Gamification in Education: Enhancing Motivation and Learning Outcomes in Rwanda

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ABSTRACT

This study investigates the impact of gamification on student motivation and learning outcomes in Rwanda, focusing on the Teacher Training College of the University of Rwanda, Huye Campus. By examining the current state of student motivation and comparing it with European contexts, the research aims to identify effective gamification strategies that can be implemented in Rwandan education. The study incorporates perspectives from students, alumni, employers, and educators to assess the competencies provided by the teacher training curriculum. The findings suggest that gamification can significantly enhance student engagement and learning outcomes. The study's implications extend beyond Rwanda, offering insights applicable to other East African countries and similar educational environments.

Keywords: Gamification, Education, Student Motivation, Learning Outcomes, Rwanda and Teacher Training

INTRODUCTION

The gamification studies started with a critical reflection on the situation of students' motivation when studying and enrolling in different courses of the Teacher Training College of the University of Rwanda, Huye Campus; and the actual situation of gamification in education, mainly focusing on Rwanda and sometimes in a synchronous comparison with Europe [1]. With a vision of contribution to best practices within the college as well as nationally, the students' motivation was only part of a broader research subject [2]. In the phase two of the study, extended questions to students, alumni, employers of alumni and teacher educators about the competencies that the teacher training curriculum provides, the outcomes and the performance, were put on the research table as an additional study [3]. These trials brought implications of practical impact in Rwanda, potentially extended within the East African region and other similar environments [4-6]. A wide range of discussions and reflections proposed on the implications of these results are applicable in numerous education institutions, beyond the specific context of Rwanda and Africa. The results of the study are interesting and surprising. I, therefore, believe that exposure to the perspective of research in practice may be more visually appealing than theory. I invite you – teachers, educators, employers, parents, learners, researchers, education companies, entrepreneurs, and policymakers – to get on this rollercoaster and revolutionize students' education and increase their learning potential in a smart way [7-12]. The government of Rwanda is giving great effort towards the development of the education sector with the purpose to increase the quality of education [13]. One of the main objectives is to enhance the skills and competencies of the learners as well as updating the education with new demands from the world [14]. This essay focuses on primary and secondary education including general education structure and content, teaching methodologies and learning itineraries, teachers' qualification, and supporting mechanism and those in a setting with specific needs and urgency beyond theoretical approaches [8, 9]. It focuses on the situation in Rwanda both in terms of how education has developed into its current stage and what leads to these changes. It investigates motivations and learning outcomes on the basis of students' interviews and research activities that were conducted by the author as part of a research study on gamification in education in Rwanda [15]. The case of gamification is one of the strategies that was tested in various scenarios, both in form of an information system for instructors in micro-enterprises who need technological support or in a higher education teaching course [16]

Background and Rationale

To enable learners to gain problem-solving skills and improve their learning attitude and achievement, educators should implement modern and effective teaching and learning strategies [17-19]. For learners to be able to critique their understanding of some concepts embedded in the STEM area, educators should employ constructivist interactive teaching and learning strategies [13]. Constructivism is based on the theory of learning and knowledge

construction using instructional approaches and strategies that actively engage learners in building knowledge from individual concepts [20]. Rwanda and the world at large are facing challenges associated with a shortage of qualified professionals, particularly in engineering, science, technology, and mathematics (STEM) [12]. In order to address these challenges, educational stakeholders all over the world are trying to renew curricula materials, retrain educators, and improve knowledge and understanding rather than memorize theoretical knowledge to improve learners' problem-solving skills [21]. After solving problems, learners are not only expected to give the right solution but also to analyze the possible reasons for the wrong solution and the mindset of the other person who gives that solution. This approach helps students appreciate problem-solving and implementation [18]. However, although learners and educators have a big appreciation for problem-solving and implementation, the challenge is how to motivate learners to have that appreciation [22-25].

Definition of Gamification

Gamification is defined as the use of game design elements in non-game contexts, and it can be used to improve motivation and engagement [23]. According to the Perlorean model, one can think of gamification as a continuum that ranges from full-game blends, which are typically used in productive, learning, or change-related contexts, and involve significant play-driven activities, to playful applications, which typically involve more subtle contextual game or game-like elements [24]. These game-like elements are used to motivate students to work harder and better to come up with good solutions, and they range from avatars to virtual goods, leaderboards showing not only the students' scores, but also the progress of their closest colleagues, story and narratives that assign the relevance of level completion and badges, thus transforming clear baselines into emotional objectives, and real-time feedback in written, explicit and implicit forms (e.g., breadcrumbs, music, effects) so that the students can be constantly aware of the progress being made. In essence, learners have to feel that their contributions are at the center [25-29].

