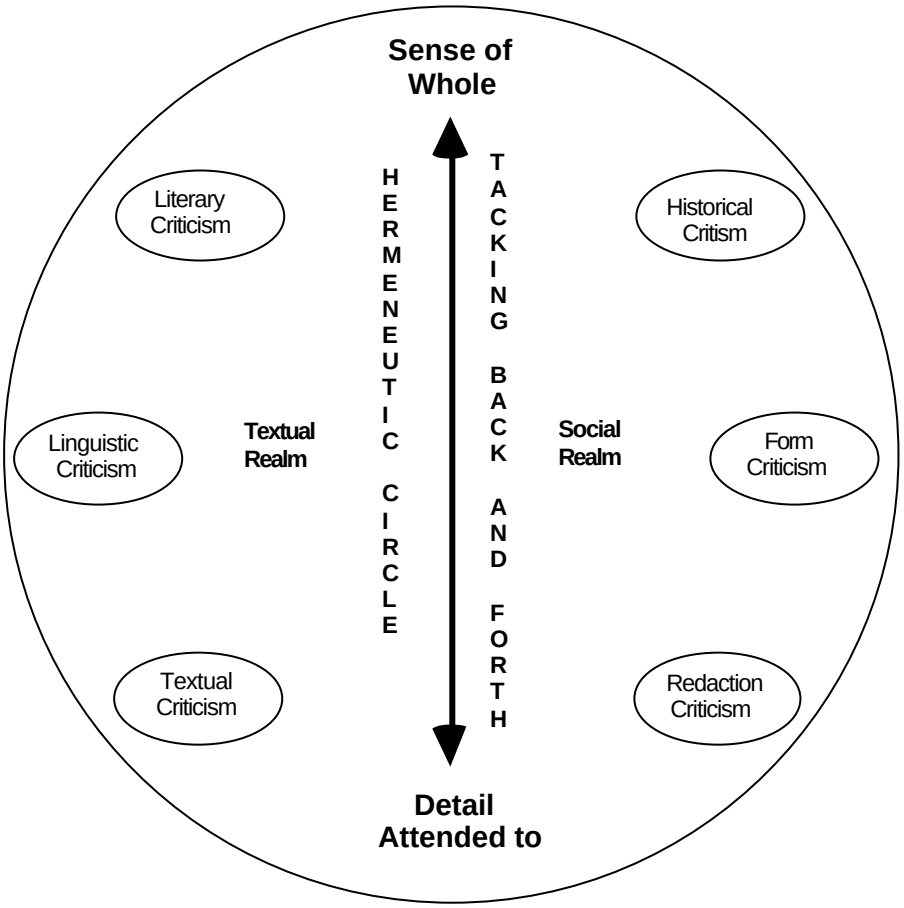


Figure 4.1: Techniques of Exegesis as Elements in the Hermeneutic Circle [Newman & Boland 1996]

Literary criticism means establishing how the meaning is shaped by genre and literary devices, and how different approaches to reading the text yield different meanings [Newman & Boland 1996, p. 3].

Historical criticism means establishing how the larger historical context at the time of writing affects the meaning, and what the historical meanings were [Newman & Boland 1996, p. 3]. I analysed the example of an emperor from a historical perspective and got the result that an emperor is located at the top of the hierarchy, he has the power to control others. A similar tendency to locate themselves at the top of hierarchy is perceivable among systems designers' behaviour in IS projects, especially among pioneers in the field [Vehviläinen 1997, pp. 17-20; Vehviläinen 1999]. When I changed my analytical perspective from historical to literary I found that these two features, power and control, are thought of as male features in Western thinking models [Karento 1999, p. 17].

Form criticism means establishing how local social practices and oral traditions up to the time of committing the text to writing affect the meaning [Newman & Boland 1996, p. 3]. I did not use this analytical perspective. In the case of analysing one's own interviews, the use of this perspective is demanding, since the interviewer participates in the shaping of the discussion and so the target of analysis is not just the interviewee but also the interviewer. This means that self-reflection is needed.

Redaction criticism means establishing how the author's personal characteristics and actions in the creative act of writing affects the meaning [Newman & Boland 1996, p. 3]. This is another perspective that is not central in my study. I did not clarify the interviewees' behaviour so much that I could estimate how it is seen in their speech[28]. In the case of analysing one's own interviews, the use of this perspective faces the same situation as form criticism; besides the analysis of the interviewee, also the interviewer must be analysed.

I have used several perspectives Newman and Boland [1996] described, but not all of them. Newman and Boland analysed seven sentences and got a report of 30 pages. My material is 24 interviews - the future visions in them take about 250 pages - so I do not have any chance to make such a deep analysis. In my case there was no need for such a deep analysis, since I got remarkable results even with a more superficial analysis.

[28] Observing and analysing someone's behaviour would give relevant information about that person's predispositions. However, it is out of the research setting of this study. It was decided that this study would deal only with written and spoken texts.

5. The Articles in a Nutshell and the Integrating Thread

5.1. Introduction

In this chapter I outline the whole picture of this study. First, I summarise the results of the separate articles. I present the articles (Chapters 6-10) individually, since they include the concrete results, and I also describe the situation of every article in the whole picture of IS specialists' predispositions. The predispositions that I encountered during this study are masculinity and technology-centricity. Second, I discuss the limitations of this study. Third, I present an interpretation of the whole dissertation, which suggests that seeing individuals as without social relationships is a possible explanation for the results. Fourth, I discuss how the results of this study could be used in the education of future IS specialists. In the three last sections there are research questions that should be studied in the future.

5.2. Presenting the Articles

In Chapter 2, I described earlier studies about predispositions in the IS field (Section 2.5). They dealt with three kinds of issues: Underlying assumptions of IS development schools, views of technology, and masculinity in the IS field. The results of my study can be joined to the latter two. The results are described in the five articles that are included in this dissertation: two of the articles were published in journals, two in conference proceedings, and one is a manuscript. I present their problems, orientation, and results in a nutshell below. Furthermore, I describe what their contribution is to the research question; what they tell us about the predispositions that are shared by IS specialists.

Chapter 6: Predispositions as Determinants of the Future

This article describes why predispositions need to be studied. It suggests that predispositions have a significant impact on the future and thus constitute an important research domain in future studies. Also IS specialists – with their predispositions - are future makers but they are seldom studied in this role. This article (in Chapter 6) does not just concern IS specialists, but it puts them into a wider frame.

Besides describing the reasons for studying predispostions, this article outlines a framework of different types of predispositions. The types are world views, reductions, and attitudes. I used the framework above in Chapter 2 to summarise the findings of earlier studies. I also use the framework in this chapter to show the contribution of the articles about the analysed text sets.

Chapter 7: Technology, Human, and Society Centred Visions of the Future of Technology

This is the oldest article in this dissertation. It consists of IS specialists' essays on the future published in the *Communication of the ACM* at 1997. The chapter describes the perspectives from which IS specialists envision the future. My analysis shows that the essays are written from technology, human or society centred perspectives. According to the types of predispositions, they all can be defined as reductions. In earlier studies, IS specialists' reductions are described as technology centred, so this analysis gives a more diverse picture of IS specialists' views and shows that there is variance among IS specialists' perspectives.

Besides the authors' perspectives, the article also describes the predispositions of the editors of the *Communication of the ACM* by showing what kinds of persons they considered remarkable enough to ask to write an essay. On the one hand, we can say that the editors made choices that made the diversity of the field visible. On the other hand, we can find two biases among the authors: America centricity and masculinity. The latter appears in an almost total lack of women among the authors. These two are reductions of the editors' views about the IS and computing science field.

