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GAMIFICATION AS MEANS OF GETTING FROM e-LEARNING TO EXPERIENCE LEARNING IN ARCHITECTURE

Raluca NICULAE, Maria DUDA
Faculty of Architecture, Spiru Haret University, 13 Ion Ghica Street, Bucharest, Romania
usharh_raluca.niculae@spiruharet.ro, usharh_maria.duda@spiruharet.ro

***Abstract**: The main objective of Adapt2Jobs project consists in analysing and adjusting the university curriculum, key competencies transmitted through teaching-learning experience, according to the needs of the labour market in constant motion. Targeting the field of architecture, the challenge is to determine how to translate employer's perspective on desirable qualified workforce in terms of student's abilities outlined by adapted or specifically tailored courses. Based on architecture curriculum analysis, in both national and international contexts and thorough interpretation of data gathered from student and employer-oriented questionnaires; some specific measures are being taken to improve the current learning experience for architecture students of Spiru Haret University's Faculty of Architecture.*
As virtual (synchronous and asynchronous) learning environments are increasingly used in the field of architectural education, the success of the educational process resides in calibrating the teaching methods as to better engage and motivate students to make the most of their learning experience. A delicate issue is to design a digital framework, supporting course's topic that enhances student's direct engagement and, in the same time, amplifies the learning process by developing new skills.
Both courses developed by experts in the field of arts and architecture are benefitting from digital media for delivering theoretical content and tentatively explore the concept of gamification and rule-based design methodologies as means of improving the e-Learning context.
This paper will discuss suitable game-thinking–mechanics and typologies translated into architectural parameters but following rule-based strategies, making use of rewards systems and experience levels and promoting healthy competition among students.

***Keywords:** adapt2jobs; gamification; e-Learning; experience learning.*

I. INTRODUCTION

As a preliminary approach to the research topic, a brief introduction of the gamification concept listing its origins, applications, constitutive elements and techniques has the purpose of arguing the academic demarche supporting the major objectives of improving the quality of teaching-learning experience in the field of architecture and enhance student's engagement. By using digital media by means of gamification strategy alongside conventional educational experience, student's learning outcomes could benefit from both self- and collaborative path to gaining new knowledge and specific abilities. The teaching strategy oriented towards the target group selected to take part in the European Social Fund (FSE) financed project POSDRU/156/1.2/G/141179 (Adapt2Jobs), art & architecture field, blends traditional teaching classes, including new media insertions like PPT presentations, with a complex e-Learning platform. Both course topics and modular delivery system are designed according to previous social inquiry results analysis oriented to student learning needs and capabilities and labour's market requirements toward employee's qualifications. The *curriculum form & content adjustment process* meets the interests of all target group categories and uses the ICTs specific means of storing and displaying information carefully considering student's unique abilities.

Considering the particularities of architecture field, the design of any teaching-learning process should be based on simulations of real life situations, should involve alongside individual learning and self-assessment, experience based environments and feed-back from educators and peers. The action of delivering information (with the help of e-Learning environment valuing time management) could definitely benefit from an interactive and dynamic approach that involves the *gamifying learning* experience.

1.1 What Is Gamification? Origins And Applications

Attempting to enhance the attributes of a relatively new but already heavily contested term amplified by the digital media industry to fit the academic purposes, the following definition was provided: *Gamification is the use of game design elements in non-game contexts* (Deterding et al., 2011). The concept's origin cannot be pointed out though, with temporal accuracy, going centuries back to the competing teams of workers dwelling the Egyptian pyramids and receiving goods for their effort or calling upon the memory of Soviet socialist work competitions and corporate staff engaging, productivity and customer loyalty techniques. Involving behavioural mechanisms and motivational science borrowed from the psychology field, some of the major international companies experienced the usage of gamification in designing their internal business and external marketing strategies, in a few words: *enhancing productivity through staff motivational techniques on one hand and strengthening the brand awareness and customer engagement, on the other.* Consider, for exemplifying, the case of Microsoft who turned the task of internationally (a multi-language conversion task implied) releasing Windows 7 into a dynamic and playful experience by using a simple game like strategy that involved employees competing to climb the *leaderboard* and at the same time reaching the level of "zero language coding errors" for the tested software. According to Ross Smith, the test coordinator: "productivity games and virtual worlds are 21st century business processes, not gimmicks, something we've seen for years at Microsoft" as the gamifying experience ended successfully and approx. 500,000 dialogue boxes were reviewed and hundreds of bugs, otherwise overlooked, were revealed in the process (Osak, 2013). Obvious examples of connection, motivation and customer loyalty are in fact well known marketing practices such as: frequent flyer programs, Ø Nike+ (a service that allows users to track their physical activity by using a mobile app. and rewards them with points system entitled: *Nike Fuel*) or Badgeville- Samsung (subscribers can earn points, unlock badges and climb the leaderboard ladder by engaging in various promotional activities via Samsung's US website).

