GAMIFICATION AS AN ELEMENT OF ACTIVE LEARNING IN HIGHER EDUCATION

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Abstract: Article is devoted to the problem of usage of game technologies in educational practice. Main objective is to define opportunities and restrictions of usage of game technologies as means of improvement of active learning in higher education. Authors consider main barriers to further implementation of gamification in educational practice (barriers to adoption, barriers to design and development, barriers to sustainability; barriers to innovations). Authors analyzed the potential of game approaches and estimated possible risks of their usage in educational practice. They admit that soft-gamification, context-gamification and sandbox-gamification approaches are the most suitable for usage in active learning. Hard-gamification approach is the most risky and organizationally difficult because it demands additional technical providing. Authors encouraged to use integrated solutions of Evidence-Centered Design (ECD) approach for overcoming barriers by using gamification in education. ECD concept includes three main elements (Content Model, Evidence Model, Task Model). Case study from educational practice is presented. According to their own experience with this approach, authors have come to conclusion, that the combination of ECD elements really provide a framework for: 1) specifying the knowledge and skills to be explored; 2) the tasks that can engage students in regard to that knowledge and skills; 3) useful information (the data and evidence) and ways of its interpretation to make inferences about the students' aptitudes. Authors admit that ECD offer a powerful tool for improving the design and opportunities in learning games.

Introduction

One of the notable trends in education is to use various technologies to enhance learning. Many researchers have noted the special role of gamification as an element of active learning (Klopfer, Osterweil, Salen, 2009). Gaming technology was chosen as the object of our study and subject is the features of their usage in educational practice. The aim of our study is to identify opportunities and restrictions on the usage of gaming technology to enhance learning. The focus of our analysis is not accidental, since gaming technologies are the driving force behind the transformation of traditional research methods and approaches.

According to Werbach and Hunter we consider gamification as the usage of game elements and game-design techniques in non-game contexts (2012). These researchers with McGonigal (2011), Zichermann and Linder (2010) became active popularizers idea of total gaming technology implementation in practice.

At the current moment the main advantages of using gaming technology to improve learning are: intensification of feedback in interaction with students; creating of additional motivation of students and the better view of tasks; simplification of educational procedures for students; increase the level of students' satisfaction from learning.

The process of implementation has been quite successful. But there is much critics of this approach too. We think, that their arguments deserve attention. Eventually, this is the only way to make a decision

whether you should use gaming technology in education or not and, if yes, to determine the limits of its usage.

Main barriers to the implementation of gamification in educational practice

The most detailed analysis of the barriers to the implementation of gamification in educational practice has been done by researchers from Massachusetts Institute of Technology (Klopfer, Osterweil, Salen, 2009 18-19). Researchers have identified **four types of barriers:**

1. *Barriers to adoption* (Curriculum Requirements; Attitudes; Logistics; Support for Teachers; Assessment; Evidence; Uses of Games; Limited View; Social and Cultural structures).

2. *Barriers to design and development (*High development costs; Development Process; Playtesting in schools; Limited Sources of funding).

3. *Barriers to sustainability (*Gamers are fickle; Speed of Change; Maintenance and Support).

4. *Barriers to innovation* (Limited Data; Limited Pedagogical Paradigms; Limited Research; Limited Ambition).

Some barriers can be prevented by a proper choice of approach to gamification. To do this, we need to know the potential of game approaches and accurately estimate the possible risks of their usage in educational practice.

For example, *soft-gamification* and *context-gamification* approaches are the most universal and safe. These approaches can be used in active learning with equal success.

Hard-gamification approach is the most risky and organizationally difficult because it demands additional technical providing.

Sandbox-gamification approach has not completely opened its potential in the field of education. In future this approach has good prospects for usage in active learning (especially with social networks and specially organized educational communities).

Some of these barriers can be overcome if we use the power of social media and online resources (from Google Drive and Dropbox to Storyboardthat, Thinglink, iSpring Suite etc.). But in most cases we need integrated solutions to overcome barriers to the use of gamification in education**.**

