

Assessment *for* Learning and Gamification: Can Two Walk Together, Except They be Agreed?

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Abstract. Although studies indicate the potential of Assessment *for* Learning (AfL) to promote academic achievement, reality shows that in various education systems this potential is not realized. Some attribute the reasons to lack of motivation on the part of learners to invest in deep learning, or to their deficient learning skills. We offer to deal with these barriers by focusing on fostering student motivation and agency. For this end, we propose a virtual learning environment that incorporates principles of AfL and gamification, which combined with the physical learning environment in classroom create two interrelated activity systems that feed each other in a co- evolutionary process. In the first part of the paper we define learner agency and ways to foster it, we continue by defining AfL and gamification and their principles, then compare characteristics of students in classrooms where AfL is successfully practiced with characteristics of successful players in digital group- games. In the second part, we explain how gamification can upgrade AfL, and display features of the proposed learning environment. Finally, we discuss attributes of educational contexts that are conducive for successful implementation of the proposed learning environment.

Keywords: Assessment for Learning, Gamification, Agency

1 Introduction

Research in assessment for learning (AfL) during the past two decades has pointed to the potential of AfL to promote deep learning and increased academic achievement (Black & Wiliam, 1996). However, the reality in various educational systems indicates that AfL has failed to fulfill its potential (Klenowski, 2009). Some of the explanations offered are the lack of students' motivation to invest in deep learning and deficiencies in their learning skills (James et al., 2007). The current paper proposes to deal with such barriers by fostering students' motivation and agency through a virtual learning environment that integrates AfL and gamification principles.

1.1 Learner agency

Agency is defined as "the capacity and propensity to take purposeful initiative—the opposite of helplessness" (Ferguson, Phillips, Rowley & Friedlander, 2015, p.1). According to Bandura to be an agent is to intentionally make things happen by one's actions (Bandura, 2001). As a psychological construct, agency embodies belief systems, capabilities of self-regulation, and a variety of other structures and functions, through which personal influence is actualized (Bandura, 2001). Self-efficacy (the faith in one's ability to succeed in achieving one's goals) is a fundamental structure of agency according to Bandura (1997). Among other factors associated with Agency are Conception of intelligence as a growing rather than a fixed entity (Dweck, 2006), consciousness, mastery orientation, and future orientation, (Ferguson et al., 2015).

From a sociological perspective, agency is perceived as a socially mediated capacity to act. Such function is constructed in social interactions using mediating structures, which lead to dynamic and mutual relations between the two, whereby the structures mediate the agency that a person takes, and in turn, the person's ability to take agency mediates the structures. Consequently, contradictions that might occur between the two in their reciprocal relations could lead to their coevolution (Siry, Wilmes & Haus, 2016).

Educators worldwide attribute great importance to the development of learner agency since it is consistent with educational goals for the 21st century that are aimed to promote competencies for successful functioning in the workplace, such as critical thinking, creativity, collaboration, and communication (Binkley, 2012). Such skills are also critical for self-regulated lifelong learning that is essential in light of the rapid pace of knowledge renewal (Pintrich, 1995).

The justification for promoting learner agency has been advanced recently by Peter Renshaw (2016), who argues that agency is an aspect of the human functioning, the focus should be on its quality (what is a good agency) rather than on its quantity (more or less agentic). Moreover, since what could be considered good agency is culture related, Renshaw suggests three perspectives for justifying agency promotion: Epistemological perspective (developing competence for knowledge construction), personal perspective (personal empowerment), and social perspective (socialization to norms and expectations of a given culture.)

Recommendations to foster student agency (both, individual and collective) through AfL come from AfL researchers and practitioners engaged in teacher training and professional development (Earl & Katz, 2006; Willis & Cowie, 2014). In this vein, AfL was incorporated in the Learning How to Learn (LHTL) – in Classrooms, Schools and Networks Project that took place in England at the beginning of Millennium (James et al., 2007).