According to the National Gaming Survey (study conducted by international market research firm Newzoo and sponsored by Global Collect, 2011), hundreds of millions of internet population aged 10 to 65, from emerging and western countries, are playing games on a regular basis: 43% of Americans, 52% of UK residents and 66% of Germans, for example. Therefore the commercial purpose of gamifying business activities can be easily understood but the question remains: *how to properly find the means to reach the targeted user performance behaviour, what are the motivational triggers that are unlocking the right abilities to solve the tasks developed by the game designer.* Going back to the synthetic concept definition, an extended explanation of gamification could imply designing a *scenario* using a set of constraining or liberal *game elements, rules and methodology* known from various online and offline games, in a *non-gaming context* (other than entertainment) in order to increase *users' engagement* in performing *targeted activities*.

1.2 Is There Already A Basis For Gamification In Teaching Architecture?

The process of adapting the structure, content and means of delivering information related to architectural education (often at the risk of having to cope with norms and multiple codes of practice) to labor market constraints' displaying continuous movement requires a thorough research and role - playing game on behalf of the project team. First of all, employer's needs according to the disseminated questionnaires, revealed curriculum's weak areas regarding overlooked practical abilities: entrepreneurial, communicational (oral - debating, argumentation, written and visual communication), administrative (related to obtaining authorization permit process), legislative (construction constraints), economic (project management, project economy) or technological. Bearing in mind the complexity of the architectural design and authorization process, the multitude of abilities required and of different specific domains of activity under architecture's umbrella, a difficult

approach resides in trying to find, address and amplify student's particular interests by providing a targeted set of competency oriented education. The gamified scenario embedded in the online course (game context) designing should thus be based on real case studies (quest, intrigue), with one or multiple addressing options that should prepare students (players) to face issues regarding the construction field. The entire course will be divided in multiple modules and at the end of each one, a set of test questions will assess the student's level of knowledge by using points scale, leaderboard, resource progression, levels or badges (game elements).

II. HOW TO APPROACH e-LEARNING FOR VOCATIONAL EDUCATION

2.1 Is Gamification The Right Choice For Our Teaching Process?

Adapt2Jobs was created to analyse and adjust the university curriculum according to the needs of the labour market in constant motion, and, at the same time, improve student interaction. The goal of the project is therefore to better prepare students for real-life work dynamics.

The specific application of Adapt2Jobs regarding teaching architecture is a technological course on Contemporary Building Techniques and an Entrepreneurship and Visual Communication course. According to surveys we carried out, most employers consider technical knowledge, management and communication skills paramount. However, although extremely useful once studies are completed, a concrete application during school years stalls on theoretical levels. This delay causes the specific, rigorous, technical, information students are presented with to be easily greeted with prejudicial boredom. Therefore, we were confronted with finding possibilities of making teaching these courses interesting and motivating. The solution we choose for stimulating and preparing students is to include and apply new communication and interaction techniques through gamification.

Our intention of introducing gamification into Adapt2Jobs education project is an experiment borrowing some of the usual activities of *millennials*, upgrading teaching techniques and vision to a stimulating environment that uses *play* elements. "Play gives you a sense of free motion in a set of certain constraints" (prof. Kevin Werbach), which in its turn sounds like the perfect contemporary approach for a learning process.

Following Kevin Werbach's lectures on *Gamification* and its application, we started with the four questions he advises upon involving such a process.

2.1.1 Does motivation matter in the educational field and would we derive value from encouraging the learning behaviour? What motivation do we offer in order to encourage the learning behaviour?

