Game-based learning: revisiting the debate

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<u>Abstract</u>

Game-based learning in its various forms has been around for a long time, but with the developments in digital technology it has emerged to the forefront of educational debates. Whilst the proponents of game-based learning suggest that games can be a useful vehicle for learning tasks and educational information, 'sweetening' the learning that the young people of today are arguably averse to, many critics have questioned these assumptions. Since the publication of Prensky's (2001) seminal essay on digital natives and digital immigrants, we have seen a significant increase in scholarship, research and technologies relevant to digital game-based learning. Now that commercial games have become a billion dollar entertainment industry rivalling that of television or the movie industry new ideas about how they can be incorporated into learning are being formed. This essay, written by the then first year student in 2011, revisits the debates about game-based learning and engages with some of the arguments within the relevant literature.

Many advocate the development of game-based learning, not only for the children and younger students but also for the older workforce of today. But why? With a well-established education system which has arguably worked well for generations, and in fact produced the teachers and trainers of today, why must a new system be put in place for today's learners? According to Prensky (2001), the current system is 'breaking down' since the learners of today 'have changed in some fundamentally important way". He argues that today's learners cannot be adequately engaged by the traditional methods of teaching, not because it is too hard but because it is boring. These learners, whose preferences and abilities have been shaped digital technologies and most notably video games, can no longer be simply 'told' the information they need to learn. Instead "it must be learned by them, through questions, discovery, construction, interaction and, above all, fun" (Prensky 2001, p 17) .

One of the main issues, then, is finding new ways to gain the attention of learners and engage them in the learning process. As early as 2001, Prensky claimed that the huge wall which had separated learning from fun was already 'beginning to tremble'. Perhaps, then, game-based learning is the way to knock that wall down, and perfectly marry education with fun. Whilst advocating game-based learning, Kiili more cautiously suggests that "the use of technology alone does not motivate students that have lived in the midst of technology their whole lives" (Kiili 2005, p14). In order to become effective, game-based learning requires games that are well designed and have well implemented learning tasks. A well-designed educational game could combine the fun, finished product of a commercial game with the learning qualities of the educational system.

But isn't learning in itself fun? Andy Russell argues that it is a misconception that 'learning by itself isn't fun' and must be necessarily sugar-coated with game mechanics and rewards. She insists that she hasn't met a young child who isn't 'naturally curious', that children are excited to learn. Russell puts forth the notion that it is the actual information that makes too many 10-year-olds cringe, rather than the way that it is taught. While educational games and interactive quizzes may well make the process more exciting,   game-based learning methods tend to add extrinsic motivation when kids are already intrinsically motivated to learn. The problem is that much of the present education is answering questions that kids are not asking. instead of giving them tools to experiment, build on, and share their own ideas. So, in Russell's view, the proponents of game-based learning fail to get to the root of the problem.

That's not to say that games could not be effective learning tools. Hogle (1996) considers using games as cognitive tools in order to motivate and interest learners. He explains that learners become 'better, more independent thinkers' when using cognitive tools inasmuch as cognitive tools promote and cultivate higher order thinking skills. But whilst cognitive tools allow students to achieve goals that they are already motivated to learn, games are well noted to rouse student interest and motivation and could be used as cognitive 'toys'. These would reduce the need for laborious activity in order to reach goals that students are not motivated to reach. Hogle even suggests that toys, rather than tools, can challenge learners to use skills they would not otherwise be inclined to use, although he admits that games, like any other activity, require an interesting context to prevent students from losing interest and motivation. If this is the case then why not make more traditional learning environments have interesting contexts and fantasy in order to encourage learning? Even Prensky (2001) admits that digital game-based learning isn't the only way to change learning, only that it's one of the first 'effective and doable' means to alter the learning process in a way that appeals to this new generation of learners.

But in what way is game-based learning, digital or otherwise, effective in learning? The most promising features are their interactivity, user-centred design and ability for immediate feedback, all of which can potentially contribute to a high quality learning environment. But the implementation of these features is still problematic and subject to much experimentation and research. As a result most attention is placed on the motivation of players and their engagement whilst playing games. Paras and Bizzocchi (2005) suggest that motivation 'has long been considered as an important step in learning', and that motivation is to provide a learner with an incentive to engage in the act of gaining knowledge. Because games foster 'play' and produce a state of flow, which in its turn increases motivation, it is logical to assume that this should support the learning process. But then why is it that game-based learning has so far remained on the margins educational process (at least for adult learners)? It would seem that games might not be as perfect for learning as some believe. The authors raise the point that in the midst of the unbroken fun and challenge that games provide learners rarely reflect on the learning that is taking place: "though someone may be pushing their skills to the limit they may not be reflecting on the experience and are therefore limiting what they can learn from it" (Paras and Bizzocchi 2005, p6).

