

Effect of Technology Professional Development on Students' e-Skills and Motivation

Albena Todorova¹ and Thomas Osburg²

¹ University of Munich (LMU),
Psychology of Excellence in Business and Education,
Martiusstr. 4, 80802 Munich, Germany

albena.todorova@psy.lmu.de

² Intel Corp., CAG Europe,
Dornacher Str. 1, 85622 Feldkirchen, Germany
thomas.osburg@intel.com

Abstract. Empirically-based and theoretical approaches to the question how to prepare young people to succeed in the conditions of global knowledge economy argue for a more pronounced role of formal education in developing students' e-skills. Programs for developing teachers' competencies to integrate digital media in their subject teaching can be seen as a key measure toward developing students' e-skills through formal education. Findings from the evaluation of a large-scale program for professional development in Germany - *Intel® Teach - Advanced Online* reveal that using technology in class in learner-centered contexts by teachers had a positive effect on students' motivation and skills for using digital media and collaboration. Teachers reported less effect on students' active participation in class.

Keywords: teacher professional development, technology integration, e-skills, motivation

1 Introduction

The concept of e-skills reflects the heterogeneous group of competencies related to information and communication technologies (ICT) and to active participation and leadership in the knowledge-based economy and society. e-Skills are only a subset of the broader range of talents and skills that people need to compete and succeed in this context, such as information and communication skills, thinking and problem-solving skills, including creativity and intellectual curiosity; as well as interpersonal and self-directional skills [1]. Both empirically-based and theoretical approaches to the question how to prepare young people to succeed in the conditions of global knowledge economy argue for a more pronounced role of formal education in developing students' skills related to ICT use. According to OECD's PISA, for the most part, the digital literacy of young people is acquired in informal contexts and remains mostly related to communication and entertainment [2]. More efforts need to be put in developing students skills through formal education, which gives better chances for targeting the areas identified by employers as most needed.

Central role in such efforts toward change is played by teachers and professional development has been recently highlighted as one of the essential conditions for the sustainability of classroom innovation [3]. Programs aiming to

increase teachers' competencies for using technology are expected to produce a positive effect on students' learning and skills. This paper discusses findings from the evaluation of a large-scale, technology professional development program for teachers in Germany - Intel® Teach - Advanced Online, and particularly the evidence in regard to the indirect effects of the program on students.

2 Intel® Teach - Advanced Online

The teacher professional development program Intel Teach - Advanced Online is a program within the Intel® Education Initiative of Intel Corp. towards advancing education through the use of technology. The program was developed and introduced in Germany and subsequently localized for England, France, Ireland, Israel, Italy and Jordan. A new version of the program preserving the general design and content, but supported by a Moodle-based online platform is replacing the previous version and being in the process of localization and implementation in further countries.

The design of the program is based on a blended learning format of face-to-face meetings and individual and collaborative learning supported by an online platform, which enables self-paced on-the-job professional development. Participants in the program are guided and assisted in the training process by mentors. In the course of the program teachers choose a pedagogical approach or technology tool to learn about, and subsequently work collaboratively with other teachers to develop a unit plan, implement it in their classroom practice, evaluate it and enhance it for further use. This pedagogical framework is called 'Learning Path' and was organized and driven by the online platform of the program, designed to support and drive all steps in the learning process. During their involvement in the program, participating teachers were required to implement in class the unit plan, which they developed in collaboration with their colleagues. Additionally, teachers' sustained engagement with the program for three or more months and available online teaching resources provided conditions for a more intensive use of technology in class, and thus, for more opportunities for students to learn in technology-enhanced classes and to develop ICT-related skills.

3 Findings About Effects on Students' Skills and Motivation

A systematic external evaluation of the implementation of Intel® Teach - Advanced Online in Germany was conducted by the Institute for Media and Educational Technology in the University of Augsburg in the period from 2005 to 2008 [4], [5]. Data has been collected on a voluntary basis through an online, self-report, end-of-training survey of teachers who completed the program. 5036 questionnaires have been submitted in total from January 2005 till October 2007. Additional self-report surveys have been filled by mentors online (n=152), and by teachers (n=418) and university students (n=67) at the educational fair Didacta 2006. For determining the conditions of implementation in the different federal states, online questionnaire including open questions have been filled by regional mentors of the program (n=14). In 2007 case studies of schools (n=16) in four federal states in Germany have been conducted through interviews and group discussions for examining the sustainability of the program and the factors for its successful implementation.