Education today, even for vocational studies, is unfortunately still based on a coercive good vs. bad vision. This binary system evaluates students' work or evolution according to failed or fitting criteria, not allowing or encouraging recognition of experience. There may very well be acknowledgement in mistakes along the process, which is just as valuable a step in accumulating knowledge, but, for now, *failure* is mostly viewed as a fearsome result. There is no reward for *failing.*

Since Adapt2Jobs is an education experiment, we decided to step up and let go of the current binary practice. In a game, players are not afraid to test trails in order to find the successful way of accomplishing their task. *Failure* is necessary in order to understand the repercussions of choices. Applying gamification in education will eliminate coercion and allow students to be creative, and focus on acquiring experience, regardless of potential *failures*. The reward for *failing* is experience, and experience valued as such and not as outcome may prove an impressive motivator.

If a creative experience makes up the on-going motivation throughout the process, the specific end goal of both courses is to prepare the students for real-life professional activities. Besides acquiring knowledge, this implies the self-responsibility of discovering one's skills and potentialities, acknowledging and improving them, with constant feed-back upon actions, from teachers, colleagues, observers. Discovering *where one fits in a team* is the value we derive from encouraging a gamified learning behaviour.

2.1.2 Does the application offer meaningful choices? Are the tasks / target activities sufficiently interesting?

Games offer the visual instruments necessary for self-evaluation, to each individual *player*. One may therefore choose the character's skills to improve, according to preferences, but also, being aware of the complexity required during certain quests, choose the team members based on the skills needed to be supplemented. Applying gaming mechanics onto our courses leads to similar outcomes.

The two courses we prepare as part of Adapt2Jobs, are structured into five, respectively three, main sub-domains: architecture, technology, structure, economics and identity on one hand, and administration, legislation and communication on the other. In the first five lessons, each course offers basic all-round information regarding the theoretical concepts of the subjects. Each lesson is followed by individual assignments, grouped according to the aforementioned sub-domains, of which each student chooses according to their own interest, motivation, curiosity.

The overall choices of assignment as well as their solving method determine the leading two skills for each student: a major and a minor sub-domain they are clearly interested in more.

At the end of the fifth assignment, each student receives a public profile, depicting their major and minor competences: *the skillset*. At this stage, students are *confident* as their interests are recognised and encouraged.

The following step of the courses is involving students in teamwork. Able to publicly asses their colleagues' profiles, students responsively group together in teams of 3, to supplement each other's skills. Competition and collaboration are thus balanced during the process of discovering and tackling new subjects and assignments.

At the end of the courses, the final application is an actual architecture competition project, which will be completed by putting together all resources and information acquired from all sub-domains. Each student will have gained *autonomy* in their knowledge and skills, being responsible on their subdomain for the team, and have established therefore their role.

2.1.3 Can we effectively gamify the system by using rules or algorithms? Can the application be structured upon a gamification mechanics?

Both courses offer a *linear structure*, with constant monitoring by means of digital help. The students' evolution is planned in phases, and each step is supervised by the teacher offering customized feedback to every action. *Failures* from one check-point to the next may be overturned through repetitive gaming mechanics, so that students may improve. Students' *experience progressively amplifies*, reaching completion in an actual architectural competition project, carried out in a team. The feed-back received on common actions is given by both the supervising teacher, as well as the team members. The end evaluation depends on all steps cumulated, revising the students' professional profile.

2.1.4 What are the potential conflicts? What other motivational structures are there in the organization and would the gamified system potentially come into conflict with them?

Professor Werbach includes education as the domains where potential conflict may occur, since recognition of merits needs incentives and efficiency, together with other motivations. Building reputation within a group enhances communication skills as to do what is in the best interest of the quest, rather than focus on participants' specific and seemingly selfish needs. Reputation gives right to privileges, and, as we evolve in a non-hierarchical system, is attainable by any student.

The answer to this question is both positive and negative. We must be aware that being part of a university implies respecting the grade evaluation system, which has been the main motivator until now. The potential conflict may be averted, as our courses focus on preparing the students for the real-life situations, and not on evaluating them. As to one of Prof. Werbach's examples, gamification can easily solve the stress of the grade: we may presume all student players enter our classes at level 0. Each step they take, with each assignment, already offers them a certain experience, which is in itself valuable, and prized with a level-up. Therefore, following the gaming mechanics, we shall recognize each accomplished level as an improved step towards reaching completion of the experience and reward it accordingly. As mentioned before, *failure* is valued, as long as it brings acknowledgement and experience. All in all, leaving the courses at level 0 will be impossible, if not a very stubborn choice.

