Permanent Education of High School Teachers Through Corporate-Academic Joint Venture E-Learning

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Abstract – **In this paper the experiences and lessons learned from the 6 year nationwide permanent continuous teachers' education programme, performed as e-learning joint venture of Microsoft Software d.o.o. and Faculty of Electronic Engineering Niš are given. The Microsoft Partners in Learning programme and its implementation by the Faculty of Electronic Engineering have been described and the outcomes, lessons learned and guidelines for further similar initiatives discussed. The paper is intended to serve as a resource for any individual or institution with upcoming projects in permament education of K-12 personnel.**

Keywords – **Life long education, e-learning, Microsoft, Faculty of Electronic Engineering Niš.**

I. INTRODUCTION

Partners in Learning is a 10-year ongoing international project of Microsoft Corporation, initiated in 2003, as a five-year $250 million funded initiative. In 2008 it was renewed for another five-year span, with additional $235 million funding [1]. The PiL initiative revolves around three fundamental concepts: professional development, including training and technical support, of education staff; development of professional collaborative networks od educators; and innovation through research in the domain of education. Partners in Learning is a collaborative project, aimed at institutions that provide service in the three aforementioned areas, the Faculty of Electronic Engineering being the one since 2005 [2].

II. PROJECT OVERVIEW

A. Recognition of need

According to the current legislation in the area of K-12 (elementary and high-school) education [3], teachers are licensed for 5-year periods. One of the conditions for renewing the license is the minimum of 100 hours of professional training (60 hours mandatory and 40 hours optional courses), as defined in the Rulebook on Permanent Professional Training and Vocations of Teachers [4]. According to this policy, the Ministry of Education's Education Advancement Center [5] serves as the accreditation body for independent permanent-education course providers.

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There is an ongoing contest for courses [6] and each year a catalogue of accredited courses is published [7] for educators to choose from. The catalogue encompasses both live and e-courses. One of course providers listed is Microsoft d.o.o. Belgrade with courses developed and shipped through the Partners in Learning program.

Faculty of Electronic Engineering joined the PIL initiative in the fall of 2006, initially with a live course in Visual Basic .Net. The premier course was not accredited and served as a pilot-course for testing the options for cooperation. Main payload consisted of Microsoft learning material localization. After initial success (97% positive feedback from users), the e-learning stage followed.

TABLE I
PROJECT PHASES IN SHORT

Year	Fall	Spring
2005/06	VB.Net Live	
2006/07	VB.Net eLearning	Web Design
2007/08	Net Security	Digital Video
2008/09	Net Maintainance	Social Software
2009/10	eLearning - Admin	eLearning – Instr Design
2009/11	C#	eComm and eCollab

B. E-learning Discussed

Even though a vastly used notion, the e-learning still seems to skip precise and comprehensive definition. Lexically similar to e-mail, it was coined by relatively marginal electronic learning guru Jay Cross and used in large variety of meanings, forming white noise of partial definitions. However, this flexibility seem to foster comprehensive research in the area(s) worldwide. Vaguely formulated by [8] as delivery of personalized, comprehensive, individualized, dynamic learning material in real time, supporting the development of knowledge communities and connecting learners with experts. Other than the term e-learning, various aspects of technology-aided learning introduce respective terms, such as CAI (Computer-Aided Instruction), CBT (Computer-Based Training), distance education, online learning etc. These terms predominantly refer to several historical aspects of e-learning, or its partial implementations. Driven by certain inflated expectations from purely technology-based instruction (that led to a crisis in this domain in 2002-2003), knowledge providers resorted to a less technological approach labeled *blended learning* – a loosely defined mixture of computer-based and live teaching. The approach chosen by the Faculty of Electronic Engineering fits best in this frame.

C. Modes of implementation

After initial, well accepted, live course on Visual Basic .Net in 2005, the online approach was chosen immediately, primarily aiming at widening the course scope. In 2006/07, same course was set up online, followed by the course on fundamentals of Web development. Courses will not be accredited by the Education Advancement Center until the following academic year.

Methodology of knowledge delivery is closest to the blending learning concept, materials being weekly published, consumed online, and participants being web-tested fixed number of days after lesson publication. Moreover, discussions have been encouraged on forums – which in turn facilitated development of community that produced moderators-volunteers, still actively participating in courses. Final exams, at the end of each course (semester) are conducted in person, in cities of Niš, Belgrade and Novi Sad. These exams are mandatory, but not sufficient for certification. Roughly up to 50% of credits are obtained throughout the course, while final exams carry additional minimum of 15% required for certification. In the course of semester, 30% of credits are gained through weekly tests, while 20% are gained via forum activities.

