Laptops for Students

Research Project in Estonia

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Summary

Methodology

The aim of the current research was to study:

- The type of activities students administered on laptops, frequency and duration of these activities.
- Changes in students' learning styles, learning preferences, learning methods, communication, attitudes towards school and using ICT, learning outcomes, missing classes and extracurricular activities.
- Changes in laptop –based classroom and homework assignments given by teacher
- Changes in teachers' teaching methods, teaching styles, communication with students and parents and attitude towards application of ICT in studies.
- Changes in parents' attitudes towards application of ICT in studies, towards school and teachers.
- Advantages and problems of using laptops from the perspective of students, parents, teachers as well as school administrators.

Based on the afore-listed aims, the study searched answers to the following questions:

- How are laptops applied at lessons and while doing home assignments?
- What kind of activities, what webpages and what learning software laptops are used for? How often and for how long?
- How students and teachers assess application of laptops at school?
- How and in what way the learning style, learning preferences and learning outcomes of students change in the process of laptop application?
- How and in what way the teaching style, teaching methods and teacher activity in the classroom change?
- Whether and what kind of changes take place as a result of laptop application in student motivation, attitude towards computer usage, school, studies, attendance and discipline?
- Whether and what kind of changes take place as a result of laptop application in teachers' attitudes towards computer usage?
- Whether and in what way communication tools between students and teachers change in the process of laptop application?
- Whether and in what way extracurricular activities of students change in the process of laptop application?
- What are the advantages and problems of using laptops from the perspective of students, teachers, parents and school administrators?
- What kinds of changes in school management are necessary in order to apply laptops in studies?

The sample comprised 8th grade students, their parents, subject teachers and school administrator from 5 schools providing general education (town gymnasium with the Estonian language instruction, town school with the Russian language instruction, rural gymnasium, rural basic school and special needs' school). The schools that entered the research were selected on the basis of a competition administered by Tiger Leap Foundation. In one of the schools ICT competencies were developed only in the framework of teaching the subject, in other four schools the syllabus included computer lessons.
The study included 98 students: 58 boys (59%) and 40 girls (41%). The age of the students in the beginning of the project was between 13 and 16 years. The parents were the ones that allowed their children to bring home laptops. 74 parents filled in the questionnaire: 61 mothers (82%) and 13 fathers (18%). 41% of parents had higher education.

44 teachers participated in the research: 39(89%) female teachers and 5 (11%) male teachers. Teachers of different subjects were represented such as mother tongue, foreign language, mathematics, history, biology, geography, physics, chemistry, music, art, manual training/handicraft, physical education, computer instruction. Seven (16% of all teachers) real sciences (mathematics and physics) teachers, 14 (32%) humanities (mother tongue, foreign language, history) teachers, 12(27%) natural sciences (biology, geography, chemistry) teachers and 11(25%) teachers of the other subjects (art, handicraft, music, physical education) participated in the study.

Students who entered the research received laptops in the beginning of the 2nd term in November. Questionnaires, interviews, lesson observations, analysis of documentation, essays and files of monitoring software installed in students' computers were used for **data collection**. Part of the observation software *Track4Win, Monitor,* was installed in all student computers that sent data on which programmes, which webpages, when and for how long were used into the server that worked at the University of Tartu. In case the computer was used without internet connection, the programmed saved the data in the laptop and sent the information to the data collecting server as soon as possible. Collected data was stored in MySQL database and corresponding statistics was compiled using different queries. An overview on data collection throughout the research is provided in Figure 1.