Chapter 8: Masculine World Disguised as Gender Neutral

This is the first of three articles dealing with the interview material. In this one, I analyse the gender perspective through IS specialists' talk. On an everyday level the talk is gender neutral, but a deeper analysis reveals that they - both male and female IS specialists - describe a male world in which women are seen as a problem. In this article I discuss the gendering process by showing how the gender bias of the IS field is renewed in everyday practices.

The studies of gender and technology outline that the IS field has a predominantly masculine world view. The results of this study fit this picture, although the level is different. The examples I present in the article describe reduction that the interviewees have displayed. They are reductions of humans; either IS specialists are seen as a reduction – seeing only male IS specialists - or women are seen as a reduction – seeing only the caring character of women.

Chapter 9: Technological Determinism in IS Specialists' Talk

As IS specialists are involved in shaping technology, it is worthwhile to study how they see the process of shaping technology. Although IS development schools state that technology is a matter of human choice, some interviewed IS specialists' talk follows the idea of technological determinism. This kind of talk becomes understandable when thinking of the contexts of the interviewed IS specialists. I placed them into two contexts: the IS field as their occupational context and the Finnish society as their living context. Besides the IS field, also the Finnish discussion of the information society, includes technological determinism.

The article can be seen as a reduction of technology creation. Technological determinism is a view about technology creation and about the relationship between the technological and the social (including people). Many researchers dismiss technological determinism and there is, in the IS field, other views of technology creation. The other views include a wider role for people. Besides a reduction, this article has connections to the mechanistic world view and to (highly) positive attitudes towards new technology.

Chapter 10: Bounded or Empowered by Technology? Information System Specialists' Views on People's Freedom within Technology

This article[29] continues dealing with views of technology shaping but now from a different point of view than in Chapter 9. Whereas Chapter 9 describes technology creation and technological determinism, this chapter describes technology shaping during its use. The difference between these two chapters can be expressed in another way, as well: whereas Chapter 9 focuses on technology, this chapter focuses on IS specialists' attitudes towards people. This analysis of the interviews showed several ways by which IS specialists limit users' freedom within technology. As we know, in IS development projects user participation has been and still is problematic and despite several attempts, this problem has not been solved. The article does not represent a new attempt to solve the problem, but it illustrates this phenomenon and makes the situation more understandable for finding out new potential explanations.

Thinking of this chapter in the framework of predispositions, it describes IS specialists' attitudes towards people. Furthermore, if we put together separate points from this article, they shape a concept of a human being, which is a reduction.

[29] In fact, Chapter 10 is not an article but it is a manuscript, thus, it will be published in the book *Information Society and the Workplace: Spaces, Boundaries and Agency*, edited by Tuula Heiskanen and Jeff Hearn; the publishing contract is with Routledge, London, UK. It is possible that there will be minor changes to the text of Chapter 10 before its publishing in the Heiskanen and Hearn book. Furthermore, I presented Chapter 10 at the International Conference on Information Technology, Transnational Democracy and Gender, at November 16-18, 2001, in Ronneby, Sweden.

The General Picture

In Chapter 2, I described earlier studies about predispositions in the IS field (Section 2.5). They dealt with three kinds of issues: Underlying assumptions of IS development schools, views of technology, and masculinity in the IS field. The results of my study can be joined to the two latter.

The gender issue in this dissertation includes the masculinity of the IS field. The masculinity is often disguised, that means that the situation is presented as if it were gender neutral although a man is the norm. This is the main content of Chapter 8, that is the article about the masculine IS world that is disguised as gender neutral. However, this theme shows up in two other articles. The starting point of Chapter 6 is criticism presented by feminist researchers and the chapter also contains an example about gender bias. As well, Chapter 7 touches the gender theme when I evaluate the choices the *Communication of the ACM* made asking for the essays.

The other theme is the shaping of technology - or views of technology, as it was in Section 2.5. Somehow all the papers deal with this theme since IS specialists' work is to create and mediate technology. If the issue is examined more closely, three of the articles concern this theme. Chapter 6 states that predispositions are involved in future making – and in the case of this dissertation, in future technology making. Chapter 9 describes technological determinism according to which technology is seen as an autonomous force – and that is a view held by some IS specialists. As technological determinism gives limited action space for people, in Chapter 10 I present other ways in which IS specialists in their talk limit users' actions space. The views of technology shaping do not just concern technology but also the possibilities people have in participating in the processes in which technology is created and shaped.

5.3. The Limitations of this Study

This dissertation describes a study that was done in a five-year period. Not everything can be done in one study, so we can find some limitations in this study. Listed below are points that could be studied in future research.

First, I deal with the empirical material. It includes two text sets. It can be questioned the extent to which these texts represent the whole IS field. The number of cases (31 essays and 24 interviews) is sufficient, since the variation of a phenomenon reaches saturation at around 20 cases, after which no new conceptions emerges [Alexsandersson 1994]. Besides of the number of cases, also their quality is notable. As I described in Section 4.5, the text sets are situated differently within the IS field. Regardless of these different situations of the text sets, they include quite similar predispositions. Indeed, there might be somewhere in the IS field, some IS specialists with predispositions different from those I have found in this study. If so, further research on such predispositions would be needed and welcomed.

The other issue about the empirical material that can be criticised is its type. Text sets as empirical material are limited for studying predispositions. Texts do not include all the information that is useful for an analysis of predispositions; non-vocal communication – such as expressions and gestures - also includes lots of relevant information. Observation is needed for analysing them. I find that text analysis has been a practical and useful way in starting to study such a complex phenomenon: IS specialists' predispositions. Furthermore, text sets are relevant material, since we encounter several texts in our everyday life. However, we could get new information about the phenomenon by continuing its study with ethnography. For example, the description in this dissertation describes that IS specialists' view on users is limited. It is an issue that could be studied with ethnography: IS specialists' and users' working together in an IS development project.

The second limitation of this dissertation is connected to me. As in this case, scientific knowledge is seen as socially constructed, the researcher has effects on the research process and its results, so it is important that the researcher's predispositions are described [Klein & Myers 1999]. I have described my background in Section 3.3. However, it can be criticised that the description is too general and it does not include everything that is relevant to my predispositions. Nevertheless, I do not find that possible, since many predispositions are not known by their holder, as mentioned in Chapter 6. Furthermore, writing the dissertation is a learning process and my views (and my predispositions) have changed during it. The changing is gradual and different, even inconsistent predispositions exist at the same time. This is a situation which can be described by Annemarie Mol and John Law's concept of fluidity. By "fluid spatiality" they mean that places are neither delineated by boundaries, nor linked through stable relations: instead, entities may be similar and dissimilar at different locations within fluid space [Mol & Law 1994]. In my case, "the places" are situations in which the predispositions appear, and so "the locations" are not geographical places but they are social situations.

The third thing that can be seen as a limitation of this study, is the method of analysis that I used. In the analysis I started from the points of view included in the text sets. The target was to find "the story that the empirical material tells"[30]. In this kind of analysis it is possible that general lines and strong opinions (and biases) dominate over others; thus I looked for alternative views, as well, and I was surprised how few of them I could find. Of course, it is possible that common views dominated and I passed over uncommon views in essential cases. As Miles and Huberman [1994] state, qualitative research is always a reduction in which essential data is separated from non-essential data. The results of interpretive study depend on researcher's - in this case: my - sensitivity and abilities to find the essential data. I find that this kind of analysis is a useful way of beginning to study a new, unorganised phenomenon. This gives a base, from which future studies can be continued by testing the boundaries of earlier studies and seeking new alternatives.