Overall, the evaluation findings as reported in detail elsewhere show that the program had a positive impact on teachers’ competencies to integrate technology in class, on their attitudes toward technology in education and on their teaching practices [4],[5]. The reported improvement of teachers’ competencies along with the implementation of the unit developed during the program in practice were expected to impact positively students’ skills and motivation. Teachers’ assessment of the effect on students was examined through student-related items in the end-of-training survey and questions during the interviews and group discussions within the conducted case studies. The evaluation aimed to determine the effects on students’ learning in four areas: enhancement of students’ media competencies, motivation, self-regulation skills, and social skills.

Media competencies. Improvements in students’ skills for using digital media in terms of handling applications and using technology to reach the class objectives were indicated by more than two-thirds of the teachers participating in the program. In slightly less cases teachers reported increase in students’ use of digital media for individual learning at home.

Social skills. During the case studies it was revealed that in technology-enhanced classes more knowledgeable and skilled students supported their peers. The findings from the end-of-training survey showed that the implementation of the devised by the teachers unit in class had a positive effect on students’ collaboration in more than two-thirds of the cases (Fig. 1).

Self-regulation skills. A less pronounced effect was reported on students’ active, self-regulated learning in terms of generating more own ideas to reach the objectives of the lesson and raising questions (Fig. 1). The opinions collected during the case studies showed that some students could not cope with learner-centered lessons and preferred assignments with detailed structuring and instruction. Independence or initiative, such as asking questions, researching independently, introducing one’s own ideas and solving problems, and collaborative with classmates were considered as inadequate for some of the students.

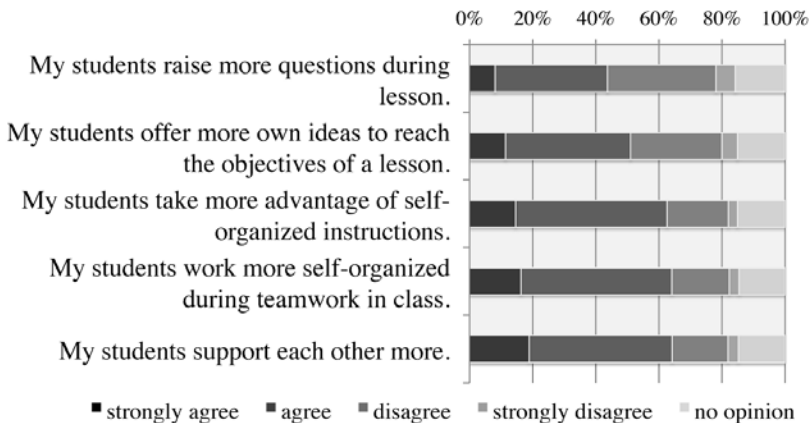


Fig. 1. Teachers’ self-assessment of the effect from the implementation of a Learning Path in class on students’ self-organized learning and social competencies (n=4526).

Motivation. Increased motivation of the students was among the most frequently reported positive effects from applying digital media in class in combination with learner-centered approaches. Teachers also reported higher interest and participation of students in the lesson. Results of the qualitative evaluation revealed different aspects of the effect on motivation. It was noted that pupils were fascinated by graphic presentations within the learning programs. Pupils also created good products, which they were proud of by using presentation software and word processing applications. Another aspect was the effortless involvement of students with learning content in technology-enhanced classes, as well as greater cooperation from pupils who otherwise showed no particular interest in the subject and had little experience in dealing with computers.

4 Conclusion

The findings from the external evaluation of the program Intel Teach – Advanced Online indicate that well designed professional development can improve teachers' competencies and practices and indirectly influence positively students' motivation, ICT-related skills, as well as their skills for active and collaborative learning. In this respect, developing a unit plan using technology and implementing it in the classroom within the professional development program, is clearly advantageous for observing the effect on students.

The reported increase in students' motivation and skills for using digital media for learning, however, need to be accepted with caution. Due to the limitation of self-reporting methods of collecting data, the findings only show teachers' subjective perception of the outcomes from technology-enhanced classes, rather than the actual effect on students. In addition, it was revealed that the positive impact on students' motivation can be partly attributed to the novelty of using technology in class and might be temporary.

It is apparent that professional development needs to be accompanied with a longer-term commitment from school and local educational authorities for supporting and maintaining the new teaching practices, which were reported to have positive effect on students' e-skills. In the case of the program Intel Teach – Advanced Online, the majority of teachers continued to use the online platform after the end of their formal involvement in it, and their use of online resources, ideas and materials indicate a sustained impact on the use of technology for instruction. This effect is facilitated in the new version of the program by integrating more opportunities for online interaction between teachers, for open educational resources and provision of additional resources for self-directed learning and professional development. Thus, it is expected that the new version of the program, which is currently being introduced to new locations in Europe, such as Portugal and Spain, will ensure improved support for teachers and indirectly will have a stronger long-term positive impact on students' e-skills and motivation.

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