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Designing Digital Game-Based Learning Approach to Facilitate Educational Objectives: Exploring New Technological Tools for Education

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Abstract:
The purpose of this paper is to analyze the strategy characteristics of digital game-based learning environments and investigates the impact of using (DGBL) in teaching various sciences. We will also establish the difference among those approaches such as Educational Games, Game-Based Learning (GBL), and Gamification in teaching areas. A clear explanation of these innovative terms with a clarification of the possible effect on learning and teaching will be offered. The main objective of this article is to demonstrate the role of the teacher and the most dominant hindrances in digital game-based learning and teaching. And to focuses on the factors that influence the acceptance of commercial video games as learning tools in the classroom. The paper will review and illuminate the several roles the teacher currently accomplishes in game-based learning. The findings provide that (DGBL) has the potential to impact students learning in educational content areas and that collaborative gamification may be of precise importance for learning advantages.

Keywords: Digital Game-based Learning; Gamification; information technology; teaching approaches; learning environment.

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I- Introduction :

Web-based learning has been encouraged as an alternative learning and teaching methods with the development of information technology. Digital Game-based Learning is considerate as one of the teaching approaches that foster students' learning and motivation and quite popular presently. in the last 10 years (DGBL) has been extensively utilized in various spheres such as the marketing, military and education. Digital Game-based learning models (DGBLM) with appropriate teaching strategies have demonstrated to be of great educational benefit and helps students improve problem-solving skills in the classroom and make it possible for them to interpret their nature, society and the world around them through simulations and roles player. Many argue that (DGBL) can positively impact students by providing a fundamentally motivating and engaging learning environment for learners in ways that traditional schools cannot.

1.1 Statement of problem:

Web-based learning has been encouraged as an alternative learning and teaching methods with the development of information technology. Digital Game-based Learning is considerate as one of the teaching approaches that foster students' learning and motivation and from this perspective, the research problem can be formulated as follows:

- How can Designing Digital Game-Based Learning Approach Facilitate Educational Objectives?

1.2 Research questions:

This article focuses to answer the following questions:

- What is the meaning of the Digital Game-based Learning?
- What is the History of the Digital game-based learning?
- What are the main characteristics and benefits of Digital Game-based Learning?
- What are the Pedagogical approaches to ICT education?

1.3 Research objectives:

This paper focus to:

- analyze the strategy characteristics of digital game-based learning environments.
- investigates the impact of using (DGBL) in teaching various sciences

1.4 Methodology:

The study is primarily based upon the secondary data. For this extant literature related to the topic from different databases, websites and other available sources were collected. A systematic review of the collected literature was done in detail.

II. Literature Review:

1.History of digital game-based learning:

Marc Prensky explains that the emergence of digital game-based learning came in the “last decades of the 20th century,” when there was a global technology boom.

1- The recent generations of students in grades K-12 have lived their entire lives with access to technology not only computers, but also digital music and video players, cell phones, video games, and a host of other gizmos that require technology. Because of this access to technology, Prensky argues that today’s students “think and process information fundamentally differently than their predecessors.”

2- Teachers, or what Prensky calls “digital immigrants” now have to adapt to the language and learning styles of “digital natives,” a term he uses to describe students who have always been surrounded by technology.

3- Prensky recommends that in order for teachers to adapt their instruction to meet the needs of students, they can implement computer or digital-based games as learning tools in the classroom. These games can be used in various subject areas and in a variety of ways. Components of digital game-based learning Digital game-based learning involves activities that can range from completing very simple tasks to the development of intricate problem-solving skills. According to Patricia Deubel, games can be categorized as “action, adventure, fighting, puzzle, role-playing, sports, and strategy.”

4- Deubel suggests that the following information should be taken into account when teachers are selecting games for students: Students’ age, characteristics, gender, competitiveness, and previous gaming experience.

The game’s target age level. Special needs. Would students with disabilities be left out? Gender and racial diversity. In its choice of characters, language, or situations, does the game offend or slight any particular group of students? Number of players. How many students can play at one time? Will too many be left sitting on their hands?

The role of the teacher.