[30] This is the phrase Klein and Myers [1999, p. 72] use in the case of the principle dialogical reasoning.

5.4. Emerging Research Questions

During this study I got the impression that in both the text sets, people were presented as individuals without social relationships and noticed the problems that are connected to this view. Individuals with or without social relationships give a useful framework to interpret the views of people but also the views of actors dealing with technology. This kind of framework would explain the gender bias and users' ignorance.

Not only do practical IS specialists ignore individuals' social relationships but also IS studies seldom deal with social structures [Avgerou 2000, Davis 2000]. In any case, we can find some such studies. The most famous one is Kling's social analysis on computing in which he classifies all early IS studies that consider social structures [Kling 1980]. Other examples of studies that deal with social structures are Markus' [1983] study on power and its effects on IS development and introduction, and Kumar and Bjørn-Andersen's [1990] study on the sources of IS specialists' values. Although we can find some studies about social structures, they are rather old.

Some IS studies mention the ignoring of social structures. I take two examples, which are Vehviläinen's [1994], and Bjerknes and Bratteteig's [1995] studies of ethical codes. Among "computing professionals'" ethical codes users are shown as non-social individuals [Vehviläinen 1994] and so are "computing professionals", since they should take personal responsibility without a professional organisation to support them as it is in the ethical codes of other fields [Bjerknes & Bratteteig 1995]. Vehviläinen [1994] states that the perspective of individuals in ethical codes reflects a general tendency among IS researchers to forget the social aspect.

Also the interviewed IS specialists seemed to talk about people as non-social individuals. The difference between isolated individual persons and persons with a social context is as big as seeing information as descriptive facts versus constructive meanings. Iivari [1991] used these two as opposite views of information. He states, based on Burrell and Morgan [1979, p. 9], that they distinguish objectivistic and subjectivistic interpretations of the universe of discourse and state that the difference is whether one believes that a data model reflects reality or consists of subjective meanings and thereby constructs reality. The difference between the views of isolated individual persons and persons with a social context is similar. Individual persons are what they are regardless of the situation or other people, for example, they have a need and desire to use technology. Seeing persons within a social context means that they are, at least partly, socially constructed and their wishes and actions depend on the situation.

When we understand that a thought-model of isolated individuals is used in the IS field, it makes the masculinity of the IS field more understandable. Many people cannot see the masculinity; indeed, they cannot see any social structures. When they face a thinking or acting model that is based on different predispositions than their own, instead of trying to understand it in another way - to take the other's

perspective as Boland and Tenkasi [1995] call it - they do not accept that person's actions. Many IS specialists think that this way of behaviour is the result of the individuals' own choice and they do not see it in a bigger context. Until individuals are seen in their social context, the problem of gender bias and ignoring of users cannot be changed. The ignoring or underestimation of users is an issue that is connected to the ignoring of social context and to views of technology shaping.

It is common in IS studies to show people's roles as important [Iivari 1991, Iivari et al. 1998], but normally, in this context, "people" refers to just IS specialists. In studies of the relationship between IS and organisation, IS specialists are portrayed as having the central role in technology shaping – and that they are working in the organisations' best interests [e.g., organisational imperative in Markus & Robey 1988]. The same idea is seen in the articles the aim of which is to support IS specialists in acting as change agents [e.g., Markus & Benjamin 1996, Allen 1998]. This thought-model includes the view that users are problems who slow down the change process. Researchers try to teach IS specialists how to handle users so that they accept change quickly. There is one exception among IS researchers: Orlikowski [2000] writes about users as shapers of technology. Although it is not a new idea among social scientists of technology, it is a new idea in the IS community. Although the above discussion underlines people's roles in the IS field, there exists alternative voices, as well. Iivari, for example, criticises the view of technology as human choice too simplified since it omits historical commitments [Iivari 1991, p. 268].

I suggest that the understanding of people in the IS field is simplified, since it views people as isolated individuals. However, people are individuals but they are also in connection with other people and it comprises their social context. The picture is still more complicated. Besides the view of people with a social context, it is important to keep in mind that people are not just human beings; they also have cyborg features.

We can find another explanation, however, as to why IS specialists' descriptions of people is simplified in the IS work context. This explanation comes from the perspective of power. Bereiter and Scardamalia [1993, pp. 23-24] present two paths showing how one's expert career can develop. First, it can occur through applying expert skills to broader social needs. Instead of increasing specialisation, some experts start to broaden the use of their talent into other areas of value to the community. The second path is giving expertise away. This is the polar opposite of what professions are often accused of. Instead of hoarding specialised knowledge and making the public more dependent on it, expert knowledge is shared by professionals in order to make the public less dependent on them. [Bereiter & Scardamalia 1993, pp. 23-24]

IS specialists' limited view of people can be seen as one method of hoarding knowledge in the area of IS for IS specialists. According to the results of this dissertation, opposite sides are constructed as users and women. Users are the group

of people that was shown as simplified, which can be a method to build a boundary around them. The IS speciality is bordered by masculinity.

The outcome of these analysis is that IS specialists' views of people need to be studied more. Analysis is necessary at least focusing on the dimension of isolation versus social relations and on the perspective of power.

5.5. Recommendations for Education

The aim of this study was to explore the concept of predispositions in order to make it easier to handle the issue, which normally is not explicitly discussed. I have tried to make visible the predispositions that IS specialists have. When it is explicitly stated what the predispositions are that are shared among IS specialists, we can start to discuss whether they are desirable and, if not, how we can change them.

The results of this study show that masculinity and underestimating users belong to IS specialists' predispositions. I find them undesirable, although I admit that they might be useful for some people and they do not want to change the situation. I find that they are reactions towards people who are somehow different than the majority of IS specialists.

I suspect that the education of IS specialists is too narrow and technology oriented. It is not a new idea to call for broader education in the IS field; for example, Rob Kling and Jonathan Allen have called for organisational studies, besides of the computer science and mathematics that are standard nowadays [Kling & Allen 1995]. Instead, I suggest expanding for social studies in such studies, since the masculinity of the IS field and the ignorance of users' knowledge (or reduction of their features) are issues that are connected to social structures.

However, there are some problems in the idea that change could come through education. Eteläpelto (1994) argues that IS experts with several years' work experience understand the role of users better than recent graduates do. The expertise cannot be expanded only with education, but working in a community of IS experts is needed, as well (this view is touched dealt with in several studies, e.g., Gregory's [1983] study of Silicon Valley, Kumar and Bjørn-Andersen's [1990] study of IS specialists' values, and Håpnes and Sørensen's [1995] study of the hacker culture). However, my interviews do not support the idea that older and more experienced IS specialists had a better understanding of people.

Furthermore, another problem with the academic education of IS specialists is that the Finnish universities have an even bigger male bias than among practitioners in the IS field[31]; at least, when the situation is observed through the numbers of posts per sex. This situation needs to be studied more, not just by presenting the statistics

[31] All the interviews carried out for this study were with IS practitioners.

of gender bias, but also through interpretive studies aiming to understand how this kind of situation has been constructed.

