The impact of laptop provision on teacher attitudes towards ICT
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The use of information and communication technologies (ICTs) in Finnish primary and secondary schools has been increasing for the last decade, but the full potential of the new technology has not been achieved; pedagogical thinking in educational institutes has not advanced in parallel with technological advances. Teachers’ attitudes towards the use of ICTs in schools are significant factors in determining how technology is used in schools. The aim of this study is to investigate if there is a difference in attitudes towards ICTs by teachers who have a personal laptop computer (provided by the employer) compared to teachers who have not. The data were collected by means of an online questionnaire, to which 69 teachers out of 196 (31%) from four schools replied. Analysis of the data reveals that teachers who used personal laptops in their work regarded the use of ICTs, both in teaching and in general, more positively than teachers who did not.

Keywords: attitudes; teachers; mobility; technology; pedagogy

Introduction
Information and communication technologies (ICTs) have rapidly changed our society, whether we look at it from a global, national, or local perspective, and it is important to foresee these changes and to react and adapt to them in a timely manner. The technological revolution is a major challenge for teachers’ professional development, as the knowledge society challenges them to adopt new pedagogical practices in order to facilitate higher level knowledge acquisition skills the learners need to empower lifelong learning (Hakkarainen et al., 2001). The development of teaching and learning by investing in providing ICTs resources to schools has proven to be worthwhile. Evidence in the research literature shows that ICTs have a positive effect on pupils’ attainment in almost all the National Curriculum subjects (Cox & Abbott, 2004). Rogers and Finlayson (2004) concluded that ICT made subject knowledge more accessible, stimulated thought, and improved learning. Educational institutions play vital roles in helping children to acquire the capacity to learn and the knowledge they will need in their future years.

In Finland, the first six years of basic education are provided by the class teacher, who teaches all, or most, subjects. During the last three years, subjects are usually taught by different (specialised) subject teachers. The Development Plan for Education and Research 2003–2008 (Ministry of Education of Finland, 2004a) is based on a vision developed by the Finnish government regarding how to continue to promote the development of an information society in Finland. The programme states that care will be taken during the programme period to ensure that all students have opportunities

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to gain the knowledge and skills they need to operate in an information society. The vision of inclusion in an information society requires that all citizens have access to technical devices and skills in their use. The vision, and the plans for its development, have greatly affected the newly reformed Finnish National Core Curriculum (Finnish National Board of Education, 2004), which is the foundation of education, teaching, and learning. Both the national and the municipal curricula currently emphasise the importance of using modern teaching methods and modern information technologies. With these guidelines, the curricula foster transformational thought in the classroom, making way for ICTs to be used to their full potential in classrooms. To realise the vision, the teaching framework in schools will need to change. The Information Society Programme for Education, Training and Research (Ministry of Education of Finland, 2004b) identifies major priorities and actions for boosting the information society development in education, training and research. The programme aimed to improve the training of teaching personnel, to produce high-quality, pedagogically sound educational material, and to make sure that appropriate use of ICTs in learning and in teaching is part of everyday school life.

Global megatrends, ICTs being one of them, are also having an effect on schools. The use of modern technology, networks, and computers has been increasing in Finnish schools for the last decade. In the 1990s, the focus was on providing teachers with the necessary technical skills and support structures that they needed to integrate ICTs into their classrooms. At the beginning of the twenty-first century, this focus shifted to thinking about how to bring ICTs into schools in a pedagogically appropriate manner. It seems that the issue is not necessarily how much ICTs are used in teaching-studying-learning processes, but rather how they are used. The opportunities that new technology can provide are still not recognised in relation to pedagogical changes; pedagogical thinking in educational institutes has not advanced in parallel with technological advances. Tools provided by new technologies are mainly used to carry out tasks that have been set up based on a pedagogical approach that is unable to grasp how to utilise ICTs to their full potential in a learning environment; nevertheless, it is generally considered that the use of ICTs in education adds value to teaching and learning (Kansanen et al., 2000) if they are used in a pedagogically meaningful way.