5- Passive observer or active participant? competitiveness, if it will be ongoing, and the effectiveness of the difficulty level. Deubel suggests that there are a few necessary components required for effective digital game-based learning. First of all, the games must keep learning and engagement at a high level. Rules and goals are also important components of a strong game-based learning program. Teachers must make the outcomes of the games clear and provide immediate feedback. Deubel also recommends that students have an interactive role not only with the game, but with other students as well. Limitations of digital game-based learning Although digital game-based learning appears to have some benefits and can be engaging to students, those opposed to this type of supplementary curriculum suggest that the games may be more distracting than a typical learning tool and that the goals of the games do not necessarily always align with the learning goals of the classroom. When using this form of instructional tool, Deubel suggests teachers must also take into account how the game’s features might affect students cognitively and physiologically.

6- Teachers must determine whether the content of the game is appropriate for specific age groups and whether the games are suitable for the standards-based accountability movement.

Griffiths also cites some disadvantages to using video or digital-based games in the classroom. Most notable of the limitations of using digital-based games is the fact that video games are constantly being upgraded. As a result, it’s difficult for educational researchers to evaluate the educational impact of some games.

Teachers must also take into account the amount of technology available to them in the school setting. If there is not enough technology to support a digital game-based learning program, some students may not have equal access to this type of instructional tool (Prensky,2001).

1.1 What do teachers need to know about games?

In many schools across North America, teachers find themselves still playing catch up with technology (Sprague, 2004). Teachers often lack the skills and knowledge to integrate technology effectively into their classrooms. While researchers in educational technology explore various ways to use the many tools available and the effects these can have on learners, and while a great deal has been discovered, this information rarely makes it into the hands of the practicing teachers—they typically do not read the journals (Sprague, 2004).

Technology use by teachers is strongly influenced by their own attitudes towards that technology (Russell et al, 2003), and digital games are often considered more of a nuisance than an asset. Some teachers will resist all attempts to alter their opinions about the use of games as learning technologies, and individual opinions must be respected, but if the attitude one holds is the result of

insufficient information, then providing that information can only help. Teachers deserve to be provided with up to date information on the potential of games in the classroom.

Digital games often make headlines: they are blamed for everything from youth obesity to fostering violence, but this must be viewed in perspective. Negative reactions to new media are hardly novel, as similar dire warnings were issued when television was new, as well as film, and even books (Williams, 2005). Just the same, it is important for teachers to be able to address the inevitable concerns of parents and administrators when the prospect of playing games, especially commercial off-the-shelf (COTS) games, is raised. There are clearly many commercial games that are simply inappropriate for most classroom environments, and this should come as no surprise, as there are also a great many films and books that are similarly inappropriate for classroom use. It is worth noting that the list of 'inappropriate' books and films may look quite different, depending on who you ask. Books banned in some districts are studied as important literature in others. Teachers still need to understand the many faces of the issues surrounding the value of games so they can make informed decisions about if, when, how and which games might be appropriate for their particular situation. Of course, understanding the issues is only part of the requirement. Teachers must also be able to locate games by knowing about online sources that can be trusted for both downloading and visitation, as well as about places that offer knowledgeable reviews of games and other software. If one is to remain cognisant of the general time pressures under which most teachers operate, it must then be recognized that these resources must be well publicized, easy to find and kept up to date.

Having located the games, teachers must also be capable of assessing these games and reviews themselves. Just as with any other technology, no one instance will be appropriate in all situations, so teachers must be able to determine where, when and how the games they find might be appropriate for them. Games vary greatly in terms of complexity, and the time commitment required to achieve a level of familiarity that will promote learning and this information must also be easily available to teachers. Some games can be used to effect in a typical single-class unit, while others require a substantial time investment both on the part of the teacher and the students. Teachers cannot be expected to simply 'know' which is which and how to use them. Evaluating an application for suitability is time consuming, so we must consider ways that educators can use to share their evaluations easily. There are several advocates and researchers who are doing this now (Prensky, 2006), and it is expected that more will be created.

