Promoting 21st Century Skills through Integration of ICT in the Classroom

Cengiz Hakan AYDIN,
Anadolu University, Turkey

Abstract

This presentation and associated paper focus on an education initiative that intends to help young learners (aged 8-16) in communities where there is limited access to technology in homes and schools acquire 21st century skills. The presentation has three parts: the first part focuses on introduction of the Intel® Learn program’s organization and content; the second part reveals the results of the program evaluations; and the third part covers the lessons learned during the implementation and evaluation of such a technology integration project in an emerging market. The results are quite promising. Although bureaucratic procedures, teachers’ old habits, preconceptions and students lack of previous experiences have caused some problems concerning implementation of the project, the Intel® Learn helped students acquire and/or improve technology, collaboration and critical thinking skills. Both quantitative and qualitative data showed that students’ acquisition of the technology skills exceeded the expected level and that they gained collaboration skills around the expected level. However, the staff should work more to improve students’ critical thinking skills.

Introduction

Over the last decade, a growing number of experts, not only from field of education but also from economics, politics, international relations and so forth, around the world has reached a consensus on a new set of skills that are needed to be able to survive in the 21st century and on providing learners alternative learning opportunities to learn more than just reading, writing, and arithmetic. The World Bank Group (2003) as well as Partnership for 21st Century Skills (2003) suggests that learners need to acquire critical thinking, effective communication, team work, continuous learning, and use of technology skills in order to help the global knowledge economy and be productive world citizens. Additionally experts, such as Kozma (2005a), express importance of a deeper understanding of core school subject including especially science, math, and technology and innovativeness in every aspect of life. On the other hand, helping learners acquire these skills requires a different instructional strategy then the traditional school approach that reflects not present day conditions but the past. Problem-based, technology-enhanced, authentic learning opportunities are considered as today’s instructional strategies (Jonassen et al, 2003).

Kozma (2005b) provided a list of significant outcomes of use of ICT in education, including improving school attendance, deepening conceptual understanding in core school subjects, promoting wider involvement in community developments. Similarly SRI International (2006) notes that “enabling children to learn to use ICTs and … creating optimal opportunities for children to develop a fuller set of 21st-century skills” are the two main ways those promote 21st-century learning (p. 3). According to SRI International ICT integration programs should be designed carefully and provide authentic pathways to help novice learners find opportunities to gain 21st-century skills.

Various projects that intended to help learners acquire these skills have been suggested, such as the Partnership for 21st Century Skills, Skills: Getting on in Business, Getting on at Work, the Intel Education Initiative, etc. The Intel® Learn Program is one of these projects.

Intel® Learn Program

The Intel® Learn is an informal after-school program, designed for helping young learners (aged 8-16) in communities where there is limited access to technology in homes and schools acquire skills necessary to compete in the 21st Century: (1) technology literacy, (2) problem-solving skills and other forms of critical thinking, and (3) peer-to-peer collaboration. The program consists of a series of hands-on activities and projects that require children collaborate with fellow learners to accomplish authentic tasks, such as designing and developing a strategic action plan for the future of the learners’ own community, or for the possible future disasters in their region, and so forth. The Intel® Learn Program is part of the Intel Innovation in Education initiative, requires collaboration with local public and private educational agencies. After completing an evaluation of the program pilot in China, Israel, Mexico, and India, the Intel® Learn program has been expanded to some other countries including Egypt, Turkey, Brazil, and Russia.

In Turkey, the Intel® Learn Program has been implemented in public schools since 2005. The Ministry of National Education (MEB) provides staff and logistics while Intel Foundation along with its partner institutions, such as the Institute of Computer Technology (ICT) and BilgeAdam, administer the program. After receiving training from BilgeAdam and MEB trainers, participant teachers offer the course as an after school
program. Up to January 2007, total 200 public school teachers were trained to put into practice the program in their schools. Around 180 teachers out of 200 offered the Intel® Learn in their schools at least one time (a batch) and trained more than 4000 students in 30 different provinces of the country.

Effectiveness of the staff (teacher) trainings and the implementations in schools has been evaluated by a local of research organization (a third party along with MEB and Intel). The researchers in this organization have collaborated with the Center for Technology in Learning at SRI International that is a private for-profit organization specialized in evaluation and research, to conduct the evaluation.

This paper gives details about the evaluation of the Intel® Learn Turkey Program. The reporting of data and results is organized into three sections. The first section elaborates the data collection. The second summarizes the findings on the following aspects of the program: (1) participation, (2) staff training, (3) usefulness of course materials, (4) learning outcomes, (5) staff-learner interactions, (6) program structure and organization, and (7) scale-up and future. The third section consists of our comments and recommendations about the effectiveness, efficiency, appeal and sustainability of the program.

