Intel® Teach - Advanced Online: Teachers’ Use of and Attitudes Toward Online Platform for Professional Development

Albena Todorova¹,², Thomas Osburg²

¹University of Munich (LMU), ²Intel Corp.

Key words: teacher professional development, e-learning, online platform, self-directed learning, collaborative learning

Abstract:

Professional development of teachers has been recently highlighted as one of the essential conditions for the sustainability of classroom innovation and of the key contributors for the achievement of the world’s top-performing school systems. This paper examines findings from the evaluation of a large-scale professional development program for technology integration “Intel® Teach - Advanced Online” to determine how teachers in Germany accept and use the online platform of a blended program and to draw some conclusions and implications about different elements of the program and the online platform.

1 Introduction

In the time of “digital natives” and universal access to technology, the question whether students are ready for a technology-rich world [1] is one side of the coin. The other side is: Are teachers ready? In a recent study, teachers in twenty-three countries identified information and communication technology (ICT) teaching skills as area of very high professional development need [2]. It is suggested that the high demand for improved competencies in technology use and integration is related to the rapid technological change and the need to keep up with it, but at the same time linked to lack of opportunities. In the context of abundance of available learning resources and tools [3], and considerable evidence for effective professional development methods [4], it is necessary to examine more closely to what degree professional development programs meet teachers’ need for competence improvement, as well as factors, which might have been overlooked, such as teachers’ attitudes toward technology and its use in education. This paper will review the findings of the evaluation of a large-scale professional development program “Intel Teach – Advanced Online” in Germany for evidence about the role of teachers’ attitudes, personal and external factors for participation in the program, use and assessment of the online learning platform of the program, and competence gains.

2 Teachers’ attitudes and use of technology in Germany

Early research on the teachers’ acceptance of technology found that use of computers for teaching was strongly related to teachers’ attitudes toward them [5] and beliefs about teaching and learning [6]. Lack of experience with technology [7], perceived usefulness [8] and anxiety [9] influenced teachers’ attitudes and indirectly their use of computers. Evidence that increased computer experience [10] and computer literacy courses [11] reduce computer anxiety and improve confidence and attitudes suggest that a decade into 21st century, teachers can be expected to be positively inclined toward technology and confident in using it in their work. However, the most recent large-scale study of teachers’ use of technology in schools in Germany shows a different picture.
The Pan-European survey “Benchmarking Access and Use of ICT in European Schools” about accessibility and use of digital media in schools [12] showed a concerning state in Germany in 2006 in terms of teacher attitudes toward and competencies for use of technology in class. Although 78 percent of the teachers reported having used computers in class in 2005-2006, only 6 percent integrated computers in more than half of their classes, while the majority used them less than 10 percent of the time. The rate of teachers in Germany not using computers in their instruction was 22 percent. At the same time a large proportion of the teachers (88 percent) in Germany search for materials in the Internet and use them in class. Although the spread and use of computers and the Internet has increased, it appears that in 2006 in Germany there were still more obstacles to the broader application of computer-supported learning in schools. When asked about the factors that hinder computer use in class, beside lack of computers, German teachers pointed as reason that they saw no clear benefits of such use (48 percent) and lack of necessary skills to integrate digital media in their teaching (46 percent). These indicators are two to three times higher than the European average.

Despite the expressed concerns about the benefits of using computers in class, teachers in Germany reported positive attitudes toward the utilization of technology for different activities. In the opinion of the majority, computers should be used by students for exercises and practicing, retrieving information and for collaborative and productive work. Three-quarters of the teachers admitted learning benefits and increased motivation of the students from the integration of digital media in class. However, 38 percent of the surveyed teachers had difficulties finding adequate learning materials and about one-third consider the existing material of poor quality.

Computer use and its impact depend to a large degree on the knowledge and skills of teachers, not only how to handle technology, but how to integrate digital media in their teaching as well. The unsatisfactory didactical and pedagogical competencies of teaching stuff in regard to educational use of new media is also pointed as a barrier to its further utilization in school in the study. The majority of teachers in Germany reported that they could handle simple Internet and Office functions, but they felt less confident with downloading and installing software and with using presentation applications. Teachers in Germany rate their knowledge and abilities to integrate digital media in instruction relatively low.

