Game-Based Learning:

Motivation, Engagement and Assessment

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**Abstract**

 Game-based learning or what is sometimes referred to as serious games has become a hot topic in the field of education. It is discussed on many levels, from being the “savior” of education by rescuing students from the boredom of the tradition classroom, to being “Satan” and leading students down a road of perpetual play with no gain in valuable knowledge. Somewhere along the way we need to find a happy medium. Before tackling the knowledge value serious games may bring to a learning environment, there are other issues that need to be explored when evaluating the usefulness of this kind of learning in the classroom. These issues include: motivation, engagement and assessment. The questions this literature review will address are: How does game-base learning motivate students? How can game-based learning meaningfully engage students? And can game-base learning be an effective method for informal and formal assessment of learning outcomes in the classroom? This review is divided into three separate areas to address each of theses topics. However, motivation and engagement are so closely tied that research from one blends into the other. The literature and research does point to a positive relationship between each of these areas and serious gaming, but as usually more research is necessary.

**Introduction**

 We have been playing and learning from games since the beginning of time. Games have a way of engaging us in play through collaborations or challenges. We are motivated to keep playing so as to beat the game or another player, but do we learn when we play games and can this type of learning transcend into the classroom environment? The bigger question might be, should it? Should games be left outside on the playground, while leaving the “serious” learning for inside the classroom?

 Many educators think that games are not a rigorous method to use for teaching and testing students. Educators do not see the value of using games to teach content. They ask questions like, “Will students really be motivated and engaged to learn in a gaming environment?” And “Can students be effectively assessed on content in a gaming environment?” This review attempts to scan the literature to discover what the research shows and what the theorist have to say about these questions as they relate to motivation, engagement and assessment surrounding game-based learning in the classroom.

**Motivation**

 In James Gee’s book, *Good Video Games and Good Learning*, he describes a new field emerging around the principles of video games. This field of game-based learning attempts to motivate players into producing deeper and more fruitful learning (p. 132). Gaming environments may create superior opportunities to learn, especially for those players who are accustom to the video game setting. The game puts the player in control and encourages active participation, exploration, reflection and the construction of meaning (Galarneau, 2005). This type of activity not only engages students, but also gives them a sense of agency, which in turn motivates them to achieve higher levels of learning. Gee states the gaming experience should be both frustrating and life enhancing (Gee, 2007). A player is more motivated to continue the game when they are playing in between the space above boring and under frustration. This space is referred to in Vygotsky’s theory of the zone proximal development.

 The zone of proximal development (ZPD) is that area of learning where a learner can problem solve independently to a point, but needs some guidance or collaboration from others to make it to the next level (Vygotsky, 1978). There are many points in video games where the player is motivated to achieve a higher level in the game, because they are in the “zone” of proximal development. The most common example of this occurs right before a player is about to achieve the next level. The player maybe having some difficulty leveling up, so they turn to the helps in the game or they refer to online tutorials. Through these means, the player is motivated to keep on going until the level is achieved. Then if the game is good there is a “hook” at the entrance of the new level to motive the player to stay engaged in the play.

 When developing the “zone” in game-based learning there are several principles developed by Marc Prensky (2004) that apply: 1) Provide enough content so players will not become bored, 2) Design the game for players, not students, 3) Design the game so players want to complete their objectives and keep playing, 4) Assist the players in perceiving their knowledge has grown, because of their time investment in the game, 5) Help the players increase their chance of winning by the experience and knowledge gained through game play.

 Game-based learning can be exploited as an effective learning environment. Games can considerably improve both knowledge of the embedded subject matter and student enjoyment while engaging and motivating the student in the learning process. Even though well-designed games actually make the player (aka learner) feel enthusiastic and improves learner’s outcome, the game’s effectiveness may vary depending on the learning objectives, the learning environment, and the age of the learners (Papastergiou, 2009). Educators must be careful when selecting games to use in learning environments. They need to make sure learning objectives and the gaming environments are appropriate for the target student audience. If the game is too simple, then the students will think it to be a waste of time. On the other hand, if the game is too complicated students will feel overwhelmed, become frustrated and stop playing.

