

## *Knowledge Development through Constructionism Game-Based Learning Application*

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*Abstract: At present time, the educators focus more on the use of technology in education such as e-games and e-learning. This paper introduces the research on the development of knowledge through constructionism learning theory by using e-games. It is foreseen to change traditional learning method into one that is ICT centered. The e-games were developed by Game Maker application and incorporated one of the learning theories that is constructionism learning theory. The parameter that is being tested is the level of knowledge in students. Gavin (2008) defines evaluation as: “Research involving systematic appraisal of organisations, processes or programmes leading to feedback on improvement or performance.” A new evaluation framework will be presented based on the compilation of all the particular areas and analytical measurements found in the literature.*

*Keywords: ICT Centered, as e-games and e-learning. evaluation, framework, feedback on improvement.*

### I. INTRODUCTION

What is good learning? That may be a subjective question. But it's likely that many educators would give answers that fall in the same ballpark...

- 1)...students collaborating and discussing ideas, possible solutions...
- 2)...project-based learning, designed around real world contexts...
- 3)...connecting with other students around the world, on topics of study...
- 4)...immersing students in a learning experience that allows them to grapple with a problem, gaining higher-order thinking skills from pursuing the solution...

The problem with traditional learning is that the students learn “what” and not “how”, the students and the teachers are busy completing the required subject matter quota [6]. Besides that, the student's motivation is low. By using computer mediated learning framework, students expressed higher satisfaction. At present, today's education courses mostly involve the role of ICT's approach. Along with the technological development, the education field was also affected. Computer games are more profitable and popular than ever before and are recognized as one of the significant cultural medium. One of the primary concerns associated with the GBL literature is the dearth of empirical evidence supporting the validity of the approach (Connolly, Stansfield, & Hailey, 2007a; de Freitas, 2006). O'Neil et al (2005) believe that an essential element missing is the ability to properly evaluate games for education and training purposes. If games are not properly evaluated and concrete empirical evidence is not obtained in individual learning scenarios that can produce generalizable results, then the potential of games in learning can always be dismissed as unsubstantiated optimism. Of course, changing instructional approaches is no easy task, particularly when technology is involved. Adopting and integrating technology-based instructional strategies has a

long history of challenges, but with it has come a great understanding of how to achieve success with them. In the contents to follow, we will discuss:

- The background and affordances of Simulations, Digital Games, and Social Networking;
- The cognitive implications of these technologies;
- Specific challenges with using these tools in the classroom, as well as strategies for overcoming these challenges in order to achieve successful learning experiences; and
- The future of these technologies and their impact and learning and teaching.

## II. EVOLUTION NOT REVOLUTION

Technology can have a reciprocal relationship with teaching. The emergence of new technologies pushes educators to understanding and leveraging these technologies for classroom use; at the same time, the on-the-ground implementation of these technologies in the classroom can (and does) directly impact how these technologies continue to take shape.

### A. What are E-Games?



Education can be taught in many ways. In addition, educators strive to find different methods of teaching students and improving their attention. As part of this plan, education through playing games also taking part. As a learning tool, E-games strategies have been shown to be more effective than traditional methods [2]. Students are more willing to learn when the learning is engaging and game-like.

Educational elements that have been applied in video or computer games can provide more enjoyable learning outcomes. [4] Defines electronic games (e-games) for education as an application that use video and computer to create an interesting learning experience. [1] which makes <e-Adventure> as their case study also supports that game-based learning can promote the learning process in many aspects. Based on [8], e-games are not only used merely for entertainment but can also be used for education and training, rehabilitation, development strategies, public policy development, simulation and wars. This emphasizes the use of e-games as not only for entertainment but also an education platform. Knowledge development can occur whilst playing e-games.

### B. New Technologies...New Learning

Why digital gaming, simulations, and social networking? Simply put, these technologies afford us the ability to convey concepts in new ways that would otherwise not be possible, efficient, or effective, with other instructional methods. In other words, these technologies don't just help us teach the old stuff in new ways – they can also help us teach new stuff in new ways. Below we provide a brief description of these technologies; popular educational and non-educational examples of each, and what researchers and practitioners are finding about their potential and impact on teaching and learning.

### C. Digital Gaming

Digital games encompass much more than your computer's Solitaire or Nintendo's Super Mario Bros. Over the last decade, the genre of digital games has exploded to include numerous platforms and designs. Digital games, whether computer-, game console-, or handheld-based, are characterized by rules, goals & objectives, outcomes & feedback, conflict/competition/challenge/opposition, interaction, and representation of story (Prenkysy, 2001) or more simply, "Purposeful, goal-oriented, rule-based activity that the players perceive as fun" (Klopfer, 2008). They are distinguished by two key elements: (1)

an interactive virtual playing environment, and (2) the struggle of the player against some kind of opposition. Gaming is already a widespread activity in our culture —more than 45 million homes have video-game consoles (Feller, 2006). Over 154 million Americans play video games (that’s about half of the country’s population) (Emrich, 2005). In a given week, the average eighth-grade boy will play video games for about 23 hours, while the average girl will play about 12—that’s even more time than they spend watching TV (Dawley, 2006). Therefore, one of the most obvious benefits to using these technologies for learning is that students are often already familiar with these interfaces and the “language” of interacting with and utilizing them. Both inside and outside the classroom, some strong examples of powerfully engaging gaming models have emerged. Some have been used quite a bit in the educational setting, while others have mainly garnered popularity in pop culture.