The perspectives on the state of utilising ICTs in schools mentioned above are fairly common conceptions; it is not the purpose of this study to try to challenge those beliefs.

In order to increase and deepen the level of learning with the use of ICTs, most ICT-based tools have in general been fully merged with the social practices of teachers and students; only then are their intellectual resources genuinely augmented and learning achievements correspondingly facilitated (Hakkarainen, 2009). Until these changes are implemented, the inconsistent use of new technologies in schools and the slow speed at which ICTs are integrated into teaching and learning will remain. This slow integration of ICTs can be explained from a historical perspective: schools have typically adopted changes very slowly, and these changes will eventually gather momentum. This perspective is anchored in the belief that technological change is inevitable; however, it is not an entirely valid explanation, because technology itself does not necessarily trigger change. Another historical point of view relates to teacher-centred teaching practices; a teacher has to have the knowledge to utilise ICTs in a pedagogically grounded manner in teaching. Therefore, in order to change teaching methods, the advantages of using new technologies should be clear to the teachers;
otherwise, they will not be motivated to change. Defects in equipment can also explain the problems mentioned above. If technical glitches occur, whether weekly or a few times a month, then confidence in the technology’s worth is undermined and contributes to sustaining current teaching practices (Cuban, Kirkpatrick, & Peck, 2001).

There are numerous factors that can affect a teacher’s readiness to bring ICTs into a classroom. Wozney, Venkatesh, and Abrami (2006) conclude that teaching styles, frequency of computer use outside of teaching activities, amount of technology-related training, and accessibility of resources within the school all had a significant effect on how much technology was used. Hallam (2008) presents evidence that differences between teachers with and without computer anxiety appear to be related to differences in social resources within the sociocultural environment of computing. It is clear that simply providing a technological tool for a teacher does not solve all the problems regarding ICTs in schools. However, providing laptop computers for teachers is a recent phenomenon; the motivation of this study is to see how this personal, mobile medium is adopted as a teaching and learning tool.

Learning today is seen as a process during which we adapt and absorb parts of a culture. Learning occurs by means of the conditions and mediating tools provided by the culture. In addition to learning skills and knowledge in schools, we socialise in a culture-specific way and engage in a culture’s activities. As society and the concept of learning are evolving, the schools’ framework will also gradually change. The focus of this study is on finding out whether mobile technologies will have an effect on teachers’ attitudes towards ICTs. Are these technological advances having an effect on how we teach and learn in schools?

Lieto, a small municipality in south-western Finland, near Turku, has developed a long-term development strategy to bring technology into teaching and learning. All schools are equipped with modern ICT classrooms, and wireless local area network connections are available; commercial e-learning platforms with ready-made content are widely utilised. ICT support is adequate and professional, pedagogical training and support are available. As part of the latest ICT education strategy, Lieto decided to make an effort to provide a personal mobile laptop computer to every teacher. During 2006, teachers in four of the nine basic education establishments were provided with laptops. This paper presents the results from research which was conducted to determine whether there was a difference in attitudes towards ICTs by those teachers who had personal laptop computers, compared to the teachers who had not.

Theoretical background

The theoretical framework of this study is based on Bandura’s efficacy theory, also known as the social learning theory. Bandura’s (2001) theory provides a theoretical context which helps us to understand how technology impacts teachers. This theory proposes that an individual creates a database on how certain actions will drive certain outcomes. This database then becomes a resource that helps the individual determine what outcome can be expected from different circumstances, and also to determine how he or she should behave in order to produce a specific desired outcome. Teachers’ actions are based upon their belief systems. The key to change is in their belief that they have the power to produce change with their actions. Further, in order to achieve certain outcomes, teachers need a strong sense of self-efficacy. Their perceived self-efficacy is a crucial link to the decisions that they make, which in turn establish their teaching methods. Teachers must have an understanding of the change process before
they are able to lead complex behavioural changes, such as using computers in the classroom. Fullan (2001) notes that there are no shortcuts for leading complex change. It is also clear that self-efficacy is not the only factor that has an effect on changing teaching and learning. The role of leadership, experience and knowledge of computers, and attitudes towards computers are vital to the successful implementation of change (Piper, 2000).

