

The Choice of Effective Methods and Approaches to the Design of an Online Course

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Abstract—The main purpose of this work is to show the importance of using process cards and Bloom's Taxonomy that allow to raise efficiency of on-line courses. It analyses existing on-line courses and demand of such courses in its dynamics. Application of process cards and Bloom's Taxonomy will encourage good design practice in projecting and implementing on-line courses thus improving educational results retention rate.

Index Terms—E-Learning, blended learning, process cards, Bloom's Taxonomy, methodological principles

I. INTRODUCTION

Generally, the problem of quality in education represents the whole set of questions, starting from the difficulties of measuring the effect of a course to the effectiveness of the entire field. This paper focuses on the issues related with the evaluation of both efficiency and effectiveness of e-learning. The analysis of various experiences of e-learning education benefits as well as examples of failures, comparing the existing approaches in Europe, America and Asia, demonstrate clearly that assessment is needed as competition in this sector is bound to grow and the question of quality and feasibility of e-learning introduction and maintenance will be becoming more and more crucial.

Nowadays it has become quite evident that the competition in e-learning is growing stronger by day. Both profit and non-profit organizations offer many dozens of various courses with participation numbers reaching millions, such as FutureLearn with 2,284,679 people (<https://www.futurelearn.com/about>) or EdX, reporting the addition of 1,03 million participants from 2012 to 2014 [10]. So, any new comers to this market are bound to feel pressure to stay level with what is already available in the area, as can be clearly seen from the example of MOOCs (massive open online courses).

It is worth mentioning that the potential for growth in e-learning turns out not as unlimited as anticipated. Apparently, MOOCs seem to be no longer a threat for higher education – as Ho et al. (2015) conclude in their survey that most of those course participants who work towards a certificate tend to be mature students either refreshing their knowledge or acquiring new skills rather than learners venturing for their first university education [3]. In other words, there is a clear preference for face-to-face university education at the undergraduate level which is supported by the data from the US government report. There are twice as many distance learners among graduates compared to online undergraduate students (22% and 11% respectively) [7].

What's more, online learners are predominantly Americans which questions another expectation that e-learning in general and distance learning in particular will enable more foreign students to benefit better access to education of their choice. The actual data demonstrates that more domestic students enroll online, particularly in less densely populated regions where over one fifth of all learners choose distance education, for example the Plains or the Southwest (23% and 20% accordingly), showing the highest rates of online enrollment in the USA [7]. To compare, foreign students make a very approximate 1.3% of all online students, including Americans studying abroad [10].

That coincides with the statistics from Babson Research Group Survey which shows the dynamics of distance learning enrollments is in fact slowing down, even though it still makes a substantial three quarters of the total rise in the United States higher education [3]. Therefore, all those who plan to develop and launch MOOCs need to fully realize what objectives they hope to achieve, and what kind of e-learners they expect to attract. At the moment there seems to be a huge discrepancy between the reality of online learning and anticipations. According to the data from Babson Group, while over two-thirds of academic institution authorities claim their intention to turn online, at present only 8% of universities and colleges can offer MOOCs, and another 5,6% of institutes are in the process of developing one [7]. Moreover, the number of those academic leaders who are optimistic about MOOCs' future decreases to less than 18,7%.

All the above-mentioned leads to the idea that e-learning nowadays requires careful planning and quality assessment – higher institutions, as well as government education authorities need to make well-informed decisions when considering their transition to online education. Thus, the first stage must necessarily include the calculation of economic value and thorough analysis of the market, while the final stages have to run a series of evaluation and revision procedures.

Starting with the planning stage, it is worth calculating the potential economy of turning online. As Inglis et al. (2002) argue the economic efficiency of the transition online in the education sector can be reached, by decreasing the costs, involved in development of learning content, either by increasing the students' intake, or by making learning more efficient [8, p. 56-57, 62]. Besides, this economy has its limitations, for instance, constantly growing enrollment may at a certain point outbalance it as more and more investment will be required for marketing and more money spent on hiring new staff to tutor these students [8, p. 60].