Studying the situation carefully takes a long time. For getting some results sooner, I suggest that there could be a pilot programme designed to eliminate, or at least reduce, the connection between, on the one hand, IS studies, and on the other hand, mathematics and technology, which are both connected to masculinity on the symbolic level. In Finland, IS studies are most often taught intertwined with computer science, sometimes with organisational studies. In Sweden and Denmark, the variation is wider. At Stockholm University the department of computer and systems sciences belongs to the faculty of social sciences [Stocholm 2001]. To take another example from Sweden: at Luleå University of Technology, for example, IS studies are taught in the division of gender and technology, which belongs to the department of human work science [Luleå 2001]. Furthermore, in Denmark, Aalborg University is an interesting place from this point of view. There is a department of computer science belonging to the faculty of engineering and science but in addition, there is *humanistic informatics* (which includes communication, humanistic computer science, multimedia science) in the faculty of humanities [Aalborg 2001]. I find that the existence of different solutions is good. Acceptance and visibility of every kind of variance might change the atmosphere so that acceptance of different predispositions would become possible.

References

Aalborg (2001), The faculties of Aalborg University: http://www.auc.dk/facultie.htm and the department of communication: http://www.hum.auc.dk/index.uk.html (obtained 14.11.2001).

Adam, Alison (2000), Information Systems, We Still Need a Feminist Approach. In Balka, Ellen & Smith, Richard (Eds.) *Proceedings of IFIP TC9 WG9.1 Seventh International Conference on Women, Work and Computerization*. June 8-11, 2000 Vancouver, British Columbia, Canada: Kluwer Academic Publishers. pp.102-110.

Alexandersson, M. (1994), Metod och medvetande (Method and consciousness, in Swedish), Göteburg, Sweden: Acta Universitatis Gothoburgensis.

Allen, Jonathan P. (1998), Who Shapes the Future? Problem Framing and the Development of Handheld Computers. *Computers and Society*, June pp. 3-8.

Alvesson, Mats and **Karreman**, Dan (2000), Varieties of discourse: On the study of organizations through discourse analysis. *Human Relations*, Vol. 53, No. 9, pp. 1125-1149

Anderson, Ronald E., **Johnson**, Deborah G., **Gotterbarn**, Donald, and **Perrolle**, Judith (1993), Using the New ACM Code of Ethics in Decision Making, *Communications of the ACM*, Vol. 36, No. 2, pp. 98-105.

Arnold, John, **Cooper**, Cary L. & **Robertson**, Ivan T. (1998), *Work Psychology. Understanding Human Behaviour in the Workplace.* Third Edition. London, UK: Financial Times, Pitman Publishing.

Aro, Jari (2000), Tietoteknologinen kehitys ja yhteiskunnallinen muutos, (The development of information technology and social change, in Finnish). In Vuorensyrjä, Matti and Savolainen, Reijo (Eds.) *Tieto ja tietoyhteiskunta*. Helsinki, Finland: Gaudeamus, pp. 139-157.

Avgerou, Chrisanthi (2000), Information systems: what sort of science is it? *Omega*, Vol. 28, No 5, pp. 567-579.

Avgerou, C., **Siemer**, J., and **Bjørn-Andersen**, N. (1999), The academic field of information systems in Europe, *European Journal of Information Systems*, Vol. 8, pp. 136-153.

Ball, L. and **Harris**, R. (1982), SMIS Members: A Membership Analysis. *MIS Quarterly*, Vol. 6, No.1, pp. 19-38.

Bangemann, Martin (1994), Europe and the Global Information Society - Recommendations to the European Council http://europa.eu.int/ISPO/ida/text/english/bangeman.html (obtained 29.3.2001).

Barki, H., **Rivard**, S. and **Talbot**, J. (1993), A keyword classification scheme for IS research literature: an update. *MIS Quarterly*, Vol. 17, No. 2, pp. 209-226.

Beck, Ulrich (1999), *Mitä globalisaatio on? Virhekäsityksiä ja poliittisia vastauksia*. Tampere, Finland: Vastapaino. (In English: Beck, Ulrich (2000), *What is globalization?* Cambridge: Polity Press.)

Bereiter, Carl and **Scardamalia**, Marlene (1993), *Surpassing Ourselves; An Inquiry into the Nature and Implications of Expertise*. Peru, Illinois, USA: Open Court.

Bimber, Bruce (1996), Three Faces of Technological Determinism, In Smith, Merritt Roe and Marx, Leo (Eds.) *Does Technology Drive History? The Dilemma of Technological Determinism*, Cambridge, Massachusetts: The MIT Press, pp. 79-100.

Bjerknes, Gro and **Bratteteig**, Tone (1995), User Participation and Democracy: A Discussion of Scandinavian Research on System Development, *Scandinavian Journal of Information Systems*, Vol. 7, No. 1, pp. 73-97.

Boland, Richard J. and **Tenkasi**, Ramkrishnan V. (1995), Perspective Making and Perspective Taking in Communities of Knowing, *Organizational Science*, Vol. 6, No. 4, pp. 350-372.

Brancheau, James C., **Janz**, Brian D., and **Wetherbe**, James C. (1996), Key Issues in Information Systems Management. *MIS Quarterly*, Vol. 20, No. 2, pp. 225- 242.

Brancheau, James C. and **Wetherbe**, James C. (1987), Key Issues in Information Systems Management: 1994-95 SIM Delphi Results, *MIS Quarterly*, Vol. 11, No.1, pp. 23-45.

Burrell, G. and **Morgan**, G. (1979), *Sociological Paradigms and Organizational Analysis*. London, UK: Heineman.

Camp, Tracy (1997), The Incredible Shrinking Pipeline, *Communications of the ACM*, Vol. 40, No. 10, pp. 103-110.

Chandra, Jagdish, **March**, Salvatore T., **Mukherjee**, Satyen, **Pape**, Will, **Ramesh**, R., **Rao,** H. Raghav, and **Waddoups**, Ray O. (2000), Information Systems. *Communication of the ACM*, Vol. 43, No. 1, pp. 71-79.

Claver, Enrique, **González**, Reyes, and **Llopis**, Juan (2000), An analysis of research in information systems (1981-1997), *Information & Management*, Vol. 37, pp. 181-195.

Clement, Andrew (1994), Computing at Work: Empowering Action by Low-Level Users. *Communication of the ACM*, Vol. 37, No. 1 pp. 52-65.

Clement, Andrew and **Van den Besselaar**, Peter (1993), A Retrospective Look at PD projects, *Communications of the ACM*, Vol. 39, No. 3, pp. 29-37.

Corrales, José A. (2001), An Asturian View of Networking 2015, *Communications of the ACM*, Vol. 44, No. 9, pp. 47-54.

Crawford, Diane (1997), Editorial Pointers, *Communications of ACM*, Vol. 40, No 2, p. 5.

Davis, Gordon B. (2000), Information systems conceptual foundations: Looking backward and forward. In Baskerville, Richard, Stage, Jan, and Degross, Janice I. (Eds.) *Organizational and social perspectives on information technology.* Boston: Kluwer, pp. 61-82.

Dahlbom, Bo and **Mathiassen**, Lars (1997), The Future of Our Profession, *Communications of the ACM*, Vol. 40, No. 6, pp. 80-89.

Davidson, Ann Locke, **Schofield**, Janet, and **Stock**, Janet (2001), Professional Cultures and Collaborative Efforts: A Case Study of Technologists and Educators Working for Change, *The Information Society*, Vol. 17, pp. 21-32.

Denning, Peter, J. (2001), Who Are We? *Communications of the ACM*, Vol. 44, No. 2, pp. 15-19.

Dickson, G.W., **Leitheiser**, R.L., **Wetherbe**, J.C., and **Nechis**, M. (1984), Key Information Systems Issues for the 1980's. *MIS Quarterly*, Vol. 8, No. 3, pp. 135-159.