Starting from the first online course, constructionist element has been introduced through programming tasks. Participant were expected to build their own solutions and upload the source code, and were assessed by both course teachers and peer moderators.

The element of collaboration has been achieved both through communities around discussion forums and, especially, through peer review of not only assignment solutions but also questions and answers on forums. Motivation for forum activity has been increased by leaving certain small percentage of concepts and facts deliberately open (incomplete or somewhat ambiguous) in order to provoke cognitive dissonance in participants. This strategy proved to generate desired outcome and was used regularly in courses.

Significant interference of live teachers and traditional teaching methods is obvious in this project. One of the reasons for this conception is the very aim of the project: professional development of teaching staff as primary and uncompromised goal, to which the choice of methodology and the experimental component being fully subdued. Another reason for the live teaching component were the requirements imposed by the Education Advancement Center. In the year 2010, in the C# programming course, this condition has been met through synchronous multi-user video conference (webinar with active involvement of participants, enabled and invited to interact in the course of the lecture). This way the gap between classical, location-dependent education and distance learning has been overcome and this mode of teaching has been recognized and accepted by the Education Advancement Center. This is a significant step in State's institutions' acceptance of distance learning mechanisms and a leap forward in the introduction of more machine-sided e-learning in the State education system.

III. PROJECT PHASES

A. 2005/06

One live pilot course in Visual Basic .Net in the fall semester. Primary task – localization of official training material and probing the potential market. This course was aimed at schoolchildren and has sparked off the rest of the project. From this point on all the courses are web-based.

B. 2006/07

FALL: The material has been uploaded and web-based course was set up. This course was aimed at teachers (to train them to teach Visual Basic .Net to schoolchildren previously targeted). 378 participants, out of which 81 took and 81 passed the final exam. This course was not accredited.

SPRING: Fundamentals of Web Presentations. 828 participants, out of which 404 took and 404 passed the final exam. No accreditation. This academic year peer-reviewing of participants' activities was introduced.

C. 2007/08

FALL: Computer Networks Security. 427 participants out of which 165 took and 165 passed the final exam. Learning material has already been used in PIL project in Croatia, only localized to Serbian. Accredited to 16 hrs.

SPRING: Digital Video in Teaching. 557 participants, out of which 130 took and 130 passed the final exam. Course has been set up and led by one of the previous participants (a high school Informatics teacher) and supervised by the Faculty staff. No accreditation.

C. 2008/09

FALL: Computer Network Maintenance. 878+292 participants, out of which 320+292 took and 320+ passed the exam.[1] First number represents fall semester targeted at technical school staff. Second number represents re-run of the course in the following spring semester, targeted at gymnasium staff (held in parallel with the following course). The course is accredited to 20 hrs.

SPRING: Social Software in Teaching. 1046 participants, out of which 550 took and 445 passed the final exam. In this course moderators (volunteer participants) were engaged in the development of instructional material. Accredited to 20 hrs.

C. 2009/10

FALL: The course title was E-learning (System Administration). 1272 participants, out of which 160 took and 153 passed the final exam. Large number of applications is thought to be inertial, while vast majority was actually

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[1] Exact number currently unavailable.

interested in instructional design (to which all the previous courses were dedicated) and not the administrative side. These participants were proposed to wait for the spring semester. Course was accredited to 20 hrs.

SPRING: The course title was E-learning (Instructional Design). 1541 participants, out of which 730 took and 721 passed the final exam. This was the first massive course, attended by a large number of non-technical teachers. Course was accredited to 20 hrs.

C. 2010/11

FALL: Modern Programming Concepts. 539 participants, out of which 130 took and 103 passed the final exam. Acredited to 20 hrs.

SPRING: E-communication and E-collaboration Within the K-12 Educational Teaching and School Procedures Support System. 1616 participants. The course is currently in progress and other statistics pending. It is accredited to 20 hrs.

IV. LESSONS LEARNED

The evaluation of each course was performed within final exams and results were submitted to the Education Advancement Center as a requirement. The statistics is the Center's internal document and is not publicly available. The Faculty of Electronic Engineering's own evaluation began in this academic year, primary results are pending and will be published as soon as they show statistical validity. Nonetheless, the six-year experience yielded several significant points that motivated this paper. These points are intended to serve as auxiliary guidelines to any course designer/administrator involved in the State-governed or other e-learning activities.