This paper continues a series of previous publications on e-learning by turning towards problems arising in development of effective course from the point of view of choice and implementation of organizational forms and didactic principles [1, 2, 6].

II. BLENDED LEARNING

First of all, let us turn to organizational problems. The very first problem for the course developer is to determine the optimal format of electronic packaging of the study materials, namely, selection between distance learning (where interactions are solely by means of electronic communication and/or on-line) and blended learning (where interactions with the students are partially on-line and partially in a face-to-face classroom). The last method has many proponents, among them D. Leakey who holds that such approach to education is the optimal one from the didactic point of view [8, p. 170 – 174]. Experience in Tomsk Polytechnic University, where during the last several years a multitude of Moodle-based courses were developed and put into practice may serve as example of such approach as well [9, p. 401 - 402].

Proponents of Blended Learning model highlight a necessity of direct interactions between the students and their instructor for subjects oriented towards formation of practical skills. B. Tomlinson says that even with the use of video and means of feedback it is not always possible to reach the necessary effect of direct participation, because the video footage undergo editing and post-processing while e-mail and videoconference are impossible to compare to real-life communication because oral commentary will always be fuller than its written version [10, p. 126]. That is why blended learning is extremely popular with course developers in both humanities and exact STEM fields.

Another aspect which seems to be influencing the choice of learning format is the level of difficulty of the underlying subject matter. Usually the more complex the course the higher the necessity for direct interactions between the instructor and the students thus less elements of the course can be translated into the electronic medium without damaging the quality of education. In other words, presently the answer to the question whether a college-level course can be made completely on-line (see Turoff (1997), via Inglis et al. (2001: 62)) is most often negative.

Analysis of courses offered through different platforms, such as FutureLearn, EdX, iversity, and Coursera shows, that most often they are either introductory courses like MITx 6.00.1x Introduction to Computer Science and Programming Using Python offered at EdX, or Cultural Studies and Modern Languages: Introduction through FutureLearn; or courses dedicated to a certain narrow topic or aspect and built to be accessible for people without any background knowledge or with minimum level of such knowledge. For example, HarvardX HKS101A American Government or TsinghuaX 00612642x Chinese History From Warring States to the Tang Dynasty through EdX (<https://www.edx.org/course>), are quite comparable to such courses as Much Ado About Nothing: In Performance from FutureLearn (<https://www.futurelearn.com/courses/much-ado-about-nothing>).

Despite the prognoses [4, 11] predicting substitution of traditional university education with different electronic

courses, statistic shows the opposite: only one in four students in the USA studies on-line, which is 1.7 million less than in previous periods as the data from Babson Survey Research Group shows. This is an organization producing statistical analysis of data from more than 70 countries and publishing an annual report on distance learning in the USA. (<http://www.onlinelearningsurvey.com/>). The data collected by the Department of Education of the US in 2014 supports this and shows that the regional percentage of students who chose studying on-line does not exceed 23% [10].

Besides a significant slowdown in growth of the on-line learning the last year also saw decline in interest in the on-line education among private educational institutions, which in general correlates with other data about e-learning in Europe. Therefore, school graduates are reasonable choosing brick and mortar universities to get tertiary and special education, while e-learning is more suitable to those seeking to upgrade one's skills by obtaining the second (or third) diploma or by undergoing training in a certain highly specialized course/subject.

Thus, in choosing a course and a format of learning both students and university governing bodies follow the simple logic: the more complex the course the weaker is the version of blended learning used.

As for didactic and methodological principles, it seems important to understand that e-learning in any form is not a radically new approach. In other words, lack of well-considered and effective educational component in the e-learning course (or e-learning version of a previously developed regular course) will have as much negative impact for its performance as lack of adequate and user-friendly software.