The scientific concept of learning has changed. The focus has shifted from a teacher-centred approach to a learner-centred approach; from individual learning to collaborative learning; from teaching to guidance; and from instantaneous absorption of knowledge to life-long learning. The purpose of education and learning is to help students to develop the mental tools and learning strategies with which to acquire knowledge and which will enable them to consider different aspects of life (Hakkarainen, 2000). Scardamalia and Bereiter (2003) describe the ‘knowledge age’ as the era in which the ability to innovate is decisive in relation to the health and wealth of society. Further, Bielaczyc (2006) states that the central challenge in implementing knowledge-building pedagogy in schools lies in creating the appropriate social infrastructure around the implementation of technology, specifically in the classroom practices and online activities involving the use of the technological environment, so that the old ‘transfer metaphor’ model of education (where knowledge is passively received) is rejected. As Ilomäki (2007) states, schools that successfully adopt ICTs into teaching and learning can have a positive impact on adjusting both teaching and learning methods to meet the demands of the curriculum and modern learning theories. When one is immersed in a culture like this, one learns how to be a part of that culture, on many levels. Can similar enculturation be detected in the attitudes of teachers who took part in this study?

Haaparanta (2007) found that pedagogical problems increase as the technical infrastructure in schools improves and as ICTs are used more frequently. According to previous research, adding technology to the learning environment cannot cause significant changes to the teaching-studying-learning processes by itself; changes in schools’ frameworks and procedures are also required (Lehtonen, 2003). To utilise technology in a pedagogically meaningfully way, reorganisations in the three processes mentioned above (teaching, studying and learning) as well as in individual actions, attitudes, and pedagogical models are required (Enkenberg, 2003). Wentworth and Popham (2005) found that giving mobile technology and laptop computers to teachers encouraged them to develop inquiry-based lesson plans and to use technology innovatively in order to enhance learning. With the aid of technology, Carroll (2000) proposed that the teacher becomes an expert learner, organising and leading others in networked learning communities.

Teachers are inclined to use their own experiences and practical, commonplace knowledge as a basis for their decision-making in teaching, rather than adopting ideas and guidelines stated in theoretical, science-based knowledge or the curriculum. It is generally accepted that, as teachers gain experience with computer technology, the use of computers in the classroom evolves into using more computer applications, more often, and more flexibly. But even if the large majority of teachers have sufficient skills for everyday and routine working practices, many of them still have difficulties in finding a meaningful pedagogical use for technology (Ilomäki, 2008). Attitudes towards ICTs can also be barriers; gaining the experience and an understanding of how to use ICTs is time-consuming and requires commitment. Attitudes toward ICTs bear a significant relationship with, and also predict, competence (Jegede, Dibu-Ojerinde,
The importance of previous computer experience is widely recognised (Snoeyink & Ertmer, 2001), even though attitudes partly depend on personality (Guha, 2000). Perceptions of the ease of use and relevance of ICT can be affected by negative experiences, making teachers less confident and more anxious.