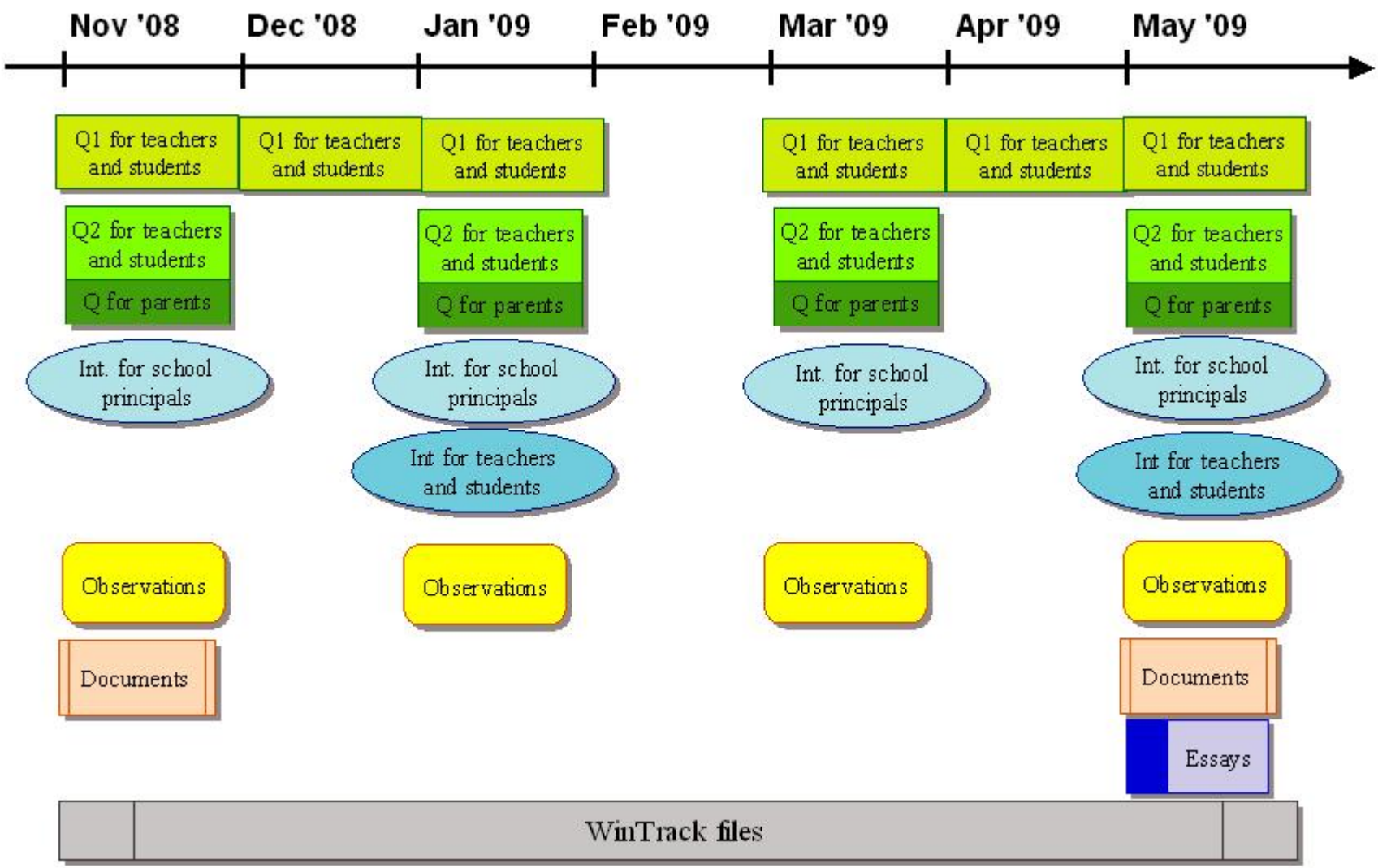

Figure 1.1. Schedule of research data collection (Q – questionnaire, Int – Interview)

Results

In the course of the project the duration of laptop usage among students and teachers decreased rather than increased. Laptop usage was different form school to school and this might be related to the school culture of a particular school. The statistics of the observation software claimed that using web browsers and gaming did not change significantly during the project whereas the usage of special study software decreased and the usage of instant messaging programmes increased in the course of the project.

Study process did not change significantly as the result of laptop application. One of the reasons might be that teachers who are key persons in study process did not consider that changes in teaching and learning should occur as a result of laptop application. Laptop replaced student book, notebook or workbook whereas methods used were the same as in lessons without laptops. Only few teachers tried to make use of the opportunities offered by computers (e.g. videos, animations and simulations, searching for most current (not in the textbooks yet) material, etc). In some cases teachers used laptops excessively and their usage became an objective in itself and learning outcomes remained secondary. In other cases similar activities (reports and presentations) were over-exploited and doing these properly appeared too time-consuming and boring for students.

Students' learning styles changed in three dimensions in the course of applying laptops. The number of students who prefer reflective learning style increased significantly. The number of students preferring both styles in sensing/intuitive style and sequential/global dimensions decreased whereas the number of students preferring cognitive and global style increased. When referring to teachers' teaching styles, it could be said that the dimension of subject expert and delegator diminished but formal authority dimension expanded. It could also be stated that application of laptops is more welcomed in case of active and cognitive learning style and suited better the teachers whose teaching style is the one of the personal model or facilitator.