2. Game-based learning:

Several authors have attempted to conduct extensive literature reviews in order to characterize the state of the field, often times painting a rather unclear picture in terms of the overall effectiveness of achieving learning gains through playing educational computer games. For instance, in a literature review based on 32 empirical studies, Vogel, Vogel et al. (2006) reported that interactive games were more effective than traditional classroom instruction on learners' academic learning gains and cognitive skill development. Similarly, Clark, Nelson, Sengupta, and D'Angelo (2009) reviewed studies on science learning through digital games and found that elementary and middle school students showed learning gains in a variety of studies and in a variety of content areas. The authors found that students' biological understanding became more advanced from Pre- to Post-test as a result of playing an infectious disease game. Playing games was also found to contribute to students' science knowledge retention. A study that investigated a version of the CRYSTAL ISLAND game-based learning environment for eighth-grade microbiology found that students' presence, situational interest, and in-game performance were significant predictors of science content learning gains (Rowe, Shores, Mott & Lester, 2010a). A related investigation compared students with high in-game performance to students with low in-game performance in CRYSTAL ISLAND (Rowe, Shores, Mott & Lester, 2010b). The study revealed significant differences in students' science self-efficacy, learning gains, engagement, and gameplay behaviors.

Other individual studies have reported that game playing resulted in improved academic learning achievement in student participants. For example, in two game-based learning studies with sixth graders, Hickey et al. (2009) found that students who received the science curriculum demonstrated greater learning gains in both understanding of scientific concepts and in achievement than did students in a control group (using expository text). The authors also reported that formative

feedback provided by the game further contributed to improving students' content area achievement. Findings from some other studies also supported this conclusion. In another study by Tuzun, Yilmaz Soylu, Inal, and Kizilkaya (2009), the authors found that fourth and fifth graders made significant learning gains (geography) from the serious game environment. Similar results were found in another study by Gillispie et al. (2009), which reported that playing 3-D digital games positively impacted students' math (pre-Algebra and Algebra) learning attitudes and achievement. However, the above-mentioned educational benefits afforded by such game-based learning environments have not consistently been supported empirically. For instance, some researchers have reported that extensive reviews of the literature have failed to support the claim that instructional games were a more effective method than traditional classroom-based instruction, in that it was not possible to identify a clear causal relationship between academic performance and computer gameplay. O'Neil, Wainess, and Baker (2005) further articulated that educational games are not sufficient for learning, asserting that individual differences should be taken into account if educational games are to be used as a method to enhance learning. For example, Wrzesien and Raya (2010) found sixth graders reported higher motivation and engagement levels as a result of playing a science-based game; however, there was no evidence to show that the game led to significant learning advancements over the traditional class.

Individual difference factors such as perceived academic ability and interest in educational content both in the game and in the classroom should therefore be taken into account in an effort to fully understand the impact of game-based learning environments on academic achievement. Since a clear consensus has yet to be achieved regarding the effects of instructional games on learning, more empirical studies are needed to validate the claimed effects of game-based learning.

2.1 Collaboration and game-based learning:

There is also evidence to suggest that playing educational video games in collaboration with other students, as well as with other in game avatars, can positively impact learning gains (see Mikropolous & Natsis, 2011). In addition to the contributions of game-based learning environments in general on students' achievement and also on students' self-efficacy, there is also emerging evidence that collaborative gameplay may have differential effects in comparison to playing educational video games as a single-player. One reason that collaboration may be an effective means of enhancing learning outcomes through playing educational video games in the classroom is that such games may influence discussion, such as that pertaining to the content received through the game. Furthermore, it is also likely that collaboration may have an effect on the quality of information that children receive from playing such games, in that students may learn from each other while playing the game, a benefit that cannot be afforded when playing individually (Mikropolous & Natsis, 2011). Howard, Morgan, and Ellis (2006) did in fact report that students highly valued the usefulness of discussion with their peers while playing the game. This discussion may therefore have an effect on other game related outcomes. Foko and Amory (2008) found, for example, that playing in pairs was more effective than playing individually and that collaboration helped students overcome their misconceptions about content. The authors also reported that students' visualization, logic, and numeric skills improved after playing the educational video game in their study in pairs as opposed to individually. In another study, Shih et al. (2010) reported that collaboration could be more influential in terms of learning than playing individually, however the effects of collaboration were highly dependent on the specific model and strategies that were being used, at least in their investigation. Finally, in a review of the virtual reality literature, Mikropolous and Natsis (2011) reported that several studies have indicated that collaboration has many beneficial effects on the learning process, such as increasing reflective thinking and more effective problem solving. However, the direct effects of various forms of collaboration and various collaborative settings remain incompletely understood, warranting more research to understand the relationships between the effects of collaboration while playing educational video games on students' learning outcomes.