Evidence-Centered Design (ECD) conception

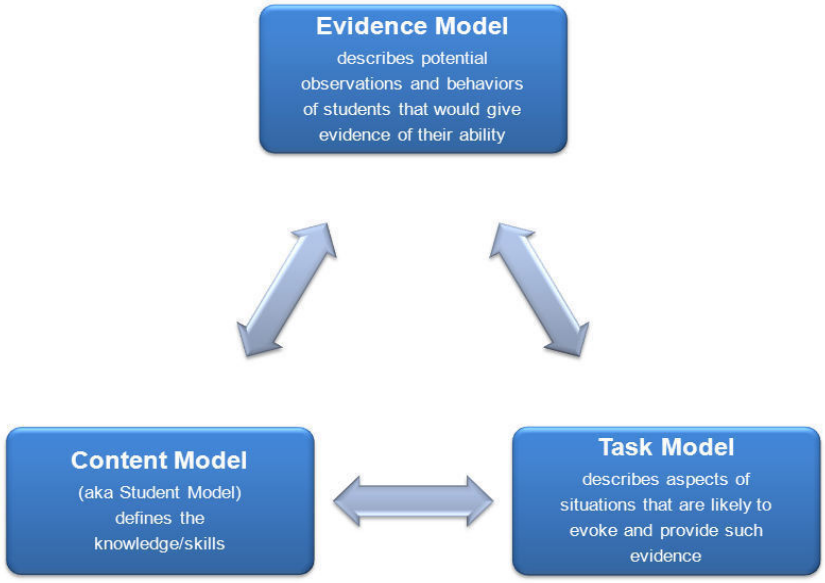
However, if we recall the famous aphorism of Robert Kirchhoff: “Nothing is more practical than a good theory” (Agassi 1967, 30-37), would be entirely appropriate to apply to one of such theories. In this case, we mean Evidence-Centered Design (ECD) conception. ECD has become particularly popular among learning games designers, because it offers a powerful conceptual design framework that can be used to

create scenarios of educational games and collect assessment data in many types of formats - including digital games.

ECD was developed at the Educational Testing Service (ETS) by Robert Mislevy, Russell Almond and Janice Lukas (Mislevy, Almond and Lukas 2003). According to MIT researchers this approach to constructing educational assessments focuses on measurable evidence of a student's learning (Groff, Clarke-Midura, Owen, Rosenheck and Beall 2015, 5-8). This explains the popularity of ECD. As a result, there has been an increase in the application of ECD across the learning game community (Conrad, Clarke-Midura, Klopfer, 2014 37-59).

ECD concept consists of three main elements (Figure 1):

FIGURE 1. MAIN ELEMENTS OF EVIDENCE-CENTERED DESIGN (ECD)



Source: ORIGINAL ILLUSTRATION CREATED BY THE AUTHOR ACCORDING TO Groff, J., Clarke-Midura, J., Owen, V.E., Rosenheck, L., Beall, M., 2015

Together these elements create a feedback loop for an ongoing learning experience (Groff, Clarke-Midura, Owen, Rosenheck and Beall, 2015, 5-8). Also these elements of ECD can be used more informally as universal design frames for learning games and experiences.

Case study from educational practice

We have experience of using this approach to create Web-quest for students (Master Degree) of Faculty of Psychology of Taras Shevchenko National University of Kyiv. Short scenario of Web-quest is present below:

Introduction. Dear colleagues. You are invited to perform a task in Web-quest, which will enlarge understanding of the opportunities of the systemic psychological knowledge in the field of management psychology. Tasks of Web-quest will need a creative imagination and persistence in the independent

information search. Web-quest envisages two stages. After each stage you will need to prepare relevant presentation materials. The maximum score for each task execution is 5 points, for 2 stages - 10 points. There will be further evaluated your participation in group work. The maximum additional score - 5 points. Good luck!

PRELIMINARY STAGE. ***Introduction to roles.*** Imagine that you are employed by a company which is engaged in business consulting. In this company you can perform various professional roles. Choose one of them: *Expert Verifier* **-** a specialist in detection of lies; *Expert Communicator* **-** a specialist in the field of business communication and negotiations; *Business Coach* **-** a specialist in organization and conducting business training; *Coach* **-** a specialist in individual and group work aimed at professional and personal growth; *Organizational psychologist* **-** a specialist in the organization of human resources and business processes. **Working process.** After you have chosen a professional role, you can start the first task.

1 STAGE. By using separate links and search activity, please look for information about key competences, knowledge and skills that should have: expert verifier, expert communicator, business trainer, coach and organizational psychologist.

Working process. After the information search, prepare presentations or interactive poster.

Depending on professional role you have chosen, the presentation materials should reflect: 1) key competence of the expert; 2) basic directions of specialist's work. Additionally, you have to define: *for expert verifier* – the indicators (external features) of lies; *for expert communicator* - methods of the development of communicative competence; *for the business coach* - methods of improving of psychological readiness for negotiations and professional growth of managers; *for coach* - methods of personal and professional development of managers; *for organizational psychologist* - methods of improving the efficiency of interaction between top managers, middle managers and line managers.