At that it is necessary to understand that simple conversion of the study materials into an electronic format does not automatically involve restructuring of the educational component, in other words a material which is methodologically and didactically weak will not become more effective, while the opposite is more possible: a dull lecture being filmed or recorded and offered on-line will have even less chance to find its audience able to watch or listen it up to the end. Use of media (including interactive ones) is just a means that allows implementation of a certain method or approach such as gamification or communicative approach.

Here we propose the use of process card as one of educational components of the course being necessary for composition of tasks, despite the fact that preparation of such cards may become a difficulty even for experienced instructors. Strategy to create the process card is based on Bloom taxonomy and serves as a method to optimize the process of course development while taking into account the didactic principles.

In this case we hold that a taxonomy is a «theory of classification and systematization of complexly organized parts of reality which usually have hierarchical nature. The first taxonomy for educational needs was created by B. Bloom in 1956. D. Krathwohl and B. Bloom divided educational objectives into cognitive (requiring acquisition of content), psychomotor (development of muscular activity) and affective (emotional attitude towards the content) domains» [12]. Such division of objectives encouraged productive work despite the mixing of results of education. Composing the process card allows to avoid

principal problems in development of an e-learning course because basic needs and capabilities of learners are taken into account and future difficulties in their attainment are predicted. The main goals included into the mentioned Bloom's Pyramid of Educational Objectives interpreted basic idea of an assessment of one's own achievements [5].

Analysis of available didactic principles allows us to maintain that by the Bloom's taxonomy a number of didactic principles is implemented, namely, principles of consciousness and activity, availability, systematics and consistency, connection between theory and practice and durability of acquired knowledge. Basing oneself on the offered foundational words a developer gets possibility to see the course from the point of view of the learner thus being able to better organize the learning materials and increase performance. If the developing instructor knows exactly what are the goals and objectives of the course then the learner may have a good grip of final results of the course, as well as preliminary results and thus studying become a more conscious process. Students get possibility to acquire knowledge and skills with more responsibility because they can exactly see the final goals and objectives of each concrete stage of the learning process and can deduce a level where they currently are in a process of studying a certain course. Structuring and presentation of a course on the basis of its planned results encourages systematics and consistency principles and subsequently approachability of material and durability of acquired knowledge.

III. METHODS AND USAGE

To implement necessary requirements according to Bloom's model we decided to make an experiment with two groups from the Institute of Cybernetics, TPU. The students from the first group (A) were given tasks in general, without any additional supplements to Bloom's characteristics or objectives and only deadline was marked. No personal interests, no descriptions. Just tasks without problem solving. The second group (B) was too big, so we divided it into two subgroups (B1 and B2) and all the tasks were planned according to Bloom's theory. I must admit that the language fluency level of these groups was the same. Well, we wanted to see our results in practice. To understand that we were right in our choice of Bloom's theory we structured objectives within the online course "Lectures and Presentations". The students were freshmen and they didn't have any opportunity before that time to work with online courses. Two subgroups (B1 and B2) were working separately, but they could consult each other but the group A could ask only the teacher. With groups B1 and B2 we analysed their mistakes and evaluate their tasks together. Each week they chose the best student themselves.

IV. CONCLUSION

We may also assume that blended learning as a whole encourages formation of learner autonomy (we hold this principle as being connected to and determined by consciousness principle), however in each concrete case an internal motivation of learners (that is, their willingness and preparedness to independent studies) plays an important role.

Each week we analysed the results. Hence, we've got amazing facts. Students' perception of online courses was not so overwhelming that we expected. Students from group A did half of the necessary tasks, they tried to fulfill just before the deadline. Students from groups B1 and B2 did long before the deadline and they were trying to do their best and achieve better results than their groupmates. Therefore, Bloom's Taxonomy was helpful in our work and our first predictions were not transparent as the results we got then.

E-learning as a whole and blended learning in particular suppose that the learning process shall be founded as a creative process and give learners a possibility for personal expression in creative projects. We hold that there is not a single principle which can be easily solved by introduction of e-learning alone. Let us reiterate that correct formulation of goals and objectives allow for prediction of success of learners in acquisition of material.

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