In summary, according to this survey teachers in Germany have generally positive attitudes toward technology use in the classroom, however they are not convinced of the benefits from it and assess their skills to use and integrate technology in the teaching process as insufficient. Although it can be expected that these trends have improved in the years following the study, there are no indications for that. Such gaps can be addressed through professional development for improving teachers’ technical and didactical knowledge and skills.

3 Blended model for teacher professional development

Effective design of a course or program for enhancing teachers’ competencies in using digital media for instruction is associated with prolonged engagement with the topic contrary to one-shot instances, collaboration among teachers, involvement in solving authentic problems related to teaching and learning, focus on pedagogical skills, opportunities for practice, research and reflection [4]. Further design principles for effective professional development in technology integration are opportunities for self-directed and school-based participation, facilitating both theoretical understanding and practical application [13]. The general impact of such offerings in terms of teachers’ use of technology is also supported by evidence for the significant and positive correlation of technology use with teachers’ participation in professional development for technology integration [14].
While the literature increasingly places value on the outlined established design principles, a face-to-face program integrating these elements is hardly implemental [13]. E-learning on the other hand provides a solution through its capacity to promote instruction that is more learner-centred, authentic, enabling learning independent of time and space, and adaptive to individual learning styles. The promise of technology-enhanced learning in professional development has been associated at the same time with lack of social, emotional and professional support [15]. Combining online with face-to-face learning, regarded as blended, hybrid or mixed learning, offers more opportunities for building on the advantageous provisions of technology, while enhancing the social element of learning.

Although the blended learning approach is considered mostly as integrating e-Learning with face-to-face forms of instruction, the rationale behind the term is wider. It refers to the combination of different modes of delivery, methods and media, such as online, offline and face-to-face activities, computer and web-based training, paper and digital materials, individual and collaborative, guided and self-directed learning [16]. Main advantages of a blended learning system are the pedagogical richness, social interaction, personal agency, cost efficiency and ease of revision [17]. Blended learning approaches are considered to increase the level of active learning strategies, peer-to-peer learning strategies, and learner-centred strategies used [18]. Blended models for teacher professional development have been shown to address more effectively the learning needs of teachers [19],[20]. Face-to-face sessions added to online interaction are found to contribute for establishing long-term relationships and for developing an effective social network, which consequently stimulates greater participation, more open contributions and sharing of reflection on practices [19]. At the same time providing a web-based training platform enabling individualized learning, hosting resources, supporting communication, interaction and feedback, extends the traditional boundaries of face-to-face training. The program Intel® Teach - Advanced Online, which is the focus of this paper, was developed based on the outlined established effective design principles in a blended-learning format, thus incorporating all suggested elements for effective environment for teacher competence development for technology integration.

4 Intel® Teach - Advanced Online: design and evaluation

The program Intel® Teach - Advanced Online is one of the projects designed and implemented within the Intel® Education Initiative of Intel Corp. for advancing education through the effective use of technology. The program was developed in Germany, following the successful implementation of a basic course for technology use for teaching and learning offered within the Intel Teach program. The concept for the advanced course was developed in 2003-2004 by the Academy for Teacher Professional Development and Personnel Management in Dillingen (ALP) - a state-owned Teacher Training Centre belonging to the Ministry of Education in Bavaria, Germany [21]. It was subsequently localized and implemented in England, France, Ireland, Israel, Italy and Jordan. In the period from 2004 till 2009 more than 125 000 teachers in Germany have been trained in the program Intel Teach – Advanced Online.