Data Collection

A mixed method approach has been employed for the evaluation. Four survey instruments and two control lists helped researchers to collect quantitative data while semi-structured interviews with the teachers, school administrators, students and families, and class observations provided qualitative data. At the end of each staff training participant teachers were asked to fill out the End of Staff Training Survey. They were also asked to complete the Attendance Form, the Sample Works Form and the End of Education Survey. Additionally, they were required to send at least 15 works created by learners during each implementation. The evaluation team used a rubric (control list) to assess the quality of learners’ works they received from the teachers and an observation log (another control list) to see how the program was working for the learners in accomplishing the project’s goals (promoting technology skills, higher-order thinking, collaborative capabilities).

The evaluation team has collected quantitative data from total 114 teachers (out of 200) during July 2005-January 2007. The team also conducted 15 site (school) visits during this period. These visits help the team observe use of curriculum materials, staff-learner interactions, learner-learner interactions, and learning outcomes. They also created opportunity to conduct interviews with teachers, students, school administrators and families focusing mainly on their perceptions of the effectiveness, appeal and organization of the project.

Results

This section provides evaluations regarding seven different aspects of the program: (1) participation, (2) staff training and support, (3) course materials, (4) learning outcomes, (5) staff-learner interactions, (6) program structure and organization, (7) scale-up and future.

Participation

According to the quantitative data collected via online version of Form 2: Attendance, total 9440 students completed the program. During site visits and phone calls evaluators noticed that staff had difficulty to find students for the program. There were two major reasons for this difficulty both of which related to the time of the implementations: the first, during summertime many parents preferred to send their kids to either their hometowns where grant parents and other relatives live or tourism places near sea shores; the second, during the summer time religious programs are offered to the same age group and according to the staff as well as local center administrators a great number of parents chosen to send their kids to these courses rather than Intel Learn. The staff and administrators also mentioned that the reason of this preference had nothing to do with the program but parents’ perception that kids will anyway learn these skills (promised by the Intel Learn) in their classes during the school time but they cannot learn their religion and its rules in schools. Another important point evaluators found out during our visits that allowing students play online games in the class during the breaks is an important motive to improve the participation. Some students were looking forward to play games but at the same time they were aware that they had to complete their activities and project in order to play games. This motive helped them acquire the skills the Intel Learn offered. Finally evaluators would like to state that the program attracts an important attention from students all over the country but its timing should be arranged better to be able to reach more students.

Staff Trainings and Support

Evaluators’ observations, interviews, and the results of Form 1 (End of Staff Training Survey) and Form 4 (Final Survey) show that staff trainings are big success. Up to now 362 teachers have been trained in the
program. The trainers got quite an experience so that they are able to handle any situation happens during trainings. As usual, the staff feels a little bit confused during the first day and the following but later they appreciate the effort put into this training and try to get more insight about the program. On the other hand supporting trained staff after the training was problematic in previous years. The majority of staff left alone with the students due to organizational problems. Although it was not enough, the only support they could find was from other staff. However, MEB along with the Intel project coordinator developed a new model and had a new agreement concerning flow of information and support. So, now the staff are be able to get enough support not only from trainers and MEB representatives but also from the project coordinator. According to this model there is a local MEB representative who is coordinating the information flow between all parties. On the other hand, evaluators still think that an online community of practice approach should be employed to be able to provide efficient and effective support. An online portal designed and developed by volunteer staff and supported by MEB, Intel representatives, the project coordinators and evaluators might help establishing a better interaction among staff and other parties, and information and experience sharing. This environment will work better if the staff feel comfortable in it; therefore, it should be created either by themselves or by Intel.

Course materials

Evaluators’ observations, interviews, and the results of Form 4 (Final Survey) reveal that course materials are well designed for the program. The staff as well as students indicated that they found all the required information in their books. However, skills book is a little bit hard to handle especially for younger students. An online version of it might work better. Additionally, in previous observations the staff were complaining about inappropriateness of some of the activities but during the last visits evaluators did not receive any such complains. Also, the staff stated that those parents who saw especially the skills book expressed their appreciation and wish to get a copy of these materials to be able to use at home.

Learning Outcomes

Each member of the evaluation team strongly agreed that the Intel Learn definitely help learners acquire the technology, collaboration and critical thinking skills but in different ratios. The program helps students develop technology skills. However, despite the developments, students are not able to develop collaboration and critical thinking skills in a satisfactory level. One of the main reasons of this problem was that these skills were not promoted before and unfortunately are still not in some classes even though new MEB curriculum focuses on these skills. Since staff and students were not accustomed to problem based collaborative learning, some of them had difficulty to adapt this approach required in Intel Learn Program which in turn affected the outcomes. On the other hand, evaluators’ observations showed that after first and second batches, staff were getting more used to this approach of teaching and implementing the program as it is planned. Students of these staff also demonstrated better collaboration skills and creative thinking examples during evaluators’ observations. In an interview with one of the staff she mentioned that she has a daughter a few years younger than her students in the program. Her daughter joined her class everyday because she did not have any place to leave her during summer. One day at home she told her daughter to do her homework and her daughter told her that “… why I do not have any partner. It is so easy to do the job when you have a partner and I can do better homework if I had one”. The staff was shocked and asked her where she learnt all these. Her daughter’s answer shocked her more: “I know because sister Ceylin [the names have changed] was working alone during the beginning of the school [the program batch] and her works were very bad although she had good ideas. But later she started to work with Selim who was better with computers and after that their works were the best.” So, this case is good evidence that the program help learners gain the required skills if it is implemented as it is foreseeing. Evaluators all agreed that experience made a difference in learning outcomes of the program. In sum, students took better technology skills, collaboration and problem solving skills with them from the program.