2.2 Game characteristics:

From a pedagogical perspective, students' attraction to computer games has been considered to address student learning interests effectively. Moreover, game characteristics are what attract

learners. Several researchers indicated different game characteristics Activities should stimulate a portion of learners' sensory control; in other words, learning effectiveness or achievement is a feeling determined by learners' actions. Furthermore, learners can be prompted to participate in role-play activities or fantasy scenarios, and can experience imaginary situations and develop intrinsic motivation (Malone & Lepper, 1987). Sensory stimuli should be appealing or novel visual and auditory stimuli. Games typically employ multimodal presentations to effectively increase interest and the instructional effects, and also integrate auditory, visual, and textual presentations to enrich players' experience. Therefore, sensory stimuli are similar to multimodal presentations, which include representations or visual factors. Curiosity is a product of perceived discrepancies or knowledge inconsistencies. Incongruous information, complexity, novelty, surprise, and violations of expectations strengthen mystery. Therefore, mystery is similar to curiosity. In a multimedia environment with abundant stimuli, curiosity and achievement are positively correlated. Prensky (2007) indicated that adaptive characteristics enable learners to generate "flow." The learner is fully absorbed in the immediate activity of the game and does not rely on metacognitively induced strategies of self-regulation to remain on task .Players typically stop playing games because overly easy tasks bore them and tasks that are excessively difficult discourage them. Thus, appropriate challenges are essential for maintaining a "flow" state (Prensky, 2007) and fostering a sense of winning and challenge. Accordingly, adopting a suitable strategy can enable learners to exhibit superior performances.

In summary, game characteristics include fantasy, curiosity, control, role-playing, fun, play, rules, goals, interactive, adaptive, win states, conflict/competition/challenge/opposition, problem solving, interaction, multimodal presentation and story, task, and outcomes and feedback. The video "Dumb Ways to Die," which has a story and is fun, induces curiosity, and involves fantasy, has attracted more than 60 million views. A curious character pokes a bear with a stick. Another character is electrically shocked, becoming a fantasy skeleton. This reminds viewers to be safe around trains (Metro Trains Melbourne, 2012).

2.3 Benefits of Games in Education:

Video games have great positive potential in addition to their entertainment value and there has been considerable success when games are designed to address a specific problem or to teach a certain skill. Video games can clearly attract the attention of children and adolescents. For over twenty years researchers have been using games in education, providing the following reasons as to why games are useful tools in teaching and learning concept. For instance (Vacca et al,2014):

- Games can be used as research and/or measurement tools.
- Games attract participation by individuals across many demographic boundaries (e.g., age, gender, ethnicity and educational status).
- Games can assist children in setting goals, ensuring goal rehearsal, providing feedback, reinforcement, and maintaining records of behavioral change.
- Games can be useful, as they allow the researcher to measure performance on a very wide variety of tasks, and can be easily changed, standardized and understood.
- Games can be used when examining individual characteristics such as self-esteem, self-concept, goal-setting and individual differences.
- Games are fun and stimulating for participants. Consequently, it is easier to achieve and maintain a person's undivided attention for long periods of time.
- Games also allow participants to experience novelty, curiosity and challenge. This may stimulate learning
- Games may help in the development of transferable IT skills
- Games can act as simulations. These allow participants to engage in extraordinary activities and to destroy or even die without real consequences.

2.4 Effects of digital games:

Generally, claims about effects of the use of digital games in formal learning settings can be grouped into cognitive learning outcomes and motivational outcomes. Several types of cognitive learning outcomes can be distinguished, such as learning factual knowledge, cognitive skills and metacognitive skills (Omrod, 2011). In this study, we distinguish between factual and cognitive skills as potential learning outcomes of learning through digital games (Hainey, & Boyle, 2012). Motivation is a broad, multifaceted term. In this study, we looked at two facets of motivation:

1) Students being engaged in the game (enjoying it, having fun, not being distracted, wanting to play), which we refer to as engagement.