DiMaggio, Paul J. (1995), Comments on "What theory is not?", *Administrative Science Quarterly*, Vol. 40, No. 3, pp. 391-397.

Dos Santos, B. and **Sussman**, L. (2000), Improving the return on IT investment: the productivity paradox, *International Journal of Information Management*, Vol. 20, No 6, pp. 429-440.

Drucker, Peter F. (1969), *The Age of Discontinuity. Guidelines to our Changing Society.* London: Heinemann.

Dubin, R. (1969), *Theory building*. New York: The Free Press, (Dubin 1978 – newer edition).

Dunlop, Charles and **Kling**, Rob (Eds.) (1991), *Computerization and Controversy, Value Conflicts and Social Choices*, San Diego, California; Academic Press.

Ehn, Pelle (1988), *Work-oriented Design of Computer Artifacts*. Falköping, Sweden: Arbetslivscentrum, Gummessons.

Elovaara, Pirjo (2001), *Heterogeneous Hybrids: Information Technology in Texts and Practice.* Licentiate Dissertation, Blekinge Institute of Technology, Department of Human Work Science and Media Technology, Karlskrona, Sweden.

Eriksson, Päivi (1999), ... on aika tehdä lopullinen ratkaisu... Strateginen johtaminen ja osallistuminen tietoyhteiskunnan kaupungeissa, (… it is time to make the final solution … Strategic management and participation in the cities of the information society, in Finnish). In Eriksson, Päivi and Vehviläinen, Marja (Eds.) *Tietoyhteiskunta seisakkeella. Teknologia, strategiat ja paikalliset tulkinnat*, Jyväskylä, Finland: SoPhi, pp. 32-52.

Eteläpelto, Anneli (1994), Work experience and the development of expertise, In Nijhof, W.J. & Streumer, J.N. (Eds.) *Flexibility and training in vocational education*, Utrecht: Lemma, pp. 319-341.

Filander, Karin (2000), *Kehittämistyö murroksessa: Sitoutuminen, sopeutuminen ja vastarinta julkisella sektorilla 1990-luvulla,* (Development work in transition: Reconsidering commitment, consent and resistance in the public sector in the 1990s, in Finnish; including Summary and six articles in English), Doctoral Dissertation, University of Tampere, Faculty of Education. Tampere, Finland: Acta Universitatic Tamperensis 777.

Fisher, Gerhard (2001), Communities of Interest: Learning through the Interaction of Multiple Knowledge Systems. In Björnestad, Solveig, Moe, Richard E., and Opdahl, Andreas l. (Eds.) *Proceedings of the 24th Information Systems Research Seminar in Scandinavia (IRIS24)*, Ulvik, Norway, 11-14.8.2001.

Friedman, Andrew L. and **Cornford**, Dominic S. (1989), *Computer Systems Development: History, Organization and Implementation.* Chichester, UK: John Wiley & Sons.

Garcia, L. and **Quek**, F. (1997), Qualitative Research in Information Systems: Time to be Subjective? In Lee, Allen S., Liebenau, Jonathan, and DeGross, Janice I. (Eds.) *Information Systems and Qualitative Research*, Proceedings of the IFIP TC8 WG 8.2 International Conference on Information Systems and Qualitative Research, 31st May-3rd June 1997, Philadelphia, Pennsylvania, USA. London, UK: Chapman & Hall, pp. 444-465.

Gattiker, U.E. and **Kelley**, H. (1999), Morality and computers: Attitudes and differences in moral judgments. *Information Systems Research,* Vol. 10, No 3, pp. 233-254.

Giddens, A. (1984), *The Consitution of Society: Outline of the Theory of Structure.* Berkeley, California: University of California Press.

Greenbaum, Joan and **Kyng**, Morten (1991), Introduction: Situated Design. In Greenbaum, Joan and Kyng, Morten (Eds.) *Design at Work: Cooperative Design of Computer Systems*. Hillsdale, New Jersey, USA: Lawrence Erlbaum Assosiates, pp. 1-24.

Gregory, Kathleen L. (1983), Native-View Paradigms: Multiple Cultures and Culture Conflicts in Organizations, *Administrative Science Quarterly,* Vol. 28, No 3, pp. 359-376.

Grint, Keith & **Woolgar**, Steve (1997), *The Machine at Work. Technology, Work and Organization*. Cambridge, UK: Polity Press.

Grundy, Frances (1998), Objectivism and Interactionism in Computing or Lifting the Spell of Science. *Asian Women*, Vol. 7, pp. 111-128.

Grundy, Frances (2000), Where is the Science in Computer Science? Found in the CD-ROM of *IFIP TC9 WG9.1 Seventh International Conference on Women, Work and Computerization.* June 8-11, 2000 Vancouver, British Columbia, Canada.

Grundy, Frances (2000b), University prospectuses for Computing. Is There a Hidden Message for Women? *Journal on Women and Minorities in Science and Engineering.*

Gürer, Denise W. (1995), Pioneering Women In Computer Science, *Communications of the ACM*, Vol. 38, No 1, pp. 45-54.

Haraway, Donna J. (1991), *Simians, Cyborgs, and Women. The Reinvention of Nature.* New York: Routledge.

Harding, S. (1986), *The Science Question in Feminism.* New York: Cornell University Press.

Hofstede , Geerd (1991), *Cultures and Organizations. Software of the Mind.* New York: McGraw-Hill.

Håpnes, Tove and **Sørensen**, Knut H. (1995), Competition and Collaboration in Male Shaping of Computing: A Study of a Norwegian Hacker Culture. In Grint, Keith and Gill, Rosalind (Eds.) *The Gender-Technology Relation, Contemporary Theory and Research*, Taylor & Francis.

Iacono, Suzanne and **Kling**, Rob (1996), Computerization Movements and Tales of Technological Utopianism, In Kling, Rob (Ed.) *Computerization and Controversy*, 2nd edition, San Diego: Academic Press, pp. 85-105.

Iivari, Juhani (1991), A Paradigmatic Analysis of Contemporary Schools of IS development, *European Journal of Information Systems*, Vol. 1, No 4, pp. 249-272.

Iivari, Juhani, **Hirschheim**, Rudy, and **Klein**, Heinz K. (1998), A Paradigmatic Analysis of Contemporary Schools of IS Development Approaches and Methodologies. *Information Systems Research*, Vol. 9, No. 2, pp. 164-193.

Isomäki, Hannakaisa (1999), Ontot tarinat: tietojärjestelmäammattilaisten ihmiskäsityksiä, (Hollow tales: information systems specialists‘ concepts of human beings, Finnish), In Eriksson, Päivi and Vehviläinen, Marja (Eds.) *Tietoyhteiskunta seisakkeella. Teknologia, strategiat ja paikalliset tulkinnat.* Jyväskylä, Finland: SoPhi, pp. 99-111.

Isomäki, Hannakaisa (1999b), The Image of the Human Being in Information Systems Development: Some Reflections by Systems Designers'. In Käkölä, Timo K. (Ed.) *Proceedings of the 22nd Information Systems Research Seminar in Scandinavia (IRIS 22): "Enterprise Architectures for Virtual Organisations",* Keuruu 7-10.8.1999. Vol. 2, pp. 95-110.

Ives, Blake, **Hamilton**, Scott, and **Davis**, Gordon B. (1980), A Framework for Research in Computer-based Management Information Systems, *Management Science*, Vol. 26, No 9, pp. 910-934.