2.2 How Do We Apply Gamification For Our Specific Courses?

The teaching methodology will mould onto a gamification mechanics, with the purpose of better offering an integrated dynamic, similar to that of a workplace: the students' theoretical progression is simultaneously applied onto design studios.

We have already briefly described the structure of the courses: a linear succession of phases. The first five classes introduce theoretical concepts and illustrate them with concrete examples. Each class ends with an individual assignment: choosing several examples out of an offered series, analysing, explaining and commenting them. The results are processed establishing a profile, based upon the individual choices and issue tackling approach. The following phase sees the individual players teamed up in groups of 3, according to their personalized profiles: their skills should be complementary. Classes get more practical, and the notions introduced before are being further explored in their direct application and varied interpretations. Teams will first warm up with a complete study case, before the final project: designing an actual project for an architectural competition. The designing process will mostly develop during studio time, but the analytical, technical, administrative, legislation and graphical factors, detailed during classes, will be included and presented as final exam.

Therefore, the gamification scheme applied on our courses will build the experience according to the engagement and progression activity loops described above. Engagement is shaped along each task, through a repeating motivation-action-feedback loop, while, progression ensues once each step is successfully completed.

To better illustrate the way gamification mechanics is sewn within the classical education scheme, we shall briefly enunciate their corresponding parallel elements:

- *Domains and sub-domains become Storylines*: the important choices along the path lead to profiling the students according to major and minor interests and skills.
- *Actors as Characters:* **1.** Teachers give the assignments, or in gaming terms, the *quest*. They also offer constant feedback on assignments, monitoring the individual profiling, as well as the evolution of individuals and teams. Teachers evaluate the engagement and progress activities, by points. **2.** Students, or *players,* solve the quests according to the chosen storyline. They do their own missions; they collaborate with other players, assuming a role according to their skillset. But they also offer feedback to their own team members, throughout the common assignments. Their work dynamic is encouraged to be internally administered, with mutual respect and responsibility for own tasks within the bigger project. Their joint effort and collaboration is also quantifiable in points. **3.** External observers may intervene along the process, with suggestions, critiques, or information. They do not offer points, but other rewards.
- *Themes as Quests*: cumulative individual progression and group based assignments according to skills.
- *Evaluation as Completed Levels:* upgrading experience on a continuous path**.**

III. CONCLUSIONS

What do we expect to achieve and how can we quantify the results?

"A game is a series of meaningful choices" (Sid Maier) and also "a game is a problem solving activity, approached with a playful attitude" (Kevin Werbach). Translated into education, gamification means an enhanced, fun interaction between students, and between students and teachers, based on acquiring, accumulating and understanding experience.

The *specific objectives* for the *student players* are:

1. To make a habit of consulting, being informed and up to date with current developing technologies, legal solutions, regulations, and graphics.
2. To be able to set their own criteria of eligibility for all actions regarding designing practice.
3. To apply the selected actions according to context.

Specific objectives may be quantified, and therefore graded. Non-specific objectives are unquantifiable, but yet noticeable: an increased motivation, increased interaction with both teachers and players, creativity, self-responsibility, self-awareness of own skills, response to feedback and a quicker adaptation of responses and actions accordingly.

The final result we aim at is confident and autonomous students, who know their skills and role within any team, making them adaptable to any work environment.

Reference Text and Citations

[1] Deterding, S, Dixon, D., Khaled, R., Nacke, E., L., 2011, *Gamification.Toward a definition*, In CHI 2011, May 7-12, 2011, Vancouver, BC, Canada.

[2] Osak, M., 2013, *The power of play: How companies are using gamification to build engagement*, Source http://business.financialpost.com/2013/02/06/the-power-of-play-how-companies-are-using-gamification-to-build-engagement/

[3] Werbach, K, 2014, *Is Gamification Right for Me?*, In Gamification, Knowledge for Action, Wharton University of Pennsylvania, Coursera Platform.