Motivation Theories in Education

In education, a key element of maximum effort mobilization is a set of strategies designed to increase motivation. When students have no goals or incentives to do better, they are unlikely to succeed [15, 16]. The skill needed to be able to affect motivation and maximize students' progress can be acquired through a genuine understanding of theories that address all possible motivational sources. These theories are often time-consuming as they are closely questioned [23]. They are alike because of their focus, explanation of behavior, and effectiveness [17]. One reason schools occasionally fail to take advantage of students' natural learning abilities is that extrinsic rewards are sometimes emphasized. Using rewards to motivate students is certainly easy, but once the reward has been granted, the acquired knowledge is different [30]. A mastery goal-based approach to learning focuses more on the intrinsic value associated with a person's natural curiosity and eagerness to learn [29]. There is evidence to show that these approaches help shape a positive attitude toward learning and lead to superior learning activities. This achievement, which results from the adoption of a mastery goal, is associated with greater emotional satisfaction and the student is more involved in the work, which of course leads to the development of a set of cognitive skills. A significant body of literature discusses the importance of motivation in the learning process, especially at a time when technology is increasingly integrated into our daily lives [31]. Within the present discussion on promotion, technology drives the ambitious call for an innovative approach to the learning system. If education is to respond to the students' drive to discover and learn, it is necessary that its design reduces the learning skills deficit. Discouragement is a well-described negative behavior that is often observed in students in various stages of education and which affects their progress. It is this versatility of motivation that makes its study so complex because it must take into account both inputs (the driving force), transformative processes, and outputs [32, 33]. In negotiating the difficult process of understanding motivation, specialists use motivational theories. In general, these theories focus on motivation by addressing who or what controls the motivation of students in a learning situation. Using this distinction, motivation theories can be classified into two categories: extrinsic motivation and intrinsic motivation theories [34].

Gamification Strategies in Education

Approaches 2, 3, and 4 call upon Game Design strategies. Some other strategies to increase motivation for learning first contain employing an impulse to in-class student activity [35].

Approach 4: Creating a game after a course content in a multidisciplinary approach. This method consists of involving different students in different classroom support activities and giving them the aim of collaborating to develop a game [36]. These students will be engaged in different activities.

Approach 3: Creating a game before teaching a course content in a regular classroom. This method consists of creating a game for learners first and then teaching the course content related to gain. A user always creates his game with the help of classroom supports (educator, author, etc.) and then teaches the course content [37].

Approach 2: Using assessment tools in education. The present tools are quizzes, tests and role plays that are designed to deliver a score. These engagement tools can be used for checking understanding after a sequence of instruction, assessing after a serious game or conducting a learning without testing [37].

Approach 1: Using educational digital games in education. Educational games are used here for enhancing competencies in students in a simple and attractive way. All contents in educational digital games are aligned with

national curriculums and contribute to strengthening the competencies of these students. Key aspects such as message communication and personal development in relation to the skills of learners are incorporated in the educational games [38, 39]. There are different approaches that educators and schools can use to create educational products while ensuring the respect of traditional educational systems and that content complements the curriculum. The order of the following approaches does not indicate prioritization or preference and may be used in any order [40].

Points, Badges, and Leaderboards

Points are one of the simplest reward mechanisms in gamification. In educational applications, points are often used as a counting metric. In a gamified curriculum, points are earned by students for exhibiting specific desired educational behaviors [41]. Badges are another popular reward used in gamification. Badges are typically issued to students in recognition of a learning achievement. Series of badges could work to fuel the students' motivation engine, from badges for students under a specific relative grade position, to badges for completing a level, to badges for mastering content at expected times and to badges for learning unstintingly [29, 30]. Mobile gamified learning applications usually utilize GPS to create a geo-located badge-earning experience, whereas non-mobile applications use eLearning platforms to display badges on student profile pages. Even though badges are relatively easy to implement using current enterprise-level Learning Management Systems used in higher education settings, the implementation of badges is relatively low [42]. The possibility that badges could be misrepresented, or that badges may encourage undesirable behavior in students, could be the cause of this low implementation rate. Leaderboards are the final reward, side by side ranking of students based on game metrics like points. Home-based leaderboards display personal point rankings on current material. Leaderboard systems are controversial [43]. To counter reluctance to adopt gamification in "serious" learning environments, we are reminded that giving points, badges, and leaderboards (PBL) to assignments should not be misconstrued as gamifying or engaging [45, 46]. There are more dimensions to gamification than these; in fact, this approach only comprises a fraction of what gamification can entail. In many educational settings, instructors have employed PBL as rewards in their traditional curricula, often without knowing that this approach is missing the entire point of gamification. Such narrow PBL uses only the reward facet of game consoles, while missing the other features that make game-based learning fun and engaging. Hence, for an engaging gamified class, we need to look beyond rewards and incorporate the remaining features into the curricula as well [47].