Järvinen, Pertti (1994), Notes on Iivari’s Framework for a Paradigmatic Analysis of Contemporary Schools of IS Development. Presented at ERASMUS workshop at University of Brighton, UK, July 1994.

Järvinen, Pertti (1999), *On Research Methods,* Tampere, Finland: Opinpaja.

Järvinen, Pertti (1999b), *IS Reviews 1999*, Tampere, Finland: University of Tampere, Department of Computer and Information Sciences, B-1999-7.

Järvinen, P. H. (2000), Research Questions Guiding Selection of an Appropriate Research Method. In Hansen, Hans Robert, Bichler, Martin, and Mahrer, Harald (Eds.) *Proceedings of the 8th European Conference on Information Systems*, 3-5.6.2000 Vienna, Austria. p. 30-37.

Järvinen, Pertti (2000b), On a variety of research output types. In Svensson, L., Snis, U., Sørensen, C., Fägerlind, H., Lindroth, T., Magnusson, M., and Östlund, C. (Eds.) *Proceedings of IRIS23*, University of Trollhättan, Uddevalla, Sweden.

Järvinen, Pertti (2001), *On Research Methods,* Tampere, Finland: Opinpajan kirja.

Järvinen, Pertti and **Tyllilä**, Pekka (1980), *Erään atk-systeemin käyttöönotto, toimintatutkimus atk-systeemin vaikutuksista työntekijöiden toimiin* (The introduction of a computer system, an action research about the effects by a computer system to workers' jobs, in Finnish), Tampere, Finland: University of Tampere, Matemaattisten tieteiden laitos, A53.

Karasti, Helena (2001), *Increasing Sensitivity towards Everyday Work Practice in System Design.* Doctoral Dissertation, University of Oulu, Department of Information Processing Science. Oulu, Finland: Acta Universitatis Ouluensis A362.

Karento, Helena (1999), *"Olen tehnyt parhaani" Tutkimus naisista valtion ja kuntien johtajina ja vaativissa asiantuntijatehtävissä.* ("I have done my best." A research on Women in Higher Civil Service.) Doctoral dissertation, University of Tampere, Department of Administrative Science. Tampere, Finland: Acta Universitatis Tamperensis 718.

Karvonen, Erkki (2000), Strategioiden aikakausi, (The age of strategies, in Finnish.) In Vuorensyrjä, Matti and Savolainen, Reijo (Eds.) *Tieto ja tietoyhteiskunta*. Helsinki, Finland: Gaudeamus, pp. 247-255.

Karvonen, Erkki (2000b), Kansalliset ja kansainväliset tietoyhteiskuntastrategiat, (National and international strategies towards the information society, in Finnish.) In Vuorensyrjä, Matti and Savolainen, Reijo (Eds.) *Tieto ja tietoyhteiskunta*. Helsinki, Finland: Gaudeamus, pp. 256-277.

Kasvio, Antti (2000), Esipuhe Teokseen Vuorensyrjä, Matti ja Savolainen, Reijo (toim.) Tieto ja tietoyhteiskunta (Prewords in Vuorensyrjä, Matti and Savolainen, Reijo (Eds.) *Information and the Information Society*, in Finnish). Helsinki, Finland: Gaudeamus, pp. v-vii.

Klein, Heinz K. and **Myers**, Michael D. (1999), A Set of Principles for Conducting and Evaluating Interpretive Field Studies in Information Systems, *MIS Quarterly,* Vol. 23, No. 1, pp. 67-94.

Kling, Rob (1980), Social Analyses of Computing: Theoretical Perspectives in Recent Empirical Research, *Computing Surveys*, Vol. 12, No. 1, pp. 61-110.

Kling, Rob (Ed.) (1996), *Computerization and Controversy*, 2nd edition, San Diego, California: Academic Press.

Kling, Rob and **Allen** Jonathan P. (1996), Can Computer Science Solve Organizational Problems? The Case for Organizational Informatics, In Kling, Rob (Ed.) *Computerization and Controversy: Value Conflicts and Social Choices*, 2nd edition, San Diego, California: Academic Press, pp. 261-276

Kolehmainen, Sirpa (1999), *Naisten ja miesten työt: Työmarkkinoiden segregoituminen Suomessa 1970-1990* (Women's and Men's Work. Labour Market Segregation in Finland 1970-1990, in Finnish), Doctoral Dissertation, University of Tampere, Department of Sociology and Social Psychology. Helsinki, Finland: Tilastokeskus, tutkimuksia 227.

Korvajärvi, Päivi (1998), *Gendering Dynamics in White-Collar Work Organizations*. Doctoral Dissertation, University of Tampere, Department of Sociology and Social Psychology. Tampere, Finland: Acta Universitatis Tamperensis 600.

Korvajärvi, Päivi (forthcoming), Women and technological pleasure at work? In Heiskanen, Tuula and Hearn, Jeff (Eds.) Information Society and the Workplace: Spaces, Boundaries and Agency. London, UK: Routledge.

Krech, David**, Crutchfield**, Richard S. and **Ballanhey**, Egerton L. (1962), *Individual in Society. A Textbook of Social Psychology*. New York, USA: McGraw-Hill.

Kumar, Kuldeep and **Bjørn-Andersen**, Niels (1990), A Cross-Cultural Comparison of IS Designer Values. *Communications of the ACM*, Vol. 33, No. 5, pp. 528-538.

Kuosa, Tarja (1997), *Tietojärjestelmäammattilaisten tulevaisuuskäsitykset.* (Information systems professionals' future conceptions, in Finnish.) Licentiate Thesis, University of Tampereen, Department of computer science. Tampere, Finland: Department of computer science B-1997-3.

Kuosa, Tarja and **Basden**, Andrew (2000), Predispositions as Determinants of the Future. *Futures*, 32, pp. 833-852.

Kuusinen Riitta (2001), *Ongelmana yhteistyökyvyttömyys? Teoreettisen ymmärryksen etsintää web-avusteiselle tiedontuottamisyhteistyölle*, (Inability to co-operate as a problem? In search of theoretical understanding of web-assisted knowledge-providing co-operation, in Finnish), Doctoral Dissertation, University of Helsinki, Department of educational psychology. Helsinki, Finland: University of Helsinki, Tutkimuksia 2/2001.

Latour, Bruno (1988), Mixing Humans and Nonhumans Together: A Sociology of a Door-Closer. *Social Problems*, Vol. 35, No. 3, pp. 298-310.

Latour, Bruno (1993), *We have never been modern.* London, UK: Harvester Wheatsheaf.

Lavikka, Riitta (1997), *Big Sisters. Spacing Women Workers in the Clothing Industry. A Study on Flexible Production and Flexible Women*, Doctoral Dissertation, University of Tampere, Department of Sociology and Social Psychology, Tampere, Finland: Univeristy of Tampere, Research Institute for Social Sciences 16/1997.

Law, John (1992), Notes on the Theory of the Actor-Network: Ordering, Strategy, and Heterogeneity. *Systems Practice*, Vol. 5, No. 4, pp. 379-393.

Lehto, Anna-Maija and **Sutela**, Hanna (1999), *Tasa-arvo työoloissa*, (Equality in work conditions, in Finnish), Tilastokeskus, Helsinki, Finland: Hakapaino Oy.

Lie, Merete (1995), Technology and Masculinity: The Case of the Computer. *The European Journal of Women's Studies*, Vol. 2, No. 3, pp. 379-394

Luleå (2001), Luleå University of Technology, Department of Human Work Science, Division of Gender & Technology, http://www.luth.se/depts/arb/index.en.html (obtained 8.11.2001).

