Finnish Primary School Student Teachers and the Internet: Worried about the Vast Information Network?

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The relationship of Finnish primary school student teachers (59 individuals) to the Internet was investigated by means of a questionnaire in 2000. The relationship was analysed in three dimensions. The first involved their emotional attitudes: whether they loved or hated it, or if they were worried about being left by the wayside. The worries were examined in detail. Different ones, such as technical, pedagogical and organisational, information-processing and cultural, were analysed from the student teachers´ and pupils´ points of view. Secondly, the student teachers´ images of the Internet as an organisation with typical characteristics were analysed. Finally, the proportions of innovation adopter categories in the use of the Internet were summarized. The main results showed that the student teachers worried considerably about the relationship of their future pupils to the Internet, especially about information-processing issues. Emotional attitudes were mainly positive and the students usually grew to like the applications once they had tried them. The students described the Internet mostly by using positive

attributes regarding its useful contents. It was often seen as a combination of different kinds of people or as an organism. The proportions of respondents in the early innovation adopter categories were larger than might have been assumed according to innovation diffusion theory.

Key words: The Internet, primary school student teachers, attitude, innovation adopter categories

1   Finland as an information society – a challenge for teachers

Finland strives for prominence as an information society. We have a strong national agenda for that, and education is one of the key items on it (Education, training and research in the information society, 1999). One of the main principles is the versatile use of networks in studying and teaching. This means that there is a pressure on every teacher and student teacher to master such skills that will enable them to use the Internet in education. This includes technical skills, searching for and evaluating information, and incorporating what is found into personal information structures.

People involved in education, like teachers and student teachers may feel stress when thinking of these new demands. This was noticed during several courses on information and communication technologies which the author of this article has had for student teachers. Even if they in principle may agree on the need for changes in schools the situation may seem unclear and even frightening for them. So they are, quite clearly a little worried about the educational uses of the Internet. These worries may concern technologies: hardware, software and user interface. These technologies must be applied in education, and ways of using them pedagogically, including the organisation of learning situations, form the second category of possible worries. Information on the Internet is different from that in books. The differences include the vast amount of it, its multimodality, its unlinearity and the ways which are needed to find it. So the Internet is a macro world with new information processing and cultural ways that may worry student teachers.

2   Theoretical background

2.1 Emotional attitudes towards modern information and communication technologies

In this research, Tella's (1995) classification of end users' emotional attitudes towards information and communication technologies in general was applied. At opposite ends of the categories are those who love technologies at once and those hating them at once; or the pioneers and the dropouts. In addition to these extremes, there are people who are skilful hackers, or slowly becoming fond of technologies. There are also the imitators, the superficials, and and those who are worried about them.

There is evidence that in kindergarten teacher education, which is very similar to primary school teacher education, many students have generally positive attitudes towards information and communication technologies (Kankaanrinta 2000b). They usually grow to like them slowly after having had the opportunity to try the applications. Considerable fear of being left behind, and more general worries about information and communication technologies have also been detected. Negative attitudes are rare.

2.2 The Internet as an organisation

The Internet could be compared to other organisations. Morgan (1986) used different metaphors to describe organisations likening them to machines, organisms, brains, the theatre, a political system and a psychical prison. In the context of the Internet, the first three are the most interesting. A machine is something mechanical without living components. It works according to stiff, mechanical rules. An organism may mean a living being or a system of living participants like an ecosystem, such as a forest. The brain model emphasizes the role of humans. They act as individuals and as parts of an organisation. The cooperation is meaningful and valuable, so an organisation is more than the plain sum of its participants.

2.3 Innovation adopter categories

Roger's ' (1983, 1995) theory of innovation diffusion is well known among scholars. His innovation adopter categories are represented in stable proportions in the population: Innovators (3 % of population), Early adopters (13 %), Early majority (34 %), Late majority (34 %) and Laggards (16 %). There is evidence that among samples of Finnish biology teachers and kindergarten student teachers, the proportions in the early categories can be higher than the theory would predict (Kankaanrinta 2000a and 2000b).

3 The empirical study

3.1 Aim of the study and research problems

The general aim of this study was to analyze the student teachers´ relationship with the Internet. The first research question dealt with technical, pedgogical and organizational, information processing and cultural worries. The focus was both from teachers' and pupils' point of view. The next questions were about student teachers' emotional attitudes towards the Internet, about the main characteristics and metaphors of the Internet, finally tackling the issue of innovation adopter categories.

The reseach problems were as follows:
1. What are the main concerns of student teachers in the use of the Internet?
2. What are their emotional attitudes towards the Internet?
3. What do they see as the main characteristics of the Internet?
4. What kind of organization is the Internet, according to the students?
5. In which adopter category do they classify themselves in their use of the Internet?