4.1 Design

The professional development offering is a blended-learning course with face-to-face meetings of teachers with a tutor and other teachers, and e-learning training phases, in which teachers use the online platform for individual and collaborative learning and development of a unit plan for their teaching. Participants in the program are guided and assisted in the training process by mentors-trainers. It starts with an introduction to the concept and content by a trainer in a face-to-face meeting; using the online platform to study the available methodological information for integrating technology in a learner-centred classroom and example materials; and discussing in groups the requirements and objectives of the training.
Teachers select a focus for their training from the possibilities available on the online platform, based on their personal professional needs. This pedagogical framework is called ‘Learning Path’ and within it teachers use a selected pedagogical approach or certain technological tool to develop a unit plan, implement it in their classroom practice, evaluate it and enhance it for further use.

Every learning path is either driven by its pedagogical approach or by the application of specific digital media. Learning paths can be chosen by subject, by concept (e.g. task-oriented, inquiry, hands-on, etc.), by various teaching methods and learning styles. The program curriculum consists of a minimum of one learning path, while the participant teachers are free to choose to work on more paths.

4.2 Platform

The web-based online platform (http://aufbaukurs.intel-lehren.de) has several main areas to suit personalized needs at a particular time: areas for work with the learning path and areas with resources, collaborative tools, additional information and online support. Using the training platform is flexible and teachers have the choice to learn and work on the unit from home or from school, depending on their preference and technology availability. Teachers also can access the platform after they have completed the program and use the available resources, ideas, unit plans and materials for self-directed learning.

4.3 Evaluation

The programs Intel Teach - Advanced Online in Germany is subject to systematic external evaluation for determining the direct effects of the training. The evaluation of the implementation in the period from 2005 to 2008 was conducted by the Institute for Media and Educational Technology in the University of Augsburg [22]. The main aim of the evaluation was to provide information base for the continuous improvement of the program and the focus shifted from quality assurance in the earlier phases of implementation toward sustainability [22],[23].

The evaluation includes surveys, interviews and case studies. The main body of data has been collected on a voluntary base through an online, self-report end-of-training survey of teachers who complete the program (n=4633). Along with the socio-demographic data, the end-of-training questionnaire includes items about teachers’ attitudes toward using digital media in professional development and their self-assessment of different aspects of the program and its impact. Additional self-report surveys have been filled by mentors (n=152) online, 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 senior mentors of the program (n=14).

In 2007 case studies of sixteen schools 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 [23]. The case studies included group discussions with teachers in these schools who participated in the Intel Teach – Advanced Online program (n=40), and with teachers who did not participate in the program (n=24), as well as individual interviews with school principals (n=15). The chosen federal states represent the policy of regional and region-wide mentorship and included Bavaria, Thueringen, Rheinland-Pfalz and Hamburg. Schools were contacted through regional mentors and took part in the study on the principle of voluntary participation. The questions regarded general attitude to professional development, the school context and the program Intel Teach – Advanced Online. The analysis of the interviews and group discussions was conducted by school and federal state. From the resulted categories and sub-categories, the ones, which were found in all schools in a federal state and in all federal states were summarized [23].
5 Results
The majority of the participants in Intel Teach - Advanced Online are female, with almost equally representation of all age groups. Interest in technology and didactical approaches is the predominant motivation for participation in the course. Most of the teachers already had experiences with e-Learning and with using digital technology in instruction.

5.1 Teachers’ assessment of the program and the online platform
Teachers’ feedback about the program is highly positive. The majority of the participants are satisfied with it and would recommend it to other teachers. Teachers also value the elements of online learning and the flexibility of the blended-learning approach. Collaboration was liked and used: most of the teachers worked with three or more colleagues in an average of twelve hours, in comparison to average of 16 hours of individual learning and 10 hours of implementation of the developed unit in the classroom. Over two-thirds of the participants find the role of the mentors in the program important and are satisfied with the mentor support they received.