1.2 AfL: Definition and principles

AfL, as defined by the Assessment Reform Group (ARG, 2002), is “the process of seeking and interpreting evidence for use by learners and their teachers to decide where the learners are in their learning, where they need to go and how best to get there”. More recent definition states that “AfL is part of everyday practice by students, teachers, and peers that seek, reflects upon and responds to information from dialogue, demonstration and observation in ways that enhance ongoing learning (AFL, 2009). Implied in these definitions are the following principles and attributes of AfL: the goal of the assessment to advance learning; its social nature that rests heavily on dialogue between the assessor (teacher or peer/s) and the learner; its dynamic nature and continuous enactment; the utilization of a variety of tools and strategies to make learning explicit, and the interpretive and integrative manner by which inferences are derived. As for the learners, the definitions point to their active role in the assessment; they participate in formulating its objectives, in developing rubrics, as well as perform the self-and-peer assessment.

Contemporary writings about assessment conceptualize it as inquiry (Delandshere, 2002); indeed, an optimal AfL cycle corresponds to an inquiry cycle. It consists of six phases: planning (setting goals, defining objectives); designing tools to elicit learner’s understanding; evidence collection (including provision of accommodations when needed); interpretation (estimating the gaps between intended and obtained outcomes and generating feedback to the learners and the teacher); utilization (taking measures, where needed, to close the gaps), and evaluation (assessing the effectiveness of those measures in closing the gaps.)

1.3 The potential of AfL to promote learner agency

AfL is grounded in the 'learning center' paradigm, according to which instruction is aimed to help students construct their own knowledge; the teacher becomes the mediator who provides her students with an appropriate learning environment and acts as a supervisor of the construction site (Biggs, 1999).

From a socio-cognitive perspective, AfL is consistent with conceptions of the educational process as a socio-cultural dialogue, and of learning as a collaborative construction of knowledge (Brown, Collins, & Duguid, 1989; Lave and Wenger, 1991). It is responsive to the interplay between individual and collective knowledge construction whereby they feed each other regularly. Hence the claim that “AfL can then be conceptualized as more than a series of techniques or strategies; as part of a dialectical and cultural process of increasing understanding and control of the learning process by the learner – that is, exercising agency” (Willis & Cowie, 2014, p.25). However, as was mentioned above, this conceptualization is not always reflected in educational practice, seemingly due to students’ lack of motivation to invest efforts in performing “school-type tasks,” which they consider as irrelevant and disconnected to their experiences in “real life.” They are eager to invest efforts in learning in other contexts, for example, to

improve their skills in extreme sports, in digital games, etc. Hence the need to develop innovative pedagogies and learning environments suitable for the “digital natives.” Our proposal to upgrade AfL based on gamification principles is thus an attempt in this direction.

1.4 Gamification: Definitions and principles

The growing interest in integrating gamification into the formal teaching system stems from the need to create experiences that encourage students’ commitment to and engagement in the learning process and increase their motivation for pursuing meaningful learning.

Gamification is defined as “The use of game design elements in non-game contexts.” (Deterding et al., 2011, p9). The central principle underlying the theoretical foundation of “gaming for learning” is that we were born to play, thus infusing fun is the most efficient way to motivate action and to change habits and behaviors for the better. Koster (2013), in his book “The theory of pleasure to design games”, argues that the increasing motivation and interest in games stem from the tasks and the challenges that are built-in into the ground rules. The players face increasingly harder challenges thus they have to exhibit understanding and control to advance to higher stages and win the game. Such struggling involves fun. Hence fun is synonymous with learning.

The Gameful design of learning environments aim is to increase motivation and promote learners' agency. According to Paul Gee (2014), digital games are complex semi-otic systems. They are, by definition, environments where uncertainty prevails.