2) Students having a positive attitude towards the game content or the school subject in which the game is used, which we refer to as motivation to learn. Wouters, Van Nimwegen, Van Oostendorp, and Van der Spek (2013) performed a meta-analysis of 39 studies comparing students playing serious (digital) games (games where the entertaining quality is used for a serious purpose, such as education or health) with regular instruction methods and found that serious games were more effective in terms of learning knowledge and cognitive skills.

Furthermore, findings from the review study of Connolly et al. (2012) show evidence for positive effects of playing games for student engagement, but findings to support effects on motivation to learn were inconclusive.

In addition to learning and motivational outcomes, several authors also mention soft skills (Connolly et al., 2012) or communicative skills as potential outcomes of playing games. When students learn with games, they can learn about the subject that the game addresses, but they can also learn general skills, e.g., collaboration or reflection skills.

3. Teachers' acceptance of technology:

The issue of technology adoption has been tackled from a variety of disciplinary perspectives. There is a large body of research dedicated to the discrepancy between the advances in hardware and software capabilities and the relative lack of implementation (Venkatesh & Davis, 2000). Within this research tradition, the measurement of potential adopters' perceptions of innovations is common practice in order to assess uptake. This practice is now making its way in educational research as well, as concerns are raised about the "peripheral and minimal" uptake of computers in classrooms and the ineffective use of technology by teachers.

Cuban (1986) pointed out that many top-down attempts to integrate technology in education have failed to impose a long-term effect on teaching and learning, in part because they ignored the perceptions of teachers. concurs, stating that technology implementation plans are focused too much on the technology aspect and its effect on students' achievement. This can be considered a flaw, because teachers are in many areas the true change agents of schools in terms of modes of education.

Recent studies have attempted to fill this gap by applying research models that originated in behavioral theory and information system research (Kiraz & Ozdemir, 2006). These models allow examining and predicting the actions of teachers. According to a recent meta-analysis on e-learning acceptance (Sumak, Hericko, & Pusnik, 2011), the most popular theory among these models is the technology acceptance model. This TAM model was developed based on the assumption that the acceptance of any technology can be predicted by (a) the perceived usefulness, and (b) the ease of use. In addition, it hypothesizes a direct relationship between these two user beliefs; according to TAM, people will consider a technology to be more useful when it is easier to operate. This can be related to the observation from educational research that teachers will not use a technology in the classroom, unless they understand how it will help their current practice by offering either administrative or teaching advantages.

The problem with TAM-research is that the findings have been rather inconsistent. Two explanations have been recurrent in the literature. Firstly, the effect sizes of the different paths in the model appear to vary depending on the types of users and the type of technology, especially in

educational settings (Sumak et al., 2011). Not only were inconsistencies found between students and teachers, but the acceptance process is also different when studying educational technologies or more office-oriented tools (Sumak et al., 2011, p. 2076). Secondly, a major problem of the traditional technology acceptance model is its inability to account for individual, organizational, and contextual characteristics.

In the context of game-based learning, Bourgonjon, Valcke, Soetaert, and Schellens (2010) have tried to overcome these problems when studying students' acceptance of game-based learning using TAM-hypotheses by including technology-, user-, and context-specific antecedents such as learning opportunities, experience, and gender to the model. By attributing these additional concepts, their video games acceptance model was able to explain 63% of the variance in students' preference for video games in the classroom. The goal of the present paper is similar, however, based on the earlier discussion about inconsistent findings in TAM-research, the relationships between factors and the effect sizes are expected to be quite different for teachers than for students. As there is a need for a grounded theoretical teacher-oriented model to describe and explain the adoption of digital game-based learning, it is therefore important to examine the available literature on teachers' acceptance of games first. This will provide evidence-based insight in the crucial factors affecting game-based learning acceptance.

4.Studies about DGBL effectiveness:

Two types of evaluation of educational interventions can be distinguished. A first type is formative evaluation which aims to determine areas for improvement and is thus an evaluation of the process of the intervention itself. This type of evaluation is conducted by using a naturalistic design with observational data collection, which describes an ongoing process in its natural setting. A second type is summative evaluation, which aims at to determine whether or not an educational intervention succeeds in attaining its goals, thus evaluating the outcomes (Calder, 2013). Summative evaluations are conducted by using an experimental design (Hutchinson, 1999). In the present study, we focus on summative evaluation and will concordantly discuss experimental design.