The usability of the online platform is mostly assessed as good, also when the general assessment of the program is lower. Specific aspects of the platform are rated higher, such as the design, the quality of the content and the methodological approaches of Learning path and Learning idea. Interesting are the findings regarding teachers’ attitudes and their assessment of the program and the online platform. Teachers who reported higher interest and experience in e-Learning and digital media were more satisfied and benefited more from the program compared to teachers with less experience. Participants with positive attitude toward the e-Learning approach to professional development rated the program and the online platform higher than teachers with negative attitude. This group of teachers also were more experienced with technology and assessed their competence gain as higher compared to the group with negative attitudes, however the difference in prior experience was not very pronounced, indicating stronger link between attitudes and competence gain.

5.2 Teachers’ assessment of the their competence gain and impact on teaching quality and students
According to the self-assessment of the participating teachers, the program improved their technical and methodological competencies for using digital technology in instruction. Four-fifths declare that they have a lot of new ideas to use digital media in teaching; two-thirds of the participants significantly increased their confidence to use new media in the classroom. Over two-thirds of the teachers reported increasing their appreciation for self-evaluation and collaboration as part of the teaching practice.

Regarding the impact on their practice, teachers report slight improvement of the quality of their teaching in terms of digital media use. This however is in direct relation to the indication that the majority of teachers already used technology to enhance their teaching before their involvement in the program Intel Teach – Advanced Online and the room for improvement was limited. The reported effect on teaching quality is lower for teachers who are more experienced in using technology in class, while teachers with less or no experience report a higher positive impact. Concerning the indirect effect of the program on students, the majority of teachers report increased motivation in technology-enhanced classes. Improvement of students’ skills for using digital media is stated by more than two-thirds of the teachers. Less effect is seen on students’ active participation. However, more than two-thirds of the teachers report increase in students’ collaboration and self-directed learning after implementing in class the unit developed as part of the Learning Path.
5.3 Factors for the successful participation in the program

Teachers report generally supportive school environment with mostly good collaborative work and support from the school leadership. Less positive are the technical and time resources with less than half of the participants being satisfied with the technical infrastructure in their school. The role of these factors for the successful participation of teachers in the program is clearly shown with higher participation success in conditions of available time and good technical infrastructure. The effectiveness of the training was related to the availability of support by mentors, thus the efforts of teachers in schools and areas lacking mentors were hindered. The outcomes of the professional development program for teachers were significantly influenced by the support colleagues in the team and the school leadership. When collaborative work with other teachers was successful, teachers reported higher competence gains than when the collaboration did not work well.

Personal factors for the successful participation in the program are experience with e-Learning and with using technology for teaching. At the same time teachers were more successful with the program when they spent more hours working on it. After receiving their certificates nine out of ten participants continued to use the online platform and more than two-thirds continued to work with their teams on other learning paths.

5.4 Factors for the sustainability of the program

The findings from the conducted case studies identified inhibiting and advantageous factors for the implementation and impact of the program [23]. Advantageous personal factors for the sustainability of the program Intel Teach – Advanced Online are good experiences with the prior basic course offered before the advanced program, deepening of the already acquired competencies and inclination to and interest in digital media. Lack or insufficient experience with digital media, lack of interest in the objectives of the program, uncertainty of the added value of the program, and low relevance of the certification for career advancement are identified as factors with negative effect.

At the level of the individual school, faculty-related factors are positive experiences with the collaborative work with other teachers, good organization of the team work and time for teamwork. Regarding teaching practices, the program benefited from teachers’ acceptance of the didactical concept, perceived learning gain, engaging in reflection on own teaching, experiences with the added value of digital media in teaching, time for use of digital media, interest of the students in learning with digital media, prior knowledge and skills of students, and solutions for handling class size. Organization-related factors identified in the study are support by school mentors, information and motivation of the teachers, available technical infrastructure and maintenance, support by the school leadership, alignment of the program with the objectives of the school focus, and participation of a higher proportion of teachers from the school in the program.