Teachers’ attitudes toward ICTs have been studied previously. Albirdini’s (2006) findings suggest that teachers have positive attitudes toward ICTs in education. The results point to the importance of teachers’ concept of technology itself, their experiences with it, and the cultural conditions that surround its introduction into schools, in shaping their attitudes toward technology and its subsequent diffusion in their educational practice. Bullock (2004) found that teachers’ attitudes are a major factor in enabling/disabling the adoption of technology. Meelissen and Drent (2008) stated that female teachers assess their knowledge and skills in ICT considerably less positively than male teachers do. Shapka and Ferrari (2003) suggest that female teachers are less likely to apply computers for various teaching and learning purposes. Some researchers (King, Bond, & Blandford, 2002; North & Noyes, 2002) have pointed out that gender should not be an issue with regards to basic ICTs skills. However, other studies have provided evidence that gender inequalities now emerge in new areas of ICTs use. Males tend to be more intensive users of the Internet, enjoy more competitive forms of e-learning, and encounter different problems while using ICTs (Colley, 2003). A study by Anyan, Owens, and Magoun (2000) (which studied teacher attitudes towards ICTs and considered the teachers’ gender, teaching experience, and teaching levels) concluded that female teachers had a better attitude towards technology than their male colleagues. Anyan et al. also found a dependency (although weak) on the teaching level: elementary school teachers were less positive in their attitudes than their middle or high school colleagues. Piper and Austin (2004) conclude that the teacher’s attitude towards working with the computer, and his or her perception of leadership and professional development, have an impact on his or her beliefs about using the computer in an instructional setting.

A team assigned by the Finnish National Board of Education to make development plans for education and research has recommended that the changes and influences on a teacher’s work when using ICT in education should be studied and analysed. The study presented in this article addresses this issue from a local municipal level by presenting a comparison group of teachers to whom mobile, personal laptop computers are provided by the employer. Piper (2000) showed that, despite extensive professional development opportunities, if the teachers ultimately have a negative attitude about the use of computers in the classroom or feel the leadership isn’t supportive of the initiative or the teacher, then it is likely that the teacher’s self-efficacy in using the computer in the classroom will be negatively influenced. Providing teachers with mobile laptop computers, however, adds a new dimension to the framework of teachers, ICTs, and learning. Mobile technology gives teachers new possibilities to prepare, plan, and carry out their teaching. The possibility of using these laptops at home as well, and in their spare time, is also proposed to have an effect on the way the teachers utilise ICTs. A personal laptop would provide a teacher with the opportunity to practise ICT skills, to test new tools and methods, and to raise their professional status with regard to the use of technology. Mobile technology could be a key factor in influencing their attitudes towards the innovation and thus having an effect on their self-efficacy of using computers in the classroom. If this proves to be the case, it would be vital for educational institutions to look into their policies and practices for investing in utilising ICTs in schools.
Research questions

The research questions addressed in this study are:

- Do teachers who have a personal laptop computer have different attitudes towards ICTs compared with teachers who have not?
- Does gender have an effect on the attitudes of the teachers within the comparison groups?
- Does teaching experience have an effect on the attitudes of the teachers within the comparison groups?
- Does being a classroom teacher (one who teaches many subjects) or a subject-specific teacher make a difference in attitudes towards ICTs?

Methods and data collection

The research data consist of 69 participants’ answers to an online questionnaire (N = 69). An invitation to take part in this questionnaire was originally sent to 196 teachers, which was the number of basic education teachers in Lieto at the time. The response rate was 31%. The basis of the questionnaire was the Survey of Teachers’ Attitudes toward Information Technology Questionnaire (TAT v.3.2a) which was developed by IITTL (the Institute for the Integration of Technology into Teaching and Learning). The original questions were first translated into Finnish and then edited to suit the needs of the study. The final questionnaire had 168 questions that were divided into 12 different sections, which were Likert questions (for example: ‘To me multimedia is important – not important’) and statement sentences (for example: ‘I want to learn a lot about computers’) with answering options on a scale from one to five (strongly agree – strongly disagree). Both positive and negative types of questions were used randomly throughout the questionnaire. After preliminary reliability and validity checks, the questions were organised according to the following subscales:

- enthusiasm;
- anxiety;
- productivity;
- semantic perception of computers;
- developing teaching methods and professional skills with ICTs;
- utilising ICTs in teaching-studying-learning processes;
- e-learning platforms and communication technologies;
- email, multimedia, Internet.

The analysis of the research data was performed statistically with SPSS, a computer statistics program. Negatively oriented belief statements were reverse coded after data collection to facilitate their interpretation. Missing data were replaced with the variable response mean. The consistency of the data was assured by looking at descriptive statistics, correlation coefficients and other statistical methods. Concept validity and the structure of the scale were assessed by using factor analysis.