This is an issue even Prensky (2001) notes. Upon recounting his work on the educational game 'The Monkey Wrench Conspiracy' he explains that originally the game was 'fire and ice'; the game was fun, fast and engaging (fire) whilst the learning tasks were boring (ice). The solution, he continues, was 'urgency', in other words the player had to be made to want to complete the task quickly. But this is precisely what Paras and Bizzocchi (2005) are concerned about, the learner focusing solely on the responsibility of reaching the specific goals without reflecting on the strategies used to reach these goals.

Beside the motivational advantages, games can also provide a meaningful environment for problem-based learning. Holyoak (1991) states that the ability to solve problems is one of the most important human skills, and a staple part of the educational process. Games themselves can be conceptualised as one large problem composed of small casually linked problems, but as Kiili (2005) explains, problems can be classified into well-structured or ill-structured problems. Whilst well-structured problems have definitive answers ill-structured problems do not. These problems have unclear goals, much like those problems found in real life, and require learners to use different problem solving strategies depending on the priorities underlying the situation. Games, in theory, could be used to create worlds and learning environments that promote these kinds of problems, and create learning environments that "allow students to discover new rules and ideas rather than memorizing the material that other have presented" (Kiili 2005, p 17). This idea of creating a learning environment that encourages experimentation and learning by 'doing' seems to be a running thread within the literature, from Prensky (2001) to Russell (2011).

Yet this notion of experimentation and open-ended learning process seems to contradict some of the key ideas and advice about instructional design, outlined in Hogle's (1996) and elsewhere, suggesting that clear goals are key part in learner motivation, and therefore the instructional objectives of an educational game must be clear and well specified. This creates a problem: how can a game have a clear goal for the player, and at the same time implement ill-structured problems and encourage curiosity? Creating a game with multiple endings or an uncertain outcome is one of the ways, according to Ebner and Hozinger (2007), who state that challenge is a necessary component for the flow state, and for any activity to be challenging it needs to have a goal with an uncertain outcome.

All of this research and discussion suggests that game-based learning will have some part in

education in the future. It seems that the question is not so much 'can games be used to support learning?', but how exactly games should be integrated into broader educational process, to work most effectively (Squire 2006). The scope of this essay is too limited to discuss this in detail, but Van Eck (2006) usefully outlines three approaches for integrating games into the learning process. The first approach is based on learners building and creating their own games; the second focuses on teachers, trainers or developers building educational games from scratch; and the third one is to integrate commercial off-the-shelf games into the classroom.

Whilst most of the ideas presented in this essay have focused on playing in order to learn, Van Eck (2006) includes the actual creation of games as another aspect of game-based learning. He explains that 'students develop problem solving skills while they learn programming languages' although he admits that this kind of game-based learning has traditionally been limited to those studying the subject of computer sciences. However, learners can   develop problem-solving skills within other aspects of game creation, which do not involve programming (for example non-digital gameplay, game art or storytelling aspects). The only concern would be that 'not all teachers have the skill sets needed for game design' (Van Eck 2006). And so, perhaps for now, this approach can't be used universally.

In terms of mass production of educational games, that would seamlessly integrate learning and game play, and be available to purchase, there are significant cost barriers. Ideally, these games must be comparable in quality and functionality to commercial games, to achieve the attention of a generation raise in the midst of technology (Russell 2011). The need to compete for attention with mainstream games makes this branch of game-based learning extremely resource intensive. The additional problem is that it requires double expertise, in both game design and educational design in order to truly reach its potential. As a result the creation of such games is a tricky and uncertain business, and Shavian reversals (in which neither the game play or the learning is effective or entertaining) litter its history. Because of this, Van Eck (2006) concludes that the widespread development of these games isn't likely to be seen 'until we demonstrate that [digital game-based learning] is more than just a fad'.

To conclude, I think game-based learning has a long way to go.   Whilst I appreciate that the learners of today are different to the learners of yesterday and that the educational system that

taught the teachers and trainers of the world is no longer as effective as it used to be I don't agree that game-based learning is the solution to all of these problems. I am more convinced by Russell's notion of the natural curiosity that children have and I share the concern that game-based learning may be an attempt "to replace teachers and parents with software rather than giving them complementary tools" (Russell 2011, np). However, I also feel that if approached in the right way, game-based learning could be successfully implemented into today's educational system. Van Eck (2006) among others has already demonstrated that commercial off-the-shelf games can teach the problem-solving skills that are so necessary for human development, and the learner-created branch of game-based learning would foster creative learning environment and encourage experimentation and curiosity. Having said that, it does not seem that enough research and funding has been put into creating high-quality educational games for this to be anything more than an idealistic view of what game-based learning could be. Finally, any issues within the educational system that game-based learning has been expected to combat, seem to be caused by wider social and economic processes, including a gradual demise of the previous educational system. Perhaps more consideration should be given to creating a variety of different solutions instead of relying solely on game-based learning and what it may or may not be able to accomplish.

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