An earlier content analysis on the effectiveness of DGBL approaches, conducted by the current authors, showed that there is a large diversity in the way that experimental research on DGBL effectiveness assessment is conducted, making comparison of results across studies difficult. This heterogeneity can be found on all four dimensions of the study design, as defined by Cochrane guidelines, which were used for the content analysis (i.e., a systematic review method which has its origins in health research and aims to assess the effectiveness of interventions for prevention, treatment and rehabilitation. The dimensions are

1) participants (e.g., characteristics of the sample involved),

2) intervention (e.g., contents, format, timings and treatment lengths, intervention(s) in control group),

3) methods (e.g., applied research methods)

4) outcome measures (e.g., instruments used to measure a certain outcomes). Variety is caused by

three main issues: the type of activity implemented in the control group (no activity, traditional classroom teaching, computer-based learning, other game, etc.), the outcome measures that are used to assess effectiveness (perceived learning, time on task, test scores, student achievement, etc.), and different statistical techniques that are used to quantify learning outcomes (percentage of improvement, between group comparison with repeated measures, post-test scores comparison, etc.).

Results of the content analysis also revealed certain suboptimal study designs which are related to confounding elements. Three main issues can be distinguished. Firstly, the addition of elements to the game, such as required reading, extra exercises, or debriefing sessions, makes it impossible to isolate the effect of the game. Secondly, the type of instructor present during the

intervention (familiar vs. unfamiliar person) and the role the instructor has during the intervention differs across studies. Instructors are either present to 1) only supervise, 2) offer technology oriented support when respondents encounter issues concerning the technology or actual game play (i.e., procedural help), or 3) offer content-related help, by providing contextualization of game play and in game elements in the broader learning context during actual game play (i.e., guidance) (All et al., 2014). Thirdly, implementation of the same test pre- and post-intervention on the same day, could lead to practice effects and pre-test sensitization. This would, again, result in an overestimation of the instructional effect. In 1992, Randel mentioned similar issues with regards to the reliability and validity of certain effectiveness studies on instructional games. Twelve years later, the same issues are still detected in DGBL effectiveness research.

5. Learners' experiences of digital game-based language learning:

In addition to the focus on learning gains, another focus of research has been on the subjective experience of playing games and its effect on learners' affective barriers or negative psychological variables, including low motivation, negative attitudes, high anxiety, and low self-confidence, which may interfere with the language acquisition process. According to Krashen (1981), learners with low affective filters (i.e., when they have high motivation, positive attitude, high self-confidence, and low anxiety) are likely to concentrate on language learning, use the L2, accomplish a task, receive comprehensible input, and acquire another language. Encouraging a low affective filter has been identified as one of the positive qualities of gaming. Computer games appear to come with certain environments, characteristics and design features that provide a low stress atmosphere, helping learners feel relaxed, confident, and motivated to use the L2. This can facilitate lowering of the affective barriers and subsequently promote more opportunities for learners to become willing to communicate and thus use more L2. MMORPGs, in particular, have been shown to have a number of key design features and characteristics that may lower anxiety while increasing confidence and motivation (Rama et al., 2012). Anyaegbu, Ting, and Li (2012) investigated the effect of playing the educational game 'Mingoville' on the motivation of young Chinese learners of English as a foreign language (EFL). The qualitative findings, investigated with 229 students through observation, field notes, interview and literature review, indicated that the majority of their students felt motivated to learn English with Mingoville because the game was fun for them and made them feel relaxed, offered them opportunities to become autonomous, avoid losing face, encouraged collaboration, gave them frequent rewards and encouragement, fostered their problem-solving skills, and created a good learning environment that allowed learners to increase their interest, broaden their exposure to English, participate actively, and receive multiple forms of language support. However, some students did not like games in general, and for them the experience had been demotivating. This supports view that employing games for motivational purposes alone is not a sufficient justification because games may not be motivating for all students, particularly students in Higher Education. Therefore, digital games should only be used if they can provide additional benefits. Also, additional support is needed before games are employed. Recent studies focused specifically on learner interaction and attitudes in MMORPGs. In his qualitative study (Peterson, 2012) of the use of the MMORPG 'NineRift,' six Japanese EFL university students participated in two gaming sessions, lasting approximately 90 minutes each, which were held one week apart. Peterson obtained data from learners' chat messages exchanged during gameplay, researcher observations, filed notes, learner responses to pre- and post-study questionnaires, and interviews. The findings indicated that learners actively participated in the game, utilized different types of strategy to manage their interaction, undertook collaborative dialogues exclusively in the L2, and had positive attitudes, claiming that interaction in MMORPGs was engaging, motivating, and enjoyable, and improved their fluency and discourse management practice. In a later study, investigated the linguistic and social interaction and attitudes of four intermediate Japanese EFL university students in the MMORPG 'Wonderland'. Participants were engaged in four sessions, lasting approximately 70 minutes each and held once a week over a period of one month. Similar to the findings from the earlier study, participants used a range of strategies, and conducted their interaction exclusively in the target language. Moreover, participants provided largely positive feedback, claiming that interaction in MMORPGs, in combination with the anonymity provided by the use of pseudonyms and avatars, helped to reduce anxiety levels and encouraged opportunities for taking risks in using the target language, and, thus, creative and extensive use of the language. This feedback thus mirrored findings reported in the literature on learner interaction in MMORPGs (Peterson, 2011).