Dispositions and competencies through	
AfL lens	Gamification lens
Attribute value to learning	Love to learn new things and improve their skills
Eager to know, curious, inquisitive	Curious; Always see the challenge, as in digital games
Enjoy challenging learning-tasks	Goal oriented and highly motivated to succeed
Exhibit self-efficacy for learning	Persisting, not give up when faced with obstacles and difficulties
Have skills to adaptive to changing conditions	
Critical thinkers	Optimistic about their ability as a group to overcome and succeed
Reflective and Creative	Creative and accustomed to thinking outside the box to solve challenging problems
Switch roles and characters as needed	

Set their learning objectives and monitor their performance towards achieving them	Are used to learn by watching others and themselves in replays
Exhibit leadership and management skills when required	
Recognize the importance of formative assessment, crave for feedback	Eager and accustomed to receiving feedback on their actions
Know how to give constructive feedback	Consider failure as an integral part of the learning process
Not afraid to make mistakes, realizes that understanding grows out of mistakes	Willing to sacrifice for others
Exhibit initiative and resourcefulness	Take risks and step out of their comfort zone
Feel responsibility for their own learning	Enact systemic thinking in a complex environment
Diligent, hardworking	Are accustomed to learning under uncertainty

Table 1. Dispositions and competencies of learners in classrooms where AfL has been implemented successfully and of players in challenging games

A skilled gamer succeeds when he acquire "ownership" of the game space, and it's underlying roles. Moreover, gamers can be anything they like, including directors and heroes in their journey. Compared to learning in the classroom, the degree of autonomy granted to players is higher. The challenges facing all gamers are tailored to their abilities and skill levels, thus enhancing their self- efficacy and their competencies. Contrary to the myth, most of the time gamers play together with other players, thereby increasing their relatedness and social skills. Such characteristics elevate the internal motivation of players and enhance their agentic capacity (Gazit, in preparation).

1.5 Dispositions and competencies that reflect optimal AfL implantation and challenging gamification

Studies of children, adolescents, and adults who play digital games have shown that those who play regularly, develop a playful approach that is characterized by fundamental beliefs, distinct patterns of action and competencies (Gazit, in preparation).

Table 1 presents dispositions and competencies of students in classrooms where AfL has been implemented successfully (Birenbaum, 2014, 2016) (marked as AfL lens) vis-à-vis those found in ethnographic studies of gamers in online digital games (marked as Gaming lens) (Gazit, 2009; Lavee & Gazit2012; McGonigal, 2011).

As shown in Table 1, similar attributes are visible through AfL and gamification lenses regarding self-regulation and self-efficacy – two main components of agency, as noted above. Theoretically, the conceptualization of the three constructs (AfL, gamification, and agency) is based on the socio-cognitive theory (Bandura, 1986) and the Self-Determination theory (Ryan & Deci, 2000), which are rooted in the perception of humans as proactive, having cognitive and metacognitive abilities, capable of self-regulation and reflection rather than as creatures who react, are being activated by environmental forces or driven by internal impulses. According to these theories, the combination of autonomy, socialization, and self-efficacy enhance intrinsic motivation. It is thus not surprising to see similar attributes through AfL and gamification lenses.

2 The Proposed Learning Environment

In this section, we discuss how gamification can upgrade AfL; present attributes of a virtual learning environment aimed at fostering learner agency, and describe the activities that can take place in such environment.

2.1 How can gamification upgrade AfL?

In spite of the common theoretical foundation that AfL and gamification share, in practice, there is a difference between how students learn in school and how they learn in games or other challenging activities in the “real world”, in which they strive to excel. Gamers in MMOGs (Massive Online Games) are enthusiastically learning by themselves, or in collaboration with their peers, by mindfully utilizing the feedback provided to them.

Likewise, when engaged in extreme sports, they are eager to receive feedback, analyze their mistakes, learn strategies by observing models (champions) in action, try the strategies and compare their performance to that of the models. In general, they are characterized by embracing change and being eager to learn to improve their performance (Brown, 2011). Conversely, as school students, many of them are not keen to learn even when feedback on their performance is available to them, seemingly because in traditional teaching they are submissive subject to obscure teaching and assessment dictates, and their learning experience as a whole is not in alignment with their experiences in the “real world”. Indeed, the current generation, known as Generation Y, or Gamification Generation (Gazit, in preparation), is exposed in many schools to teaching methods that are based on epistemological beliefs and perceptions that were proper for achieving the educational goals of the past but are not suitable for achieving those of the 21st century. It is therefore not surprising that many teachers fail to engage students in their lessons and in the learning tasks, which are seen by students as “burdensome necessity”. Consequently, the more motivated students orient themselves towards achievement goals rather than learning goals, especially nowadays when such orientation seems in line with education policies that adhere to external test-based accountability, despite wide criticism regarding its collateral damage (Berliner, 2011). Moreover, it is difficult to update teaching and assessment methods so that they competently