Student and Staff Interactions

Same as learning outcomes, although staff bring their past experiences and habits into the program implementations, the experience help them get better in guiding students rather than teaching. Evaluators observed positive and negative examples of the staff-students interactions. For instance, in a center, unexpectedly a young staff, after his student asked, started to show how to change the color of a clipart on the computer rather than directing his student to skills book or other students. Later during the interview he indicated that the best way to learn a skill was watching the correct demonstration first. Evaluators tried to convince him about the exploratory learning philosophy of the program but evaluators could not succeed it. Also in another center, evaluators came across a chaotic situation in the class and the staff was not there. Evaluators found him in another room talking with other teachers. Evaluators noticed that he was not really motivated about the program
and so he was trying to fulfill the requirements of the program but had no intention to encourage students to
explore and discover. He was leaving students alone and providing almost no guiding. He was an
older/experienced teacher. During the interview he complained us about the money they got for this project and
expressed that the project actually does not bring anything new for them and they have already been implying
the same (problem based collaborative learning) approach in his classes for years. On the other hand, evaluators
met another staff via emails. He was quite old as a public school teacher but was very enthusiastic about the new
role he had to play in the class and looked forward for the opportunities to encourage students to ask questions
and seek for their answers. He wrote us that he was giving a small prize such as a candy bar to the student who
asked the best and most useful question. He also mentioned that he was thinking about retirement before the staff
training. In fact he went to staff training to relax and spend several days out of his daily duties and environment.
But starting from the training he felt the difference of the program that helped him remember something he lost
years ago: the joy of helping students learn. Now, he is not thinking of retirement. Similarly in a center located
underdeveloped part of Istanbul both of the staff were having hard time to ignore the students’ request for direct
demonstration of the tasks they are supposed to do. One of them had to yell students and told students that the
first student who come her to ask direct demonstration of a task before going to her/his friends and/or checking
the skills book was going to get the penalty of standing still at the corner of the class for at least 15 minutes. She
actually did not apply this penalty to any students. In the light of these observations and more evaluators
conclude that staff even with a few instinct motivation performs better than those who do not have any even
though you try to provide as much as you can to motive. So that during the staff selection the project coordinator
and MEB must be more careful.

**Program Structure and Organization**

In terms of instructional structure and organization, evaluators have not came across any problem and
almost all the staff, MEB representatives and students find the program successful. However evaluators noticed
several problems in terms of project management especially first half of this year. Almost all these problems
related to the bureaucracy. For instance it took quite a while to find a way to pay some money to the staff
involved in the program. Another problem that affected our data collection efforts was the information flow
especially between MEB and the staff. MEB could not establish a healthy system to learn which staff was
implementing the program when. But after attaining local MEB representatives, all the parties including
evaluators are getting timely and enough information. In addition organizing all the staff trainings in one center,
Ankara was a very appropriate decision. All the staff had chance to meet with MEB upper level administrators
and Intel representatives. This helped them to understand the importance of the program for MEB. Evaluators
definitely recommend organizing all the future trainings in Ankara if it is possible.

**Scale-up and Future**

MEB representatives and the project coordinator mentioned that some of the staff who joined the staff
trainings will work as trainers and offer staff training in local provinces in 2007. Although this organization
might help to train more staff, evaluators are not sure how effective those trainings would be. But of course this
is just a feeling and this organization might work fine. Evaluators think that an online or blended version of staff
training might be better. Also, establishment of an online environment where all the staff can came together and
share their experiences and feelings might help to develop the sense of community and connectedness among
staff. This might increase their commitment to the program and in turn might affect their performance positively.
This sort of an environment also may help us establish a better interaction and get better insight about their
feelings. This environment should also work for presenting the students works.

Additionally, mostly through the enthusiasm of some of the staff such as Ali Bilgi news about the
implementation of the program take place in local newspapers. Especially, one news had a very impressive title:
“They are still in classroom but never complain never bored”. Evaluators think that these kinds of news along
with MEB representatives’ positive attitudes toward the program create a positive impression about the program
and provide public support and recognition.

**Conclusion**

The results are quite promising. Although bureaucratic procedures, teachers’ old habits, preconceptions
and students lack of previous experiences have caused some problems concerning implementation of the project,
the Intel® Learn helped students acquire and/or improve technology, collaboration and critical thinking skills.
Both quantitative and qualitative data showed that students’ acquisition of the technology skills exceeded the
expected level and that they gained collaboration skills around the expected level. However, the staff should
work more to improve students’ critical thinking skills.
References