6. Computer Game and Game-based learning:

A game is "a physical or mental contest that has specific rules, with the aim to amuse or reward the gamers" (Zyda, 2005). Hays (2005) provides the following definition of a game or computer game: "A game is an artificially constructed, competitive activity with a specific goal, a set of rules and constraints that is located in a specific context." A game does not represent reality. It is a constructed activity that resembles portions of reality. Games are interactive, which promotes particular behaviors like individual control, trial- and-error and constant change. Games provide situated experiences in which players are immersed in complex problem-solving tasks (Squire et al., 2005). Another category of games that captures researchers' interest is the instructional game. Hays (2005) defined instructional games as games that have been specifically designed or modified to meet learning objectives.

Sometimes, researchers call an instructional game as "serious game." The purpose of a serious game is to assist organizations in education or learning. Serious games meet their objectives by including rules, constraints and activities that closely replicate the constraints of the real-world tasks that are being trained. Hays (2007) classifies serious games by the type of task to be trained: skills and procedures learning games, action games, role-playing games and strategy games. Game-Based Learning (GBL) refers use of computer games that possess educational value or different kind of software applications that use games; for learning and education purposes. Although there is widespread of games utilization in training and learning, there is still a lack of empirical studies that assesses their effectiveness for learning and training. Conrad (2010) highlight that there is insufficient research that look into the effectiveness of games in learning. Most of the claims on the effectiveness are based on the teacher's judgment, and anecdotal and personal encounters.

Although many researchers proved that using games increases motivation and interest, however, there is still missing evidence on the effectiveness of games as learning tools. who suggests that there is a need to create an evaluation framework for evaluating serious games that are used for learning purposes? Although many researchers try to evaluate game effectiveness, many failed to identify or include control groups that would allow comparison of the results between groups (Hays, 2005). Further, in a paper written by Hainey, Connolly & Boyle (2009) the authors claim that the existing GBL framework is lacking in pedagogy aspects. This is supported by Mazeyanti (2013) who found that there were 16 evaluation frameworks on games which none concentrates on learner background particularly on culture, ethnicity and language spoken by the learners. Knowing the target audience's background is essential before an instructor could consider using a game in class. Hong & Liu (2003) has found that the effect of learner's background and game design influence the overall learner performance. They mentioned that information about the learners' background helps to refine the game design in such that it can provide more effective learning experiences. This includes cultural factors such as the learners' linguistic background, the approach to learning and the communication style that play a pivotal role in learners' readiness and willingness to engage in learning . Further, the learner background parameters include gender, indigenous status, socio-economic background, language and geographic location.