utilize digital technologies due to the reluctance of many teachers to apply these technologies, thus leading to preservation of "archaic instruction," as perceived by students. As a result, the generation gap grows between teachers ("digital immigrants") and students ("digital natives"), making the schooling experience appear less and less attractive and relevant to the students.

Consequently, we propose to deal with those barriers by harnessing gamification to upgrade the teaching, learning and assessment experience in school so that it appeals to students and fosters their agency. Specifically, we propose a virtual gameful learning environment, which combined with the physical learning environment in the classroom will offer a bi-level blended learning space. The rationale underlying the development of the virtual environment argues that if the goal is to foster learner agency, teaching cannot be a process that is planned and executed solely by the teacher while the students are submissive subjects to its dictates. It should rather be a process that students understand its language and tools and are partners in planning, executing and monitoring it together with the teacher. In other words, we argue that for students to be involved in learning, take responsibility, exhibit initiative and desire to know they need to participate not only in the assessment but also in the instruction process.

2.2 Characteristics of a gameful learning environment geared to foster learner agency

The goals of the virtual gameful learning environment are addressed from three different perspectives: Epistemological, Subjective, and Social, as advanced by Peter Renshaw (as described above) to justify fostering learner agency.

From an epistemological standpoint, the aim is to evoke deep learning due to student participation in the instruction and assessment, adapting them to the media utilization of "digital natives."

From a subjective perspective, the goal is to empower students so that they become self-efficacious regarding their ability to self-regulate their learning, to co-regulate learning, and to socially share regulation of their collaborative learning.

From the social perspective, the goal is socialization to norms and skills required for proper functioning in the 21st century.

The proposed virtual environment, labeled AfL Island, is designed to offer students an activity space, which they would be responsible for its design and management, so as to encourage them to be active participants in the instruction, learning, and assessment processes.

This virtual activity space, which can be accessed 7/24, contains learning and teaching resources as well as virtual facilities, devices, and tool for learning-related and leisure activities. Students will design, build and shape the space according to their preferences (as in a Minecraft environment) and will operate and maintain it. The general guidelines and targets for the activities that will take place in the AfL Island will be formulated by the students under the guidance of the teacher.

The virtual activity space can be utilized for knowledge management, i.e., documenting the collective knowledge constructed during classroom discussion (knowledge maps, lesson summaries, exemplary performances, etc.); managing inventories of strategies, tools, and applications for instruction and assessment, of standards and rubrics; assembling a library of relevant information resources.

Moreover, the virtual space can be used for the construction of models and illustrations for instructional purposes, and for the development of learning games and group games as well as for cooperative learning interactions such as peer assessment, synchronous and asynchronous discussions and more. It is also possible to conduct in this space experiments (in a virtual lab) and hold exhibitions and conferences in which learning outcomes can be presented.

The activity that takes place in the virtual space offers opportunities to the student to take responsibility, develop "expertise," assist and guide their peers, work in teams, solve authentic problems and cope with challenges. As such, the activity is expected to promote deep learning, self-regulation, co-regulation and socially shared regulation,

increase motivation for excellence, and empower those students who usually do not participate in classroom discourse ("transparent students"), as well as foster self- and collective efficacy, and a sense of cohesion. Moreover, it can also expand students' personal identities due to the experience they gain from taking on roles as performed in the workplace of the 21st century, which require competencies, most of which are unrealized by students as part of their regular school work. As such, the activity that takes place in the AfL Island has the potential to contribute to the advancement of learner motivation and agency.