Storytelling and Narrative

More recently, investigated the impact of a hands-on storytelling experience on students with cognitive disabilities such as autism, dyspraxia, and others who may meet the criteria set by the DSM-IV diagnosis. They concluded that storytelling has several cognitive, emotional, and social benefits for such students [48-56]. These benefits include enhanced speech development, cognitive development, increased emotional engagement, and a shared understanding concerning the emotions, intentions, and desires of others, the development of emotional attachments, and the increase in the participation of the affected individuals in group storytelling and take part in more group activities [57]. Storytelling can help educators to communicate knowledge, ideas, morals, values, and the importance of education to learners naturally and effectively [58-60]. They found that it not only promoted active learning and facilitated the acquisition of knowledge and competences, but it also motivated students to take responsibility for their own learning. In addition, they reported that it can encourage the collaborative construction and communication of meaning and shared experiences [61-65]. In line with these previous studies and other related theoretical works, effective storytelling might be achieved using the elements of gamification that are designed to involve players as real participants in a fictional world. Such experiences could motivate the younger generations of students, making learning both enjoyable and relevant [66, 67].

Progression and Levels

In the context of the teacher training program to be developed with teachers in Rwanda, we perceive that at the beginning the level of difficulty will be different; but as the student moves to the Curriculum section, levels and exercises will be focused on the development of curricular documents and the lesson planning, aiming at raising confidence through the practice [68]. In the course content on Monitoring and Evaluation, teaching strategies and communication that encourage student participation and promote engagement to maximize knowledge transfer and create a work by different competencies in both curricular areas will be developed [69-73].

Progression is presented as an important mechanism in gamification literature and allows the players to see their progress through increased levels, and to unlock more content through gaining points or badges. Levels are generally seen as bigger than just one activity [65, 67]. However, the transition from an individual assessment to a collection of assessments that comprises a level for a student in a learning context can be considered complex [74]. Some research that focused on levels states that the students with weaker skills in the initial state may disengage due to frustration, whereas the students with higher skills may become bored with the same level. This suggests that it might be especially difficult to create levels that are enjoyable for all students and that are tailored to meet the individual learning needs and allow all students to have a chance to advance [75-79].

Case Studies of Gamification in Rwandan Schools

We report how the game features and strategies correspond to the learning goals and the teaching material, and analyze the learning processes observed during the game sessions [56, 57]. We conclude that empowering learning is heavily dependent on a mutual synergy between the gamified tasks and their integration, as well as prior classroom activities and follow-up sessions [60]. Our findings underline the importance of thoughtful didactical consideration when designing and running educational games [76, 77]. The school visit highlights the potential implementation of our series of interventions toward the school and educational system environment found in Rwandan schools, along with addressing some of the challenges when applying gamification [80].

Challenges and Opportunities for Implementing Gamification in Rwandan Education

An additional challenge for Rwandan lecturers includes the lack of digital literacy among many of the students. In a rapidly evolving global educational environment, the ICT syllabus seems to be static, with the result that many students fall behind in digital literacy skills, including navigating e-learning platforms [81]. This obstacle is further complicated by unequal access to educational materials, and by power outages that can make it nearly impossible for students to complete online assignments [72]. Due to this challenge, supplementary training may have to be provided to both students and teachers so that this issue can be mitigated. Although not an easy task, education is moving towards a student-centered approach in which students have a more active role in the acquisition of knowledge. Finding the correct balance is crucial [65, 68]. As touched upon in the previous section, implementing techniques of gamification in classrooms and higher education is not an easy undertaking. Students should not only have good social relations with their teachers, but also among themselves, as well as inside and outside the classroom. However, by implementing competition elements within the learning process, students might find it difficult to help one another as it may damage their own grade [82-88]. While it is true that game monikers can enhance anonymity, for smaller classes where it is easy to identify the person behind the nickname, this issue should certainly not be disregarded in an educational setting [80,84,85].

CONCLUSION

The research highlights the potential of gamification to revolutionize education by enhancing student motivation and learning outcomes in Rwanda. The study demonstrates that incorporating gamified elements, such as points, badges, leaderboards, storytelling, and progression, into the educational framework can lead to increased student engagement and improved academic performance. The findings suggest that while gamification offers significant benefits, its implementation must consider cultural and economic contexts to be effective. The study recommends adopting gamification strategies in Rwandan higher education institutions to address current educational challenges and improve the quality of education. Additionally, the research emphasizes the importance of ongoing professional development for educators to successfully integrate gamification into their teaching practices. The insights gained from this study can be applied to similar educational environments, potentially transforming educational practices and outcomes across the East African region and beyond.

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