At the level of the school system the factors are grouped in three categories: concept transfer, experience transfer and establishing of standards. Beneficial factors related to the development of school policy are: digital media as component of curriculum and lesson plans; more autonomy of the schools; external evaluation for quality development; and demand due to professional development requirements. At the same time the low value of digital media in teaching, workload due to restructuring of the work and search for training limited to needs, influence negatively the sustainability of the program. The impact and long-term implementation of the program are higher when the program is aligned with the objectives for professional development, uses flexibility and creativity, mentors integrate different functions and are well prepared, teachers are well informed about the program, the group of teachers not interested in technology is also reached, the program is recommended by other teachers on the base of positive experiences and is presented to teachers in a stimulating way through content. When the objectives of the program do not represent current school policy of the federal state,
mentors are not in sufficient number, or the frequency and place of presentations of the program in front of teachers is regulated only by demand and not supported sufficiently by staff, the program implementation was affected negatively.

6 Conclusion
The positive outcomes from the implementation of Intel Teach – Advanced Online confirms the assumption that a program based on effective design principles supported by solid theoretical background and empirical evidence, such as provision of self-directed, authentic, collaborative and sustained learning opportunities in a blended format is perceived positively by teachers and has positive effect on teachers’ integration of technology into the classroom. Incorporating opportunities for individualized, self-directed and self-paced learning, and providing rich resources usable in teachers’ practice contributes to the sustained engagement of teachers in the professional development process. The flexible e-Learning opportunities allowing teachers to choose to do the training from home or in school enables a closer link of the professional development to teachers’ work and direct transfer of the new knowledge and ideas to the teaching practice. The authentic experience of designing, developing, implementing in practice and evaluating a unit plan, is clearly advantageous for developing skills for using digital media in teaching. The opportunity to collaborate with other teachers, share experiences and practices, and learn from each other’s real-life classroom solutions are highly relevant and promote the adoption of new approaches and ideas.

The findings of the program evaluation point at multidirectional links between teachers’ prior experience, attitudes, their interaction with the online platform, mentors and colleagues, and competence gains. Positive attitudes toward technology and e-Learning were related to higher rating of the program, the online platform, competence gains and experience, however, the evaluation findings do not provide base for drawing causal directions. Here, findings from the case studies provide a clearer view of the possibilities for influencing positively both teachers’ attitudes and outcomes. Firstly, communicating the character, prerequisites and outcomes of the program in a more clear way and to a broader audience of teachers and school principals can have a significant positive effect. Similarly, the example of tutors and participant teachers and their attitude and satisfaction with the program has a strong influence on the interest of teachers, who have not participated in this professional development offering. Strengthening the presentation of the program to teachers with demonstrations of the learning process and the available resources and support will be beneficial. The importance of effective teamwork during participation in the program can also be capitalized on, through improving the conditions and support for collaborative work within the program design. The possibilities for improving the conditions for implementation of the program are of great significance in the context of high demand for increasing teachers’ technology-related competencies and attitudes.

In summary, the implementation and outcomes of the Intel Teach - Advanced Online program provides some insights about addressing the challenge for schools and teachers to keep up with technological change. The findings of the evaluation of Intel® Teach - Advanced Online confirmed the benefit of using an online platform to support design principles identified as effective within a blended form of teacher professional development. It appears that such offering is a viable tool for addressing the concerning deficiencies in Germany in terms of teacher attitudes and competencies. The platform was accepted and used as resource for theoretical and practical content, example materials and for sharing developed materials. Implementing pre-and post-testing for teacher attitudes and personal characteristics could improve our understanding of the current state and the interplay of the involved factors for teacher acceptance of technology-supported professional development for technology integration. One major limitation of the presented findings is that teachers with low interest and negative attitudes toward technology are clearly underrepresented in the population of
teachers participating in this professional development offering. Further investigation how to involve and attract this large group of teachers in Germany is necessary.

References:

Author(s):

Albena Todorova
University of Munich (LMU), Faculty of Psychology and Education
Martiusstrasse 4, 407, 80802 Munich, Germany
albena.todorova@lmu.psy.de

Thomas Osburg
Intel Corp., Corporate Affairs Group, Director Europe
Dornacher Strasse 1, 85622 Feldkirchen/Munich, Germany
thomas.osburg@intel.com