Lyytinen, Kalle and **Goodman**, Seymour (1999), Finland: The Unknown Soldier on the Information Technology Front. *Communications of the ACM*, Vol. 42, No. 3, pp. 13-17.

Mackay, Hugh, **Carne**, Chris, **Beynon-Davis**, Paul, and **Tudhope**, Doug (2000), Reonfiguring the User: Using Rapid Application Development. *Social Studies of Science*, Vol. 30, No. 5, pp. 737-757.

Manser, Martin and **Thomson**, Megan (1995), *Combined Dictionary-Thesaurus*, Edinburgh, UK; Chambers.

March, Salvatore T. and **Smith**, Gerald F. (1995), Design and natural science research on information technology. *Decision Support Systems*, Vol. 15, pp. 251-266.

Markus, M. Lynne (1983), Power, Politics, and MIS Implementation, *Communication of the ACM*, Vol. 26, No 6, pp. 430-444.

Markus, M. Lynne and **Benjamin**, Robert I. (1996), Change Agentry - the Next IS Frontier, *MIS Quarterly*, December 1996, pp. 385-407.

Markus, M. Lynne and **Robey**, Daniel (1988), Information Technology and Organizational Change: Causal Structure in Theory and Research. *Management Science*, Vol. 34, No. 5, pp. 583-598.

McDonough, Jerome P. (1999), Designer Selves: Construction of Technologically Mediated Identity within Graphical, Multiuser Virtual Environments, *Journal of the American Society for Information Science*, Vol. 50, No. 10, pp. 885-869.

McKenna, Eugine (1994), *Business Psychology and Organisational Behaviours.* UK: Psychology Press.

McLoughlin, Ian (1999), *Creative Technological Change. The Shaping of Technology and Organisations.* London, UK: Routledge.

Miles, Matthew B. and **Huberman**, A. Michael (1994), *Qualitative data analysis: an expanded sourcebook*, 2nd ed., Thousand Oaks, Ca: Sage.

Mingers, John (2001), Combining IS research methods: Towards a pluralist methodology, *Information Systems Research* 12, No 3, pp. 240-259.

Mol, Annemarie and **Law**, John (1994), Regions, Networks and Fluids: Anemia and Social Topology, *Social Studies of Science*, Vol. 24, pp. 641-671.

Moser, Ingunn (2000), Against Normalization: Subverting Norms of Ability and Disability. *Science as Culture*, Vol. 9, No 2, pp. 201-240.

Myers, Michael D. (1999), Investigating information systems with ethnographic research. *Communication of AIS*, No. 2, Article 23, 12 p.

Mörtbeg, Christina (1997), *"Det beror på att man är kvinna…" Gränsvandrerskor formas och formar informationsteknologi*. ("It's because one is a woman…" Transgressors are shaped and shape information technology, in Swedish.) Doctoral Dissertation. Institutionen för Arbetsvetenskap 1997:12, Avdelningen Genus ach Teknik. Luleå Tekniska Universitet, Luleå, Sweden.

Newman, Michael and **Boland,** Richard J. (1996), Hermeneutics, Exegesis and Organizational Text: Maintaining an Openness of Inquiry in Interpretations. A Manuscript, 31 p.

Niederman, Fred, **Brancheau**, James C., and **Wetherbe**, James C. (1991), Information Systems Management Issues in the 1990s. *MIS Quarterly*, Vol. 15, No. 4, pp. 474-499.

NII (2001), the National Information Infrastructure in the USA, http://nii.nist.gov/nii/niiinfo.html (obtained 18.4.2001).

Nurminen, Markku I. (1986), *Kolme näkökulmaa tietotekniikkaan*, Juva, Finland: WSOY. (In English: Nurminen, Markku I. (1988), *People or Computers: Three Ways of Looking At Information Systems*. Lund, Sweden: Studentliteratur/Chartwell-Bratt.)

Orlikowski, Wanda J. (1992), The duality of technology: Rethinking the concept of tehnology in organizations, *Organisation Science* Vol. 3, No 3, pp. 398-427.

Orlikowski, Wanda J. (2000), Using Technology and Constituting Structures: A Practice Lens for Studying Technology in Organizations. *Organization Science*, Vol. 11, No. 4, pp. 404-428.

Orlikowski, Wanda J. and **Barley**, Stephen R. (2001), Technology and Institutions: What Can Research on Information Technology and Research on Organizations Learn from Each Other? *MIS Quarterly*, Vol. 25, No. 2, pp. 145-165.

Orlikowski, Wanda J. and **Gash**, Debra C. (1994), Technological Frames: Making Sense of Information Technology in Organizations, *ACM Transactions on Information Systems*, Vol. 12, No. 2, pp. 174-207.

Orlikowski, Wanda J. and **Robey**, Daniel (1991), Information Technology and the Structuring of Organizations, *Information Systems Research,* Vol. 2, No. 2, pp. 143-169.

Parker, Donn B., **Swope**, Susan, **Baker**, Bruce N., and **Weiss**, Eric A. (1996), All in Day's Work: Nine Provocative Examples in the Practice of Computing Professionals. In Kling, Rob (Ed.) *Computerization and Controversy*. 2nd edition, San Diego: Academic Press. pp. 870-875.

Pateli, A., **Stack**, J., **Atkinson**, M. and **Ramsay**, H. (1999), The status of women in the UK IT industry: an empirical study. *European Journal of Information Systems*, Vol. 8, pp. 170-182.

Peiris, D. Ramanee, **Gregor,** Peter, and **V**, Indigo (2000), Women and Computing, Breaking the Cycle of Imbalance at the Interface. In Balka, Ellen & Smith, Richard (Eds.) *Proceedings of IFIP TC9 WG9.1 Seventh International Conference on Women, Work and Computerization*. June 8-11, 2000 Vancouver, British Columbia, Canada: Kluwer Academic Publishers. pp. 34-41.

Piispanen, Eeva (1995), *Simulaatiopeli muutoksen käynnistäjänä*, (The simulation game as a starter of change, in Finnish) Tuottavuudella tulevaisuuteen, KETO-projekti, TTK, Espoo, Finland.

Piispanen, Eeva ja **Pallas,** Katriina (1991), TOTO, Tietotekniikalla tulosta hallintotyöhön. (TOTO, Information technology gives profits to administrative work, in Finnish) Valtionhallinnon kehittämiskeskus, VAPK-kustantamo, Helsinki, Finland.

Pringle, Rosemary, **Nielsen**, Sue, **von Hellens**, Liisa, **Greenhill**, Anita, and **Parfitt**, Lynne (2000), Net Gains, Success Strategies of Professional Women in IT. In Balka, Ellen & Smith, Richard (Eds.) *Proceedings of IFIP TC9 WG9.1 Seventh International Conference on Women, Work and Computerization.* June 8-11, 2000 Vancouver, British Columbia, Canada: Kluwer Academic Publishers. pp. 26-33.

Rantalaiho, Liisa and **Heiskanen**, Tuula (Eds.) (1997), *Gendered Practices in Working Life*, Basingstoke, UK: MacMillan.

Raskin, Jef (1997), Looking for a Humane Interface: Will Computers Ever Become Easy to Use? *Communications of the ACM*, Vol. 40, No. 2, pp. 98-101.

Rommes, Els (2000), Gendered User-Representations, Design of a Digital City, In Balka, Ellen & Smith, Richard (Eds.) *Proceedings of IFIP TC9 WG9.1 Seventh International Conference on Women, Work and Computerization.* June 8-11, 2000 Vancouver, British Columbia, Canada: Kluwer Academic Publishers. pp. 137-145.