2.3 Activities in the AfL Island

The students start designing and constructing the sites for the various activities that are about to take place on the island, including buildings (centers), infrastructure and landscape, based on the specified purpose of the isle. The construction process is led by the students who are experienced with, and enthusiastic about using 3D creation softwares such as Minecraft.

Once the island is created, the activity centers are put into action. Such centers can include:

- Information and resource centers, to which students can turn for advice, to receive training, and to share information. The directors of such centers are elected by their peers and represented by avatars. Their responsibilities include: locating, collecting, organizing, and cataloging information resources and learning tools; disseminating information and tools; providing consultation services to fellow students and to teachers; initiating educational activities and events such as exhibitions and conferences (at the classroom, the school, and the community levels), which are to be held at the center or in collaboration with other centers.
- Learning activity centers, to which students turn to work on assignments and develop concrete materials using specialized software.
- Leisure activity centers, to which students come to play, practice, and learn together extracurricular subjects.
- The island administration which consists of the cyber center, and development and communication centers. The students who run this center hub manage the virtual environment and the internal and external communication.
- Knowledge dissemination centers which include a conference center, a museum, and several galleries in which learning products are displayed or presented and discussed.

The performance of each center is assessed based on an automatic log produced by the system, so that each center team is motivated to excel, and each team member feels responsible for the success of the team.

The scoring and rewards system (e.g., medals, awards, status scores for contribution to knowledge construction, etc.) is based on a set of criteria that has been determined in a

joint discussion between the teacher and students and is agreed upon by all participants. Scoring reports are regularly available and are transparent to all participants.

Every semester, the team of each center is required to submit an evaluation report regarding the center's activities based on the data produced by the automated system, in which they reflect on the center's performance, i.e., to which extent they have reached their objectives and in case of a discrepancy, suggest how to close it and improve the performance next semester.

The activity in the AfL island follows procedures, regulations, norms and ethics rules by those in effect at the school.

From an Activity Theory framework (Engeström, 2001), the two learning environments – the virtual (AfL Island) and the physical (classroom) can be seen as two activity systems, where mediation between the subject (learner) and the object (learning goal) is accomplished by tools, including intervention by the teacher and fellow students. The two systems differ in the division of labor between the teacher and the students and among the students. While in the classroom the teacher dominates the interactions, in the AfL Island the students dominate and use a larger variety of tools than in the classroom. The two activity systems are coordinated and interrelated as each one feeds the other continuously, which leads to their co-evolution and to the creation of a “third space” (Engeström, 2001), in which personal learning evolves.

3 Conclusion

Contextual conditions that can promote successful implementation of the proposed learning environment. A classroom that would appreciate activities of the kind occasioned by the AfL Island is characterized by a climate of growth, relationships of trust and mutual respect among students and with the teacher, the students like the teacher and feel that she cares about them. Typical of such classroom are norms of mutual support, transparency, openness and legitimacy of errors; The students feel confident to try, to dare, to initiate and set challenges and believe in their ability to meet them. They are experienced in teamwork and peer teaching and participate in self- and peer assessment.

The teacher is caring, thinks outside the box, sees herself as an educator, not as knowledge imparting agent; it is important to her to cultivate values, to foster critical thinking and creativity, as well as social competencies, to empower her students and enhance their self- efficacy. Professionally, the teacher feels she is supported by "critical friends" in the school- based learning community, which is a cohesive one and maintains cooperative learning.

The team members are motivated to improve the learning ability of all students and nurture their agency, and they believe in their collective capacity to meet these challenges, and feel pride. They exhibit constructivist conceptions of instruction, learning, and assessment, and attach importance to cultivating students' interest in the discipline they teach. It is a team that thinks outside the box, is enthusiastic and open to new experiences, exhibits an inquisitive disposition, practices professional accountability and internal regulation.

The team members feel that they receive full backing, support, and assistance from the school management that sets a high priority on fostering agency both among staff and students.

Schools with such properties of organizational culture seem conducive for successful implementation of AfL Island and mindful integration of the virtual and physical activity systems. The Researchers

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