**Engagement**

 People play games because the process of game playing is engaging. Engaging in this context means the player’s attention is held or they are excited and want to continue on with the activity. The top two reasons people engage with interactive games, according to the Interactive Games Association, is because they are being challenged and relaxing at the same time (Prensky, 2002). When a player becomes so engaged in a game that time becomes irrelevant, they achieve a state of activity referred to as “flow”. Flow describes a state of complete absorption or engagement in an activity and refers to the optimal experience. The Flow Theory has eight components: 1) a challenge with attainable goals and known rules, 2) complete absorbing activities, 3) clear goals, 4) immediate feedback, 5) concentration on task, 6) a sense of control, 7) loss of self-consciousness and 8) transformation of time (Csikszentmihalyi, 1991). Gaming can create this flow type experience for players. By highlighting the importance of clear and achievable goals or acknowledging the significance of appropriate and logical feedback educators can take game-based learning into the educational arena (Whitton, 2011). So now game-based learning can achieve a level of flow and engage players into becoming knowledge learners.

 In making the transition to education we must ask, “Why are video games so engaging?” The reason is the primary objective of the game designer is to keep the players engaged. They need to keep players coming back for more and keep paying. Game designers are involved in what is known as “gameplay”. Gameplay are all of the activities and strategies game designers employ to get and keep the player engaged and motivated to complete each level of an entire game. Gameplay is all the doing, thinking and decision-makingthat make a game either fun, or not. (Prensky, 2002).

 The major problem in making the transfer from entertainment games to game-based learning is educators don’t see student motivation or engagement as their primary goal. Teachers have a captive audience and students have to keep coming back in order to graduate or achieve their learning goals. In fact, there are studies showing that teachers are reluctant to engage students with games in the classroom (Egenfeldt-Nielsen, 2006). Theses teachers feel the job of the educator is to deliver content and assess the learner, not to keep them coming back for more. Many educators teach how they were taught, so it is hard for them to make the paradigm shift from serious learning to engaging learning through game-based learning.

**Assessment**

 There have been many studies conducted on engagement and motivation for games and game-based learning, however the research is limited when it comes to standardized testing methods that demonstrate learning outcomes in these environments. In the studies that have been conducted the results are mixed. Some studies show no significant gains of game-based learning with standard testing measures (Sward, Richardson, Kendrick & Maloney, 2008; Young, et al, 2012), while other studies show significant improvements in learning outcomes through the use of game-based learning (Barab, et al, 2008; Ke, 2008).

 In a study conducted in an online environment about contagious disease, researchers found that the multimodal approaches to assessment being developed within the ‘new literacies’ paradigm hold more promise for identifying game-based learning outcomes than traditional classroom tests (Jenson, 2012). It bears noting that students in the control group did slightly better on the pre and post standardized testing, however more impressive projects showing learning outcomes were created by the experimental group. This might point to the use of multimodal, production-oriented work being used as a more effective learning outcome assessment than that of standardized testing.

 More studies need to be focused in the area of assessing learning outcomes based on game-based learning or serious games. Many studies have been conducted on engagement and motivation of game-based learning and this is important work, however it is imperative to be able to assess learning outcomes when students are using serious games to learn content. As educators we need to prove that games do belong in the learning environment. Motivation and engage are but two steps to bring students to the content table and keeping them hungry, but demonstration of learning is proof that they have eaten, are satisfied with the meal and can go cook for others.

**Conclusion**

 All three of these areas: motivation, engagement and assessment hold the key to making our 21st Century students more successful learners. As educators, we need to create life long learners by showing our students that learning can be “fun”. One way of doing this is with the use of game-based learning or serious games.

 The research demonstrates that games are engaging and motivating for players, but do these games actually point to an improved way of learning content? This goes back to the critical assessment piece discussed in the last section. James Gee asks some important questions that could help in changing the paradigm around game-based learning and assessment. The first question is, “Can game-based learning lead us to new and better models of assessment?” and the second is, “What are the impacts of game-based learning on our global society?” (p. 134)

 More research needs to be conducted in this area of study to be able to draw real conclusions around the influence of motivation, engagement and assessment practices of game-based learning for true educational applications.

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