The term for preparation of presentation materials of the first stage - 2 weeks. On completion interactive seminar will be organized. Your works will be evaluated by your colleagues. After this online group discussion for the reflection on the achievements of the first stage will be done.

2 STAGE. In the second stage, you'll see a short film "A techie against the humanitarian."

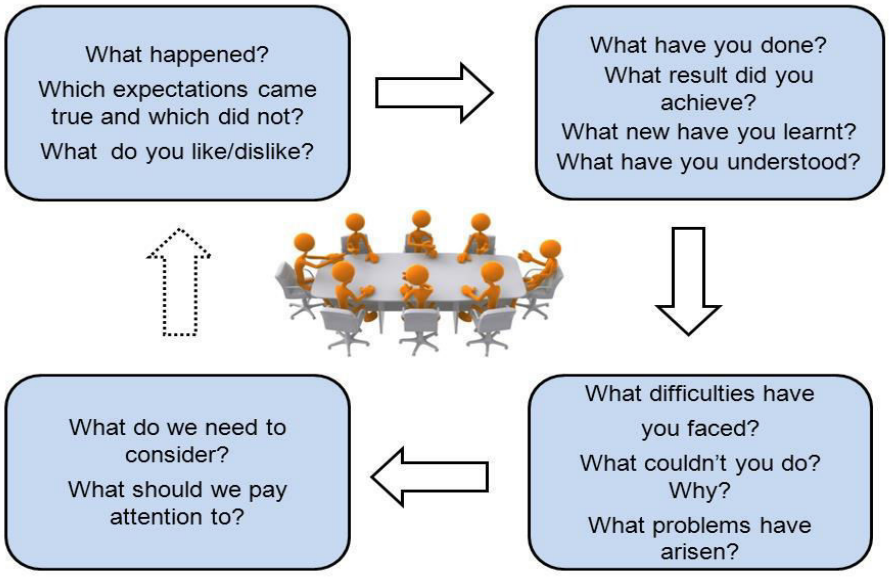
Working process. During the screening, depending on the selected professional role you will have to: *for expert verifier* **-** identify movie characters which told lies and formulate advice on what to do in such situations in the negotiations; *for an expert communicator* **-** identify the specifics of communication problems of the movie characters and offer a program for development of communicative competence for them; *for the business coach* **-** identify problems in the psychological readiness to negotiations of movie characters and offer for them appropriate educational / training program; *for a coach* **-** define the

characters who need coach's care first of all and offer for them a program of personal and professional growth; *for organizational psychologist* **-** identify what inefficiency teams of negotiators is caused by and propose measures to improve the efficiency of interaction between top managers, middle managers and line managers in these situations.

Please make a presentation. The term for preparation of presentation materials of the second stage - 2 weeks. On completion it will be organized interactive seminar. Your works will be evaluated by your colleagues. After this it will be done online group discussion for the reflection on the achievements of the second stage.

FINAL PART. The group reflection. The final group on-line discussion for the purpose of reflection of achievements in the passing of Web-quest, organized by a technique "Reflexive square" (Figure 2):

FIGURE 2. SCHEME OF "REFLEXIVE SQUARE"



Source: ORIGINAL ILLUSTRATION CREATED BY THE AUTHORS

Conclusions

The process of implementation has been quite successful. However, there are barriers to further implementation of gamification in educational practice. Researchers have identified four types of barriers: barriers to adoption, barriers to design and development, barriers to sustainability; barriers to innovation. Some barriers can be prevented by a proper choice of approach to gamification. To do this, we need to know the potential of game approaches and accurately assess possible risks of their use in educational practice. S*oft-gamification*, *context-gamification* and *sandbox-gamification* approaches are the most suitable for usage in active learning. *Hard-gamification* approach is the most risky and organizationally difficult because it demands additional technical providing. Some of these barriers can be removed if you

use the power of social media and online resources (from Google Drive and Dropbox to Storyboardthat, Thinglink, iSpring Suite etc).

We need integrated solutions to overcome barriers to use of gamification in education. This is possible through the use of an Evidence-Centered Design (ECD) approach. ECD offer a powerful lens for improving the design and opportunities in learning games. ECD concept consists of three main elements (Content Model, Evidence Model, Task Model). According to our experience with this approach, we can say that the combination of ECD elements really provide a framework for: 1) specifying the knowledge and skills to be explored; 2) the tasks that can engage students in regard to that knowledge and skills; 3) useful information (the data and evidence) and ways of its interpretation to make inferences about the students' ability.

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