Results

Of the 69 participants (N = 69) in the study, 62.3% were female and 37.7% were male. Almost half of the participants (49.7%) had had teaching experience of more than
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15 years, and 76.8% of the participants had a computer in the classroom. A projector was available in the classroom for 27.5% of the respondents.

**Attitudes and laptops**

The main research question of this study was: Do teachers who have a personal laptop computer have different attitudes towards ICTs compared with teachers who have not? Because it is not customary for teachers in Finland to utilise expensive personal equipment in teaching, all of the teachers in the four schools concerned were given the possibility to receive a laptop provided by their employer, which they accepted. After the provision of laptops, the teachers were given some technical support in order to make sure that all of them knew for instance how to connect the laptop to a data projector, to an external sound amplifier, and so on. They did not receive any extra pedagogical support. This was to minimise the possibility of affecting their attitudes before the questionnaire; the data for this research were gathered within six months after the provision of laptops. The invitation to reply to the questionnaire used for gathering data for this research was sent to all teachers in Lieto; the fact that almost half of the participants were those who did receive laptops was purely coincidental. The division between those participants who had a laptop provided by the employer and those who had not can be seen in Table 1.

The differences in respondents’ views about utilising ICTs in teaching and learning are presented in Figure 1.

The variables that measured teachers’ negative, neutral or positive attitudes towards utilising ICTs in the teaching-studying-learning processes revealed that there was a slight ($p = 0.023$) correlation between having a laptop for use and the teacher having a positive attitude. When the respondents’ means in this subscale were compared with a T-test, the results were statistically significant ($p = 0.009$). As can be seen from Figure 1, 57.6% of the teachers who had laptop computers for their use had a positive attitude towards the subscale. Only 25% of the teachers who did not have a laptop computer for their use had a positive attitude towards this subscale. Respondents with laptops had more positive attitudes towards utilising ICTs in teaching and learning. Respondents’ answers for each of the two comparison groups are presented in Figure 2.

The same tendency was also present when analysing respondents’ attitudes towards email, the Internet, multimedia, use of ICTs in developing teaching methods, improving the development of professional skills, and use of ICTs in teaching. Teachers who had the use of a laptop gave, on average, higher values to all of the six subscales presented in Figure 2. The biggest difference with the two comparison groups was in their attitudes towards developing teaching methods using ICTs. However, developing professional skills with ICTs and utilising ICTs in education also received higher values from teachers with a laptop to use. The differences,

| Has your employer provided you with a personal laptop computer? | Frequency | Percent |
|---------------------------------------------------------------|-----------|---------|
| Yes                                                           | 33        | 47.8    |
| No                                                            | 36        | 52.2    |
| Total                                                         | 69        | 100.0   |
Figure 1. Respondents’ views about utilising ICTs in teaching and learning.

Figure 2. Divisions of respondents’ answers in six subscales presented with mean rank values.
however, were not statistically significant. It was interesting to discover that concepts which are abstract in nature are seen more positively by teachers who had laptops, yet more concrete concepts, such as the Internet and email, differ less when the two groups are compared. It was also interesting to see that teachers who were using personal laptop computers in their work evaluated all of the 12 subscales more positively than teachers without a laptop. Since these teachers’ attitudes towards ICTs were unavailable for the period of time before the personal laptop computers were provided, it is not possible to state that having a laptop for personal use is the only factor that explains this ranking; however, it does indicate that the factor is relevant to the topic under discussion.

**Attitudes and gender**

The second question evaluated by this study was whether the gender of the teachers within the comparison groups affects attitudes towards ICTs. Table 2 presents the results of how female and male teachers differed in their attitudes towards ICTs in general.