#### D. Simulations

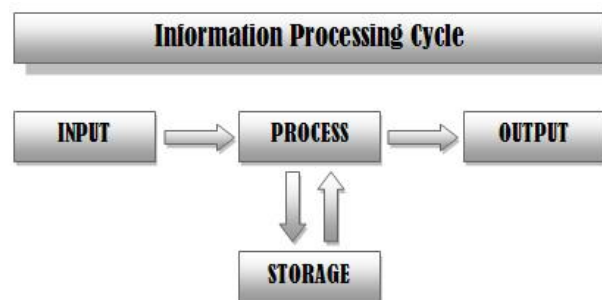
Although analogous to digital games and often included in the gaming spectrum, simulations are “analog[ies] of a real world situation[s]” as they recreate a modeled or modified version of a real world situation. One essential aspect that separates digital games from simulations is the lack of game dynamics or the “win state” that exists in digital games.

### III. THE OTHER SIDE OF EVOLUTION

Throughout the past few decades, the emergence of new technologies has been paralleled by the evolution of theories on cognition and learning. Where learning and the mind were once viewed as “filling of the bucket,” the “social mind” is now a much more prevalent model. Of course, educators have long been aware that learning is a social activity, where learners construct their understanding not just through interaction with the material, but also through collaboratively constructing new knowledge with their peers.

#### A. CONDUCTING FUN GAMES WITH BLENDING TECHNOLOGY

As a aspect to incorporate technology by games we organized “FOOD WITHOUT FIRE” for the students where the rules included to give the flow of process like as SDLC method.(processing a product).



Researchers such as Patricia Marks Greenfield also argue that habitual playing of video games results in the development of new cognitive abilities that translate into the key skills for our transformed world

- The ability to process information very quickly.
- The ability to determine what is and is not of relevance to them.
- The ability to process information in parallel, at the same time and from a range of different sources.
- Familiarity with exploring information in a non-linear fashion.
- A tendency to access information in the first instance through imagery and then use text to clarify, expand, and explore.
- Familiarity with non-geographically bounded networks of communication.
- A relaxed approach to ‘play,’—the capacity to experiment with one’s surroundings as a form of problem solving.



The feedback and responses from the students showed the following qualities:

- 1) Organizational & Teamwork Skills
- 2) Creativity, Self-Confidence & Self-Esteem
- 3) Student Engagement
- 4) Collaboration between technologies with other aspects.
- 5) Creative Exploration
- 6) Tangible Learning Outcomes.

#### *B. LEARNING THEORY = TEACHING PRACTISE*

Our innate beliefs about things like how we think people learn are often unstated, but serve as the “operating system” upon which we base our instructional decisions in the classroom. These technologies align strongly with the constructivist and social constructivist theories of learning, and therefore will also fit well into classrooms where these theories of learning are embraced. As new technologies push instruction in the classroom in new ways, so to does our ability as professional educators push the evolution of educational technologies. With the recent tide of Web 2.0 technologies (web services which center around user-provided content, like flickr, YouTube, or Facebook), one can only speculate where things go from here.

### IV. CONCLUSION

#### A. MOVING FORWARD

##### *“What aren’t these technologies used more in education?”*

If you are – or have ever been – a classroom teacher, you probably already understand much of the answer to that question. As Ed Tech pioneers have begun test-bedding these technologies in the classroom, we’ve learned a lot about the issues educators are likely to face in implementing these innovations.

#### B. OVERCOMING BARRIERS TO INNOVATION

Groff and Mouza (2008) discuss six central factors, each with its own critical variables, that interact with one another to produce barriers to implementing technological innovations in the classroom: (a) Research & Policy factors, (b) District/School factors, (c) factors associated with the Teacher, (d) factors associated with the Technology- Enhanced Project, (e) factors associated with the Students, and (f) factors inherent to Technology itself.

##### **THE INNOVATOR (Teacher): your beliefs, methods, experiences, etc.**

- How Technologically Proficient are you? Are you familiar with the technologies in this project?
- What are your beliefs about a Tech-Integrated Pedagogy? Researchers have established a good pedagogical mindset that often accompanies good technology-based instruction, where the learning is constructivist and student-centered...how close is your teaching style to this?

- What is your Knowledge of Resources? Do you know what outside resources (other people, websites, books, etc.) that are available to guide you in your work? to contact if you get stuck?

#### **THE INNOVATION (Project or Tool): the technology, as well as the project design for it**

- How distant from the School/college Culture is the project or innovation? Does the tool support the curricular and pedagogical goals of the school?
- How distant from School/college Resources is the project or tool? Can the technology and other resources in your school support this tomorrow, or do you need upgrades/modifications/additions?
- How distant is the innovation from your Current Practice? Will using this instructional tool be similar to your current methods of teaching? Have you done something similar in the past to draw from?

#### **THE NOW AND FUTURE**

"One of the powerful ideas undergirding games is the fact that games work as rule-based learning systems, creating worlds in which players actively participate, use strategic thinking to make choices, solve complex problems, seek content knowledge, receive constant feedback, and consider the point of view of others. As is the case with many of the games played by young people today, to enable students to "take on" the identities and behaviors of explorers, mathematicians, historians, writers, and evolutionary biologists as they work through a dynamic, challenge-based curriculum with content-rich questing to learn at its core. It's important to note that it is not a school/college where whose curriculum is made up of the play of commercial videogames, but rather a school that uses the underlying design principles of games to create highly immersive, game-like learning experiences. Games and other forms of digital media serve another useful purpose: they serve to exemplify the complexity and promise of "systems." Understanding and accounting for this complexity is a fundamental literacy of the 21st century."

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