6.1 Pedagogical approaches to ICT education:

Computing is interwoven in almost all facets of managing and running a business. Furthermore, it is expected that technological applications will get more efficient and advanced over time, requiring more skilled and collaborative workforce. A study investigating critical information systems/information technology (IS/IT) skills from the perspectives of seventy managers shows that web applications, online services, networking protocols, wireless communications and wireless applications are the skills of the future (Lee & Mirchandani, 2010). Moreover, growing use of technology in our daily lives has added to the myriad of technology courses offered by education providers to prepare upcoming students. ICT education as such provides "an effective link between purpose, people and pedagogy inside the institutions". Students enrol in ICT courses to learn new technologies and to comprehend the bigger picture of how IT solutions are being developed for businesses. However, these students face many challenges in grasping conceptual understanding and logical reasoning of how classroom topics in hardware, programming, databases or networks are related with real world applications. "Students could not transfer knowledge gained from either lectures or theoretical exercises to practical exercises. Without having direct hardware interaction, students learning becomes abstract, which leads to their displeasure and to the main question: Why

we are learning this, and how and where shall I use it?" (Stolikj, Ristov & Ackovska, 2011, p. 340). Students' acceptance of technology has been shown to be a critical factor in understanding by Stantchev et al. (2014). To help students relate course contents to real world examples, a blended learning approach has been used. This approach consists of a mix of teaching deliveries, namely (1) Classroom: traditional teaching, (2) Website: web based self-paced learning, (3) Actual lab: real experiments, and (4) Virtual lab: visualization/animation techniques.

Studies in ICT education suggest that students find it challenging to apply taught concepts to a problem when there is no single, simple or well-known solution. "Students can also display an inability to translate classroom examples to other domains with analogous scenarios, betraying a lack of analytical problem-solving skills. For the students, these problems can lead to confusion, a lack of self-confidence and a lack of motivation to continue" (Connolly & Stansfield, 2006, p. 462). To overcome these challenges, it is suggested that classroom teaching be scaffolded with interactive computer games to simulate problem-based scenarios, since games provide more opportunities for collaboration and reflection, which in turn will lead to increased motivation (Connolly, Stansfield, & McLellan, 2006). evaluated the learning effectiveness and motivational appeal of a computer game targeted at the learning of computer memory concepts for high school students. Results showed the gaming approach to be very effective in gaining students' understanding of computer memory concepts. Papastergiou concludes not only the learning effectiveness, but also provides solution to the students "feeling bored." One participant in Papastergiou's study responded: "It's more enjoyable and active. You never get bored as in traditional teaching because you concentrate on a goal." used an educational game IFM (Internal Force Master) in a mechanical engineering study programme. Their findings demonstrated high levels of user empowerment and fun elements for students who played IFM. The feedback in the Ebner and Holzinger study showed students' readiness to play the game a second time in the event of a failure. However, the study did not find noticeable difference in students' results between those students whose learning involved IFM game play, and those students who had learned in a traditional classroom environment.

III. Conclusion:

Education has another role but to teach fundamental knowledge and that is to prepare students for their life ahead. Much too much emphasis is placed on factual education and not enough on teaching students how to get along with each other as members of society and how to interact with others through cooperation and compromise by cultivating friendships and the feeling of belonging to a peer group. Students feel the need to engage in a recreational activity which will provide them with the much-needed break from their mundane routines. Moreover, due to the rapid development of technology and digitalization of everyday life, students' new needs and requirements for more interactive and engaging learning experiences have arisen. As education should not simply stick to traditional forms but should be reformed and utilize contemporary techniques, methods and technologies so as to satisfy and fulfill these new needs and requirements and reinforce students' learning procedure.

Digital game-based learning approach and serious games in general can be utilized as an educational tool which can boost students' wellbeing and self-esteem, help them improve their soft skills, develop their critical thinking, decision-making and problem-solving skills, as well as maintain a healthy mental and psychological balance. With that view, we presented and analyzed the concept of serious games in education and described the characteristics and features of educational games. We also pointed out the significance of students' motivation and engagement. Finally, we analyzed the digital game-based learning approach and presented some of its benefits. In conclusion, when applied in education properly and in a student-centered way, digital game-based learning approach and serious games can be considered as an effective educational tool that can facilitate and enhance students' learning procedure, as a means through which interaction, cooperation and communication can be promoted and improved and as an educational process which can instill interest in educational issues, promote learning motivation and engagement, as well as induce eager and active participation in lessons.

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