The main impression can be summed up as: pressure must be maintained at all times. This refers to a positive, motivating pressure; nonetheless it must contain certain portion of force. This is best achieved through two approaches: constant human presence and challenge. First of all, this project (in the way it was implemented) strongly suggests that autonomous, machine-based e-learning is still unable to produce better or equal results as human-driven instruction. For example, in the C# course one group of participants was deliberately "left alone with the machine" to establish a self-paced learning, while the other group was closely monitored. The motivation of the first group decreased significantly in the first two weeks of the course, and the number of participants that even took the final test was significantly lower. The group seemed to have been "left without custody" and the intrinsic motivation was not sufficient. The fall of motivation appears quickly upon the absence of live instructors (primarily as moderators on forums), so the presence must be kept constant. The second aspect is the challenge. Whatever time constraint being assigned to tests, majority of participants will procrastinate until the deadline. Shortening of deadlines didn't lower the results in general (deadlines were not shortened to more than 3 days after lesson publication). Other type of challenge was introduced by peer reviewing in forums. Gaining points in

discussion was the primary factor for attracting and keeping participants in forums, i.e. active in the process of learning throughout the course. Another means of activation of participants was deliberate incompleteness in instructional material. This provoked desire to learn more in order to gain full picture of lessons, thus ask and respond in discussions. This experience only emphasizes the aspect of motivation in schooling, often neglected in technologically-driven approaches. Teacher equally serves as the knowledge provider and a motivator/moderator of students' behavior; and behavioral component is crucial for the success of any instruction. In that sense, no e-course can succeed without both sides of the role.

Procrastination issue led to another important observation. In courses that had no time-bind for testing, nearly all participants took the test just before the closing. This led to the server overhead and test crash in a large number of participants, which put extra overhead to moderators, since not all the tests crashed, so those that did needed be restarted manually. Multiplied by several hundreds of participants, this overhead was large and unnecessary. The solution was found in pipelined approach to testing; certain time overlapping of tests was permitted, but no tests were closed simultaneously. This was only one test was largely occupied at any given moment, and the overload was prevented.

Sloppy decrease of active participants in the first week of all courses was noticed. Through feedback, it was established that participants usually had wrong expectations from courses and that it was only when they had immediate contact with the material that they were able to decide whether or not they want to participate further. This brings about two issues. Firstly, each course need have appropriate preview/summary that gives sufficient information about the type of knowledge offered, use cases etc. Secondly, this situation can be viewed as a micro-case of State education in general. It is common that students get disappointed by the material/methodology in Universities, and a need for efficient high-school level professional orientation services is present.

Discrepancy between traditional and electronic teaching is perhaps best seen in the participants' feedback regarding the number of professional development hours accredited to courses. Most of the courses are accredited to 16 hours, while participants claim that they took them more to complete. Almost all courses last 6 weeks and, hours estimated, last longer. In traditional education, number of hours is easily measured; nonetheless, this number shows little about the actual learning process that takes place. Time measure is a blunt and obsolete instrument. However, e-courses still don't have any widely-accepted means of metrics, which puts them into even a worse position, especially in a rigid system such as State education.

Finally, it was noticed that a number of teachers volunteered to help moderate courses. This self-motivated moderator base still actively participates and takes on a large portion of workload from the Faculty moderators. These moderators are not materially rewarded and operate only driven by intrinsic motivation and, partially, challenge. Each moderator is assigned three 50-person groups and given assessment privileges. This phenomenon shows that service to

community, coupled with certain degree of technological challenge (just slightly less than competencies), can and does serve as a sufficient motivation factor.

V. CONCLUSION

In this paper the experience and lessons learned from an ongoing, 6-year long Microsoft Software d.o.o. Belgrade and Faculty of Electronic Engineering Niš joint venture within the Partners in Learning project have been summarized. It is intended to serve as an addition to guidelines to any institution to be involved in a State governed or supervised e-learning project. Experience gained through this blended-learning project can be shortly stated in the following fashion: at the current state of electronic (blended) learning, especially within slowly-changing systems such the State education, requires constant active participation of human resources in the instruction process. Moreover, the participants need to be constantly challenged in order to be kept active and learning. Efficient metrics of course value (adequate to time measure in traditional education) is still unclear in e-courses, and any accreditation assigned to them may be understated.

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