The analysis of the data revealed that a greater number of teachers who had positive attitudes towards ICTs were, in fact, female (64.9%). Female teachers also viewed the Internet, email, and utilising ICTs in teaching and learning more positively. On the other hand, male teachers’ attitudes towards developing teaching methods with ICTs were more positive in a statistically significant way ($p = 0.01$), when compared to those of female teachers. Male teachers were also more positive towards multimedia, developing professional skills with ICTs ($\chi^2(2) = 7.964; p = 0.019$), and increasing productivity. Analysis of the data revealed that gender did make a difference, but only partly and variably, and only one subscale revealed statistically significant differences. These results are in line with earlier studies; the traditional belief that men are more positive in their technological attitudes than women could not be confirmed.

**Attitudes and teaching experience**

The third question of this study was to evaluate whether teaching experience had relevance to teachers’ attitudes towards ICTs. In general, it is believed that younger teachers are more accustomed to the technological advances in society and therefore would adopt and deploy the use of technology in classrooms in a more flexible way. In analysing the data of this study, we divided the respondents into two groups, based on their teaching experience: one group of teachers, with fewer than 10 years of teaching experience, and another with over 10 years. According to the analysis of the results, the

| Table 2. Cross-tabulation of female and male teachers’ attitudes towards ICTs in general. |
|---------------------------------|--------|--------|--------|
| ICTs in general                 | Female | Male   | Total  |
| negative                        | Count  | 19     | 13     | 32     |
| % within                        | 59.4%  | 40.6%  | 100.0% |
| positive                        | Count  | 24     | 13     | 37     |
| % within                        | 64.9%  | 35.1%  | 100.0% |
| Total                           | Count  | 43     | 26     | 69     |
| % within                        | 62.3%  | 37.7%  | 100.0% |
less experienced teachers were more positive in their responses to most of the questions. The greatest differences between the two comparison groups were seen in their attitudes towards utilising ICTs in teaching and learning, and in developing teaching methods with ICTs. However, even in these two subscales, the differences were not statistically significant. Teachers with more than 10 years of teaching experience viewed email, e-learning platforms, communication technology, and general ICT questions more positively. Therefore, according to the results of this study, the general belief that younger teachers are more sympathetic towards ICTs must be questioned. There are differences in the emphasis of the younger teachers, but their attitudes did not differ significantly and the results were not consistent. The results of this study are consistent with earlier studies about computer attitudes and teacher experience; attitudes towards computers are not solely dependent on the length of teachers’ teaching experience.

**Attitudes and teacher type**

Finally, this study investigated whether being a class teacher or subject teacher would make a difference in teachers’ attitudes towards ICTs. Analysis of the results revealed that these two sample groups were very much alike in their views. Class teachers’ answers were more positive, on a statistically significant level, when it came to questions concerning developing teaching methods with ICTs; on all of the other subscales, however, the attitudes of class teachers and subject teachers were very similar.

**Discussion**

The aim of this study was to investigate how the ICT-related attitudes of teachers using personal laptop computers differ from teachers without laptops. The results revealed that those teachers who had a personal laptop computer for their use were more positive in their attitudes towards ICTs in education and towards ICTs in general. Teachers with laptops had a much stronger belief in the value of utilising ICTs in teaching and learning, developing teaching methods, and developing their own professional skills with the use of ICTs. Their attitudes were more positive in all of the subscales. Other research variables, such as gender, teaching experience or class teacher and subject teacher division, did not have a statistically significant effect on the attitudes of teachers in any of the subscales and did not have a coherent influence on the research group. Coupled with the results of a previous study by Cuban et al. (2001), which also found that teachers’ age, experience, and gender were not significant factors in explaining the differences in teachers’ use of ICTs, the findings of this paper’s study indicate that providing mobile technology to teachers can have an effect on their attitudes towards ICTs.