3.2 Materials and Methods

Students in Finnish primary school teacher education take a Master of Education degree. This comprises 160 credits, one credit representing

40 hours of work and corresponding to two ECTS (European Credit Transfer System) credits. The education programme includes a course and lectures in media education, worth two credits. At the Media Education Centre of the University of Helsinki, media education is assumed to include electronic media like communication via the Internet and modern information and communication technologies (Tella 1998). The emphasis is on human communication and interaction.

The author of this article distributed a questionnaire to students on the course in media education in 2000. The issues addressed included their worries concerning the Internet, their emotional attitudes towards it, their representations of it and the innovation adopter categories in its educational use. The themes of the worries and attitudes were assessed on a six-point scale ranging from "not at all" (1) to " very much" (6). Representations were investigated in open-ended questions. The innovation adopter categories were explained to the students during the course, and they decided into which category they fitted. A total of 59 students filled in the questionnaire.

Student teachers' ﹘worries associated with the Internet may concern themselves as future teachers, or their pupils. Thus, they simultaneously answered the questions thinking of themselves and of their future pupils. Their worries were grouped into four different fields: technical, pedagogical and organisational, information-processing, and cultural worries.

Technical worries

Am I / are my pupils able to use the hardware without causing it to break down?
Am I / are my pupils able to use programs without causing them to crash?
Is there enough technical support?

Pedagogical and organisational worries

Is there enough psychological support in coping with the problems?
Is there enough time to learn all the new things?

Is there enough training to enable reasonable use of the Internet?
Does the search for information take too much time?
Am I / are my pupils frustrated by the huge amount of information?

Information-processing worries

Am I / are my pupils able to search effectively for information?
Am I / are my pupils able to select the information?
Am I / are my pupils able to evaluate the reliability of the information?
Am I / are my pupils able to associate the information found with their own information structures?
Am I / are my pupils able to use the information in reasonable ways?
Am I / are my pupils able to apply the information without mechanical copying?
Am I / are my pupils able to make references to the information found on the web?
Are there problems with the uneven quality of information?

Cultural worries

Am I / are my pupils able to communicate properly by e-mail?
Am I / are my pupils able to communicate properly through Newsnet news?
Will the use of the Internet displace other information sources?
Will other beneficial hobbies and activities be pushed to one side by the Internet?
Will human interaction diminish?
Will all human habits be extinguished by the Internet?
Could I / could my pupils learn bad things from the Internet?
Is there a danger of Internet addiction?
Could I / could my pupils meet bad people through the Internet?
Could I / could my pupils learn bad habits through the Internet?

4 The results

4.1 Worries

Hardware and software, and lack of the technical personnel, may cause various problems for teachers and pupils. Our students were not especially worried about technical problems in the use of the Internet, except for the availability of technical support. They were more worried about their pupils than about themselves with regard to technical issues.

Pedagogical and organisational fears in the use of the Internet included psychological support with problems, time to learn new things, training to enable reasonable use, time to search for information and possible frustration by the huge amount of it. — The students were very self-reliant in their use of the Internet: they did not worry about psychological support. They were not so relaxed when thinking of their future pupils, who would possibly need more support than would be available. They felt, however, that they needed a considerable time to learn new technologies, and were not sure that they had enough. It seems that they believe that their pupils will be quicker to learn these things. The problem of being given enough training was an issue as far as the students and their future pupils were concerned. The student teachers were in significant danger of becoming frustrated with the huge amount of information, but the threat to the pupils was even bigger.

Information processing may cause many concerns at schools. The effectiveness of the search, selection, evaluation and indexation of information, and its integration into the user's own ideas and structures, are constant challenges when working on the web. — Problems in information processing did not worry the students very much. They showed concern only in the uneven quality of information. However, as far as their future pupils were concerned, there was a real threat. The search for information was seen as the least problematic, but all the other skills were felt to be insufficient. They especially worried about their pupils´ abilities to make references on web materials.

The Internet forum is different from real life. It offers new opportunities for on-line and off-line communication with many people simultaneously. The effectiveness of this communication measured by the people involved is many times greater than face-to-face discussions.

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It is no wonder that this new electronic culture causes people to worry .
— Electronic communication was no problem for the students but they
perceived it as problematic for their pupils. They were not sure if their
pupils would be aware of the "netiquette" and were concerned about
possible negative effects on hobbies, other information sources and human
contact. It could even threaten human nature as a whole. Pupils may
learn bad habits, develop Internet addictions or make undesirable contacts.

The scale of worries was from "not at all" (1) to "very much" (6),
so the mean of all the student teachers was counted for all the issues. The
worries could be classified as "light" if their mean was from 1 to 3 and
"severe" if their mean was from 4 to 6 (table 1).