Marks, compared with the same period of the previous year, were analysed in the study. We lack in information whether the teachers used the same assessment criteria during both periods or made use of different criteria that included assessing computer skills during the period of the project. The results of the analysis showed that laptop application in itself is not related to changes in grades. Marks are more affected by activities that included laptop usage (utilisation of special study software brought along positive change) and methodology applied. It must be added that if a student already faces learning difficulties then laptop cannot help to overcome these. A student like that will rather find games that provide him/her with recognition in the laptop.

Application of laptops did not significantly decrease skipping classes and did not improve students' attitudes towards school or studies. It could still be claimed that first and foremost motivation of male students decreased and students in general lacked in the feeling of accomplishment. Decrease in motivation was also perceived by the parents. It appeared that students with low motivation level who do not value education rather used laptops for gaming.

Direct communication between students, their peers, teachers or parents did not decline remarkably. From among computer options, students made more use of speed communication programmes. These were utilised in communication with peers, parents and teachers. Students mentioned that they started to use e-mails more often when communicating with their teachers. It could also be stated that prior to the project computer based communication tools were more often used for exchanging info, pictures, music, etc that was not related to school and school work then during the project computer- based communication tools were also used for study- and school-related issues. Schools A and C tried to use laptops in school-related communication more extensively whereas school B demonstrated no change in communication tools' usage. Nor did significant changes appear in communication aims and objectives of teachers in the course of the project. The assumption that laptop usage would increase the usage of ICT tools in teacher-student communication was not confirmed as remarkable changes did not occur. Teachers who used versatile communication tools including computer-based prior to the project, continued using these during the project. Those teachers tried to use ICT tools in and for study-related purposes, though for quite a short term. The only exception in this area was e-mail usage that teachers started to use more extensively for communicating with students.

Students started liking computer usage less with the introduction of laptops. Likewise, they stopped believing that computer usage makes studies easier. Teachers 'disappointed' in computer usage to a little extent although less than students. Both teachers and students perceived that laptops create additional work but both parties drew this conclusion in the course of the project. Prior to the project the attitude towards laptop usage in studies was more positive. Laptops did not meet the expectations of teachers who thought that new teaching methods could be applied by laptop usage. At the same time teachers stopped fearing laptops in the course of the project.

As most of the students participating in the project had a computer at home, many of them had a personal one that they did not have to share with family members, then it could be said that laptops did not change significantly student home activity (reading, watching TV, hobbies, etc). It could still be noted that more changes occurred in female students' home activity especially in the beginning of the project when their 'no computer'- time decreased. Teachers and parents observed primarily the rise in independence and self-confidence of students.

It appeared that laptop usage brings forth advantages and problems on school management level. The advantages and problems were different and changing in time from the perspective of students, teachers, parents and school administrators (see divisons 10.1 and 10.2). From among keywords of advantages 'info', 'speed' and 'computer literacy' were chosen. When in November only single students wrote that they do not see any advantages in laptop usage at classes, then in January 1/3 of students mentioned it, in March and in May a one third. From among keywords of problems secondary issues and internet connection were brought out (especially by teachers). Quite often it was stated that there are no problems or problems are no known.

Computer skills of teachers are very versatile and in general there is a need for purposeful development. Although, students are relatively good at computer usage, it

could still be ostensible and the hope of teachers that students can manage one or another thing could be erroneous. Majority of teachers and several students found that computer classes should be included into the syllabus for the students to get core skills and this enables unification of the general level. This would help to avoid the situation where one has to acquire the skill of the technical application of a programme on top of the subject. Teachers need to be provided with training packages on teaching the methods of computer usage and computer-based teaching materials that comply with the Estonian context and national curriculum. It is recommended to establish the position of the educational technologist at schools. The infrastructure of schools should be made suitable for everyday laptop usage as well. Laptop usage at schools will highlight again the issue of schoolbag weight.