Since the number of participating teachers was rather small, and the study was limited to teachers in the municipality of Lieto, this study will not draw conclusions about teachers’ attitudes in a wider or general sense, but will instead focus on teachers’ attitudes in the municipality of Lieto and draw conclusions as to whether providing teachers with laptops would have a positive effect on this specific group. However, if one of the goals of an educational system is to have an influence on how ICTs are used in schools, the step taken in Lieto is only a part of the solution, although it seems to be a step in the right direction. As Roschelle, Pea, Hoadley, Gordin, and Means (2000) state, an education system is like a locked puzzle: if you want to move
or change the place of one piece in the puzzle, it is only possible if other surrounding pieces are evolving at the same time. If we want to develop the use of ICTs in teaching and learning, it is necessary to develop teacher training, curriculum, evaluation, pedagogical support, and school infrastructures simultaneously with technological advances. ICTs are already very much present in schools, and their use will increase even more in the future. Providing teachers with an opportunity to use technology, not only while at work but also in their spare time, seems to be a good way to increase their technological experience.

Teachers’ beliefs about the relevance of ICT to their subject can impact on their attitudes towards utilising ICTs in education. Unfortunately, it is not easy to demonstrate the immediate benefits of using ICTs in education, particularly since they will be perceived differently depending on the teacher’s subject area. For example, a domestic science teacher would perceive the benefits of ICT use differently from a physical education teacher. This might explain why the results of this study gave the notion that class teachers were slightly more positive in their attitudes towards ICTs. Teacher training is one way of changing the attitudes of teachers, but the problem with training is that it often is irrelevant to teachers’ specific needs (Cuban et al., 2001). Although this type of training is necessary for computer novices, the training needs to be extended to also help teachers learn and prepare to integrate ICTs into their pedagogy. According to Espinosa and Chen (2001), all teachers can become technologically literate, and most can learn constructivist teaching practices. The challenge is how to combine these two domains. Specific, targeted assistance is necessary for teachers to be able to understand and integrate technology into their teaching and at the same time apply constructivist teaching principles.

Implications
Many of the traditionally manual activities in today’s schools have already been automated, using software-based or Internet-based applications. In the municipality of Lieto, communication between the parties in the school – teachers, headmaster and parents – is carried out through an online communication system. Leave of absence and student evaluation are accomplished with online student administrative software, and schools have their own intranet systems online. In addition, many teachers are administrating and updating their classroom systems to facilitate cooperation between home and school: for example, teachers are using online calendar software to inform everyone about school activities. In order to ensure these tools are used, it is vital that teachers always have the possibility of using an online computer. Therefore, the availability of mobile, personal laptop computers and wireless local area networks is critical. Teachers must be able to go online, whether in a classroom, staff room, or the school library. Mobility gives teachers the opportunity to choose the time and place for their research, communication, and planning activities. The expectation that teachers utilise ICTs in schools is reasonable only when the technical infrastructure, equipment, and support are available and sufficient.

Making pedagogical decisions about how to teach is not purely routine thinking; pedagogical thinking guides the decision-making process when a teacher is choosing from different options in order to achieve certain goals. If a teacher has the ability, means, and skills to easily adopt technology in teaching and learning, ICTs will be increasingly used in schools. Providing teachers with laptop computers and with technical and pedagogical support will affect a teacher’s readiness and willingness to
bring ICT to students; in order to achieve this, it is necessary to provide ICTs as part of the infrastructure of a school. Cuban et al. (2001) argued that, without these support structures, only modest, peripheral modifications will occur in teaching and learning. In other words, without these support structures, teachers will adapt innovations to the constraints of the self-contained classroom, using new technologies to sustain old practices.

**Conclusion**

Technology implementation is a diverse process mediated by teacher characteristics, technological framework, and conditions within the school. According to this research, providing teachers with laptops can be seen as a factor to influence teachers in how they utilise mobile technology at work and also in their spare time. This is consistent with other findings. Wozney et al. (2006) found that personal use of computers outside of teaching activities was the most significant predictor of teacher use of technology in the classroom. When the use of modern technology is not tied to a specific time or a place, teachers will have more time to use and evaluate the possibilities provided by the technology. If teachers make lesson plans using a computer, and then use this computer later in the classroom, the threshold for utilising the tool and its software in planning and teaching will be lower.

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