

Gaming the Schools: Lessons Learned

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Abstract: This paper presents four guidelines on the use of play and game based approaches in a formal educational setting. These guidelines address issues related to the potential as well as the limitation of educational games, the required competencies of teachers and trainers for using educational games in the classroom, as well as the limitations and requirements of educational game design as well as business development. They represent the results of a sequence of research and development projects performed over a period of six years.

Introduction

Even though first mentions of the importance of games in human and cultural development date back to Schiller's sequence of letters on the aesthetic education of man in the late 18th and early 19th century (Schiller, 2004) and the first applications of game based learning can already be found in the work of Maria Montessori in the early 20th century (Montessori, 1966), we are just now starting to understand the true potential as well as the intrinsic limitations of play and game based instruction. The main driver for this development is the recent cultural emergence of video games. From applying core concepts of digital game based learning (Prensky, 2007) to utilizing game mechanics and game thinking in educational processes (Salen et al, 2010) the last decade has therefore seen a surge of play and game related approaches in formal education.

In 2006 we started a series of projects and studies funded by Austrian Federal Ministry of Education, Arts and Culture with the purpose of identifying the potential of game based methodologies within the established school system and formulating recommendations for educational policy makers. Our research activities involved several dozen schools and teachers and hundreds of students (Wagner and Gabriel, 2011). It included the introduction of game design and development as a mandatory school subject within a computer science focused high school, the in-class integration of educational games as well as off the shelf commercial games (Mitgutsch and Wagner, 2009), the gamification of learning management processes (Wagner, 2013), as well as the custom development of curricula based educational games (Wernbacher et al., 2012). The following presents the consolidated findings of these projects in a concise and digested, yet unpublished set of four fundamental guidelines on the potential and limits of formal game based education.

Limits of the Medium

While games can provide powerful tools for learning, their real potential, especially with respect to self-directed learning, is quite often overhyped. Learning with games as with any medium is a recursive process in which the learner is constantly reflecting on the learning progress. The success of this circle of reflection (Gee, 2013) depends on multiple factors, including personal preferences, learning environment, guidance by a teacher or instructor, and affinity to a particular medium used for learning. The actual medium or the underlying technology itself plays only a minor role in supporting a successful circle of reflection. We were able to show that any game can be used as an educational tool and vice versa, any so-called educational game can be used in a non-educational context without any educational effect. Being educational is therefore not a property of the game or the medium; it is a property of its use within an educational context. In some sense there are no educational or serious games, there are only games that are used in an educational or serious context.

Teacher Competencies

As the success of a game based approach in education does not primarily depend on the game itself but on the way the game is used, it turns out that teachers who want to use games for instruction do not need to be proficient gamers. In many of our studies we found that those teachers that had strong competencies in using media of any kind were also best suited for utilizing the full potential of games, independent of whether they were considered gamers or not. In fact, our most successful projects involved teachers or trainers that had little to no prior experience with digital games (Mitgutsch and Wagner, 2009). In every case we observed, however, these teachers were known to have exceptional competencies and experience in general media pedagogy and media didactics. Most of the time, successful teachers used games as one element in a mix of media and students were free to choose on their own, which medium they would use for what particular assignment or learning activity.

Economies of Scale

Because the potential of game based learning and instruction primarily depends on the way a game is used and not on the game itself, game based approaches in education are highly individualized by necessity. While this adds to the appeal of games in the era of competency-based education and individualized learning paths, it also has detrimental consequences for the custom development of games for learning. Due to this need for individualization, educational games in general cannot be mass-produced making the production of educational or serious games difficult from an economic point of view due to a lack of economies of scale. It is not surprising, that sustainable business models in this industry remain rare to find and difficult to develop. There are certain noticeable exceptions. The production of an educational game will provide sufficient scalability, for example, if the underlying business model includes elements mass individualization, such as through the integration of customizable didactic materials for teachers. Another option is custom development through a process we call iterative didactic design.

Iterative Didactic Design

In contrast to instructional design, game design commonly relies on an iterative development process model based on a playtesting phase (Fullerton, 2008). As any recursive model, iterative design seeks to heuristically optimize the parameters that are subject to change within a single iteration. In other words, the set of playtesting questions as well as the playtesters themselves become the driving factors for the development of the game. If, for example, the main emphasis of the playtesting phase is to evaluate player experience within a group of male adolescent playtesters, the corresponding iterative design process will tend to evolve the prototype into a game that optimizes player experience of adolescent males. Through the specification of the playtesting process, including the selection of the playtesters as well as the situation in which the playtesting takes place, iterative design is capable to custom design a game for a particular target group and application scenario. We were able to show that it is possible to setup the design process in such a way that it heuristically optimizes knowledge transfer within a certain educational setting (Wagner and Wernbacher, 2013). For this purpose, we enhanced the commonly used playtesting methodology with an educational evaluation including the analysis of motivational aspects such as self-efficacy or interest in subject matter issues as well as knowledge gains. It has to be noted that this approach works best, if the game concept exhibits a certain “didactic replayability”. In other words, learning has to occur incremental as well so that the didactic playtesting can be repeated with the same group of playtesters.

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