Worried about	Number of issues		
	"Light worries", the mean from 1 to 3	"Severe worries", the mean from 4 to 6	
themselves as future teachers	22	4	26
their future pupils	10	16	26
Total	32	20	

Table 1. Worries in general: the number of issues about which most student teachers
expressed lower (from 1 to 3) and higher (from 4 to 6) levels of worries.

The students were not especially worried about themselves. It was only
in problems with time, having sufficient training, and the quality of
information and frustration with the huge amount of it, that they came
out above the middle of the scale. They were much more pessimistic
about their pupils. Of the 26 themes discussed were they found 16 rather
problematic. Positive exceptions included technical issues, the search
for information, "netiquette", organisational issues and time spent.

4.2 Emotional attitudes towards the Internet

Most of the students had a positive attitude towards the Internet. If they have the opportunity to use it, they also grow to like it. Feelings of deprivation or shame because of insufficient skills were not rare. Superficial attitudes, e.g. using it because others were doing so, were an exception. Negative attitudes involving hating it, wanting to destroy it or use illegal files were very rare. Most of the students also reported that their attitudes had become more positive during the course. Only one student reported negative changes.

4.3 The Internet as an organisation

The students were asked to freely describe the Internet as an organisation. They perhaps considered this question difficult, however, because only 38 of them answered. The descriptions were classified in three categories, with ten of them remaining unclassified.

Ten persons described the Internet as a non-living system or place. They sometimes used the word "network" or defined the telephone lines. The Internet was seen as a place like a shop or dumping ground. Twenty students described something living in connection to the Internet. Half of them saw it as a living organism or system, such as a jungle, an ant hill, an octopus, a dovecot or a rhizoid. Eleven respondents emphasised the human component and the potential contact. They referred to a company, a library, parliament and the international red cross, but there were always some signs of human beings.

4.4 The characteristics of the Internet

The students described the Internet in their own words. The majority of the characteristics mentioned were positive: the Internet was found to be useful and it included valuable information for the teacher. The Internet was seen as a dynamic, interesting and attractive area. The most frequently-expressed characteristic was "wide", which could be understood as a neutral expression. The negative features mentioned were that it was difficult, unreliable and frightening. Many of these characteristics were opposite ends of a continuum as described in table 2.

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Characteristic		
Positive	Neutral	Negative
Quick 13		
Global 6		
Easy 6		Difficult 16
Useful 23		Useless 3
Interesting, tempting 25		Boring, frightening 8
Dynamic 17		
Contains high quality information 10		Contains unreliable information 10
Contains lots of information 20	Wide 27	Has a complicated structure 12

Table 2. Qualifications of the Internet.

4.5 Innovation Adopter Categories in the Use of the Internet

The proportion of early majority was considerably higher in this sample than expected according to the theory (table 3). Correspondingly, the proportion of late adopter categories, especially the late majority, was small. However, the sample was small, so the results cannot be expected to follow the theory.

Category	Among student teachers, %	In general population, %
Innovators	1,7	2,5
Early adopters	22,0	13,5
Early majority	57,6	34,0
Late majority	13,6	34,0
Laggards	5,1	16,0
Total	100,0	100,0

Table 3. The Internet as innovation: adopter categories among the student teachers and in the general population.

5   Discussion

The student teachers´ relationship with the Internet was revealed to be complex. They were not afraid of it themselves: they had no serious problems with technologies, or the information processing except for the uneven quality. There was only the lack of time to learn about it and to be educated in these issues. Instead, they were worried about their future pupils. As far as information processing was concerned, they mentioned evaluation of reliability, the creative use of information, and listing references. Problems of quality and cultural worries of other hobbies withering away and learning undesirable things were seen as severe. On the one hand, the students thought that the Internet contained useful and interesting information, but on the other hand they were afraid of the huge amount. This aspect of the Internet is one of its main characteristics, its strength, weakness, opportunity and threat to both the pupil and the teacher. This paradox was also observed in the characteristics of the Internet mentioned by student teachers: the listed qualifications which often were opposite ends of a continuum like "interesting or tempting" *vs.* "boring or frightening".

The student teachers´ attitudes towards the Internet and how they gradually grew to like it reflected the results obtained from kindergarten student teachers (Kankaanrinta 2000b). Large proportion of early adopter categories was also seen in other student teachers and in-service teachers (Kankaanrinta 2000a). The students placed themselves in these categories, and it is possible that they wanted to give a progressive image of themselves. However, the same trend has also been observed when the categories were formed on the basis of statements which were answered by the students. This proportion of innovation adopter categories needs further investigation in connection with information technology innovations. In any case the results among some Finnish teachers and student teachers have been consistently different from what was to be expected according to Rogers' (1983, 1995) theory.

The perception of the Internet mainly as a combination of human beings, or at least as a living organism rather than a place or other inorganic structure, is a significant finding. So even if the Internet is a combination of hardware, cables and software it is most important as a means for communication with other people.

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