SITRA (1998), *Elämänlaatu, osaaminen ja kilpailukyky. Tietoyhteiskunnan strategisen kehittämisen lähtökohdat ja päämäärät (Quality of Life, Knowledge, and Competitive Ability; The Starting Points and Goals of the Strategic Development of the Information Society, in Finnish*. Helsinki, Finland: Sitra 206.

Stockholm (2001), Stockholm University, Faculty of Social Sciences, Department of Computer and Systems Sciences,

http://www.su.se/organisation/presentation/english/departments.php3 (obtained 8.11.2001).

Suoninen, Eero (1997), *Miten tutkia moniäänistä ihmistä? Diskurssianalyyttisen tutkimusotteen kehittelyä*. (How to Study Multi-voiced Human Beings? Elaboration of the Discourse Research Approach, In Finnish), Doctoral Dissertation, University of Tampere, Department of Sociology and Social Psychology. Tampere, Finland: Acta Universitatis Tamperensis 580.

Sutton, Robert I. and **Staw**, Barry M. (1995), What theory is not? *Administrative Science Quarterly*, Vol. 40, No. 3, pp. 371-384.

Swanson, E. Burton and **Ramiller**, Neil C. (1993), Information Systems Research Thematics: Submissions to a New Journal, 1987-1992, *Information Systems Research*, Vol. 4, No. 4, pp. 299-330.

Taggart, William M. Jr. and **Tharp**, Marvin O. (1977), A Survey of Information Requirements Analysis Techniques, *Computing Surveys*, Vol. 9, No. 4, pp. 273-290.

Talja, Sanna (1998), *Musiikki, kulttuuri, kirjasto: diskurssien analyysi*, (Music, Culture, Library: Analysis of Discussions, in Finnish), Doctoral Dissertation, University of Tampere, Department of Information Studies. Tampere, Finland: Tampereen yliopisto.

TTL (1998), Tietotekniikan liitto ry (Finnish Information Processing Association in English), Tietoja jäsenistöstä, Internet: http://www.ttlry.fi/ (obtained 10.4.2001).

Van **Dam**, Andries (1997), Post-WIMP User Interfaces. *Communications of the ACM*, Vol. 40, No. 2, p. 63-67.

Van **Maanen**, J. (1989), Some notes on the importance of writing in organization studies. In Cash, J.I. & Lawrence, P.R. (Eds.) *The Information Systems Research Challenge*: Vol. 1, Harvard Business School, Boston, pp. 27-33.

Vehviläinen, Marja (1991), *Social Construction of Information Systems - An Office Workers' Standpoint*, A Licentiate Thesis. Tampere, Finland: University of Tampere, Department of Computer Science.

Vehviläinen, Marja (1994a), Women Defining their Information Technology – Struggles for Textual Subjectivity in an Office Workers' Study Circle, *The European Journal of Women's Studies*, Vol. 1, pp. 73-93.

Vehviläinen, Marja (1994b), Reading Computing Professionals' Codes of Ethics - A Standpoint of Finnish Office Workers. In Gunnarsson, Ewa and Trojer, Lena (Eds.) *Feminist Voices on Gender, Technology and Ethics*. Centre for Women's Studies, Luleå University of Technology, Luleå, Sweden, pp. 145-161.

Vehviläinen, Marja (1997), *Gender, Expertise and Information Technology*. Doctoral Dissertation. University of Tampere, Department of Computer Science. Tampere, Finland: University of Tampere, Department of Computer Science A-1997-1.

Vehviläinen, Marja (1999), Gender and Computing in Retrospect: The Case of Finland. *IEEE Annals of History of Computing*, Vol. 21, No. 2, pp. 44-51.

Vehviläinen, Marja (2000), Gender and Information Technology. In Mörtberg, Christina (Ed.) *Where do we go from here? Feminist Challenges of Information Technology.* Division Gender and Technology, Luleå University of Technology, Luleå, Sweden, pp. 17-37.

Wajcman, Judy (1991), *Feminism Confronts Technology*, Cambridge, UK: Polity Press.

Walls, Joseph G., **Widmeyer**, George R., and **El Sawy**, Omar A. (1992), Building an Information System Design Theory for Vigilant EIS. *Information Systems Research*, Vol. 3, No. 1, pp. 36-59.

Walsham, Geoff (1995), The Emergence of Interpretivism in IS Research. *Information Systems Research,* 6, No 4, pp. 376-394.

Walsham, Geoff (1997), Actor-Network Theory and IS Research: Current Status and Future Prospects, In Lee, Allen S., Liebenau, Jonathan, and DeGross, Janice I. (Eds.) *Information Systems and Qualitative Research*, Proceedings of the IFIP TC8 Wg 8.2 International Conference on Information Systems and Qualitative Research, 31st May-3rd June 1997, Philadelphia, Pennsylvania, USA. London, UK: Chapman & Hall, pp. 467-480.

Walstrom, Kent A. and **Leonard**, Lori N.K. (2000), Citation classics from the information systems literature. *Information & Management,* Vol. 38, pp. 59-72.

Webster, Frank (1995), Theories of the Information Society, London, UK: Routledge.

Weick, Karl E. (1995), What theory is not, theorizing is, *Administrative Science Quarterly*, Vol. 40, No. 3, pp. 385-390.

Wilson, F. (1999), Flogging a dead horse: the implications of epistemological relativism within information systems methodological practice. *European Journal of Information Systems*, Vol. 8, pp. 161-169.

Ylijoki, Oili-Helena (1998), *Akateemiset heimokulttuurit ja noviisien sosialisaatio,* (Academic tribal cultures and the socialisation of novices, in Finnish), Tampere, Finland: Vastapaino.

Appendix 4.1

Originally in Finnish

Background Information on User Interfaces

History:

1965 The mouse

1975 The first micro computer

1984 Apple MacIntosh and graphic user interface

Nowadays situation:

General features of a user interface are windows, icons, menus, and pointers (as the use of a mouse).

Visions:

- A user interface of the future will include natural language communication and pointing with sight and gesture. (van Dam, 1997)
- One possible continuation is a direct mind to machine –interface. (Raskin, 1997)

Appendix 4.2

Originally in Finnish

Subject: Request for an interview

I am Lic.Phil. Tarja Kuosa from the University of Tampere. I work as a researcher at the Work Research Centre in a project on the information society. The project is funded by the Finnish Academy. The project includes several subprojects and each of them studies the shaping of the information society from one perspective. My subproject concerns visions of the future among specialists who create or meditate information and communication technology. Besides being a researcher in a project, I am also a post-graduate student. I am using my subproject research for my dissertation in the department of computer science, supervised by Professor Pertti Järvinen.

My study is based on interview material. For the interviews I have chosen about 25 specialists. The choice was not random; rather, I have chosen specialists with different backgrounds, who work in places which create or use a new information technological reality, and persons, who are known to have visions of the future. Hannakaisa Isomäki, Katriina Karkimo, Riikka Kivimäki, Riitta Smeds, and Marja Vehviläinen helped me in looking for interesting interviewees.

I hope you will be one of the interviewees.

The interview will be open-ended, so I cannot say definitely how long it will take, since it depends on the length of your answers. I think it will take from one hour to one and a half hours.

Please suggest some times that are suitable for you and also the place where you would like the interview to take place.

With best regards,

Tarja Kuosa
University of Tampere
Tel. 03 – 215 6028
E-mail: tarja@cs.uta.fi