Conclusions

It was the first and a unique project in the Estonian context and students, teachers, parents and school administrators had to manage in a new and in a way, compulsive situation. It is obvious that in a situation like that things to not go according to the plan, on the contrary, different, unexpected and unpredictable issues crop up. The activity did not start in November last year when students received their computers. They actually had some computer usage habits prior to the project. Teachers had carried out computer- based lessons earlier. The curriculum, textbooks and workbooks were exploited. Learning and teaching happened in different ways. Obviously, the level of satisfaction with it was different. The expectations and hopes ran high with the distribution of laptops. The initial excitement at using laptops (in different ways and at a different speed) went flat up to the occasions towards the end of the project where some students even lied that they cannot use laptops at lessons because of technical reasons. The enthusiasm of teachers diminished also. Teachers focused on learning outcomes and in case they noticed that laptop usage under particular circumstances (computer literacy of teachers and students, attitudes of students and teachers towards computer usage, knowledge of teachers in the sphere of computer usage methodology, school management, Estonian educational system, etc) is harmful rather than beneficial, they did not make use of laptops.

A whole list of managerial problems emerged in connection with laptop usage. On the one hand, there were some technical issues- where to store laptops, how to charge batteries, how to guarantee power supply at lessons (batteries do not last for a whole school day). On the other hand, there were regulation-related issues- whether and what new rules are to be laid down, how to act when rules are broken. The issues of decision making (who and how) and responsibility were brought forth. The decision of the teacher not to use laptops at a particular lesson or at any lessons is thoroughly understandable as he/she is responsible for the efficiency of the lesson.

Purposeful and rational usage of laptops at lessons is one of the biggest challenges. It is a complex issue and scientific literature does not provide a uniform answer yet. How to act if principally students have access to computer facilities at the lesson? It is apparent that a laptop-based lesson requires a lot from the teacher (this was even noticed by students). The attention of the student can easily be diverted from learning. The question is whether the teacher has time, options and skills to administer a

gripping lesson with laptops. Where could it be studied? How many supportive materials and suitable programmes are available?

What is the essence of a laptop then? More or less electronic

- Book or newspaper for retrieving information from;
- Workbook for doing the tasks;
- Notebook where one can put down and then erase the notes;
- Communication tool for communicating with peers, but also with parents and even with teachers, almost always and sometimes even during the lesson;
- "Carrot (and stick)" that you can acknowledge your student with or deprive him/her of;
- Toy that one could almost always play with- sometimes at nights and during classes. It was noticed on several occasions that former disruptive students do not still participate in the lesson but deal with their own business (e.g. game) on computers and do not directly disturb others.

Students' computer behaviour was different but in general it could be said that computers were mostly used for gaming, communication and watching videos. Some students gaming time was significantly long. Although the time of using special study software was short, computers were used in studies much more often.
We would like to give some recommendations to make laptop usage at schools more efficient. These recommendations are meant for further reflection and discussion rather than instant direct application.

1. **Rules**. Specific set of rules has not been laid down yet as laptop usage is a relatively new concept at schools. Whether, when and how students could use laptops? When could a student initiate laptop usage, e.g. for information search? When could it be used for gaming? What for could a laptop be used? If a laptop has been started in the lesson already, could a student continue using it for the whole lesson? It is inconvenient and time-consuming to switch the computer on and off repeatedly within one lesson. Specific set of approved rules could alleviate several problems. New issues crop up with checking whether the rules are followed.
2. **Development of methodology and teacher training**. The usage of laptops allows and to a certain extent requires application of different methodology. This methodology should be based on research findings and is to be worked out and developed in co-operation with teachers. Methodology of computer-assisted teaching is also an important aspect in pre-service teacher training.
3. **Computer-based study materials**. Application of special study software and study materials is convenient and expedient both for teachers and students. Unfortunately, there is an insufficiency of materials that suit the Estonian context and comply with the curriculum.
4. **Educational-political conditions**. Educational management in force (e.g. curriculum, system of examinations and level tests) could consider possible computer usage. Forcing overuse of computers should still be avoided.
5. **Educational technological support**. Appropriate educational technological support that offers both technical and methodological support alongside with ideas and materials could be very helpful for teachers (as well as students) at school. This kind of a system has been established in several schools already and hopefully it expands and increases.

6. **Learning communities.** The results of the current research revealed that if cooperation between teachers, exchanging experience and sharing materials found in the internet existed, then application of laptops in studies was wider and a variety of teaching methods was used.
7. **Technical readiness of schools**. Laptop usage sets specific technical requirements to schools. There should be a room for safe storage of laptops, charging batteries, etc. It would be good to have sockets at the desks to avoid stumbling upon extension cords.

Majority of the above listed recommendations do not assume that every student should have a personal laptop that he/she carries along everywhere. A mobile set of laptops would enable the teacher to make use of the set if needed.