

Learning through Computer Game Design: Possible Success (or Failure) Factors

Kung-Ming TIONG^a, Su-Ting YONG^b

^a*School of Science and Technology, University Malaysia Sabah, Malaysia*

^b*Faculty of Engineering, School of Foundation, University of Nottingham, Malaysia*
victor@ums.edu.my

Abstract: The idea of using computer game design as a form of learning is gaining popularity. Game development companies and universities have started to develop game authoring tools for the purpose of introducing computer game design to students from elementary up to university level. In the excitement of introducing and promoting this activity, many pertinent questions have yet to be answered particularly concerning its pedagogic model, evidence of its purported learning outcomes, and what is quantifiable from its use in education. This paper outlines some of the questions that game development companies and researchers promoting this initiative have to think upon.

Keywords: Computer game design, learning, game development

Introduction

Recently, there is increasing enthusiasm for research into computer game design as a promising form of educational activity. There seems to be a de facto wide view of approval regarding computer games design as a teaching and learning concept ([1] refers to this emerging perspective as *constructionist*) judging from the increasing number of research and initiatives devoted to it in recent times. Some studies (cited in [2]) highlight the potential of game making as a powerful learning environment where learners are actively engaged in the process of skill development. In [3], the authors cited the works of several other authors working on the learning through design trail regarding several benefits of computer game design which include enhancing motivation, collaboration, communication skills and metacognitive skills.

Many questions and issues however, have yet to be answered by these initiatives and it would be valuable to investigate what those questions are in order to properly drive its research.

1. Current Research and Initiatives

The research and activities into computer games design as a teaching and learning tool so far are mainly focused on and limited to building game authoring tools which users will employ in the computer game design process and less on devising and implementing a pedagogic model for teaching and learning computer games design itself. Many of these activities are conducted by university research teams in close collaboration and partnerships with game development companies. The targeted “game designers” range from elementary to college level students. Some examples are:

- London Knowledge Lab (collaboration between Birkbeck and Institute of Education, University of London) together with Immersive Education) – produces a 3-D environment game authoring tool (Mission Maker), a game literacy model in the production and analysis of game design, a pedagogic model for teaching and learning game design, and a model for participatory industrial design [4]
- University of Wisconsin-Madison together with Gamelab – develops Game Designer, a user-friendly software to create and modify games without the need for programming skills and intended for middle school and college students [5]
- University of Colorado at Boulder with AgentSheets, Inc. – activities on game design as outreach programs for K-12 (elementary to high school) students with a purpose to attract potential computer science undergraduates [6]

Aside from these, some game and technology-based companies are offering commercially-based computer games design short courses and summer camps to learners, for example GameCamp! [7] and iD Tech CampsTM [8], both designed for middle school and high school students and involves intensive training on various aspects of computer game design where students receive instruction from, among others, experienced game developers and industry professionals.

Looking at the above activities, it is clear that there are two lines of approach in the preparation, implementation and utilization of computer game design for learning. The university-game development company teams very often develop game authoring tools together and the process involves various game design development stages [4, 5, 6]. In essence, the university-game development company teams apparently spend a large portion of time and effort into the development of game authoring tools with some concern on the pedagogical model of computer game design and very little on the computer game design activities itself. This is perhaps due to the enormous time spent on the game authoring tool development stage where concerns on usability and user-friendliness are in focus, as one of the aims is to allow users to use the game authoring tools without much need of programming skills or knowledge, most notably [4] and [5]. The purpose is to have users concentrating on the game design instead of spending enormous amounts of time learning complex (professional) game authoring tools which may take away the desire and time to create games as it would be tedious work.

On the other side of the picture, the commercial providers of computer game design courses [7, 8] usually use readily available game authoring tools such as Adobe Flash 8® and Multimedia Fusion 2 Developer®. Unlike the previous university-game development company teams, the commercial providers place immediate attention to the activity of computer game design and tend to view and operate its teaching and learning from a game industry perspective, judging from the contents of their curriculum, an aspect which the university-game development company teams seem to slack.

2. Possible Success (or Failure) Factors

2.1 Game Design Educators Lack Game Design Experience and Skills

As noted by [9], developers and educators usually fail to realize that “making games is hard”. Since designing and developing a computer game requires substantial knowledge and exposure to some aspects of game design theory (which require some form of curriculum) and more importantly adequate game-playing exposure (which is difficult to quantify) in various categories of game (desirably), it seems that to teach and hence for students to learn from the activity of computer game design poses numerous problems. This is particularly so when “professional educators and scholars of learning have pretty

naïve ideas about game design and development. They're generally not gamers, and lack the hands-on experience to really know what makes a game tick." [9]. In order for teachers to be able to teach computer game design *properly*, they must first be considerably exposed to gaming, learned the pre-requisite knowledge of game design theory, and have at least some substantial experience in developing games themselves. This crucial question somehow eludes the proponents of learning through computer game design.

A good example can be found in [10] where a professional game designer's thought processes involved in designing and developing games were articulated that serves to highlight the complexities and multitude of factors to consider during game development which may not be within the grasp of an *average* game design educator. Another prominent example [11] demonstrates that even those with a higher technical expertise and exposure to software design faced challenges in designing and the subsequent evaluation of a suitable educational software.

2.2 Differing Views on Game Design between Developer and Player

A related problem is the differing points of view regarding certain game aspects, e.g. what makes a game fun, between game developers and players. In [12], it was found that differing views exist regarding various cognitive and perceptive game design factors and the weightage of these views further depended on the types of games considered, i.e. whether they were simulation or role-playing games. The result of this study probably suggests that there may be difficulties in evaluating game design outcomes in educational settings as what constitutes a fun game to the "game" developers (the students) and players (other student peers who test the "game") may not coincide with what *real* game developers would regard as a game, much less a fun (or good) game. The ability of student-designers to design games, and more importantly their perception of what makes a game fun, largely depend on their degree of experience in game-playing and the type of games they played. This leads to the issue of what would be the ensuing learning outcomes of learning through computer game design when the most important aspect, i.e. learning to design a *good* computer game, is shrouded in vagueness.

2.3 Lack of Empirical Evidence

A substantial amount of research into computer game design deals with the question of what can be learnt from the design of games. Authors like [13] and [14], for example, argue that a good game design successfully applies many learning principles that traditional instructional design sometimes fail in. Furthermore, these authors go on to promote the study of game design and advocate that knowledge gained from the study of game design can be transferred to instructional design, particularly in its ability to deeply engage learners and sustain learners' motivation to learn long, complex and difficult games [13, 14]. What was not mentioned, however, is whether the *activity* of game design itself is worthwhile to pursue for *learners*. Alarming, this crucial aspect has not been properly covered in literature with empirical evidence although many vouch on the many supposed benefits of computer game design activities. Having said that, however, it should be noted that research on learning through computer game design is still new and there are ample opportunities to develop this line of research. Much like when computer and video games emerged in the past and the educational benefits of these games slowly gained recognition, there could be gains in empirical evidence supporting the notion of learning through computer game design in the near future.

2.4 Over Emphasis on User-friendliness and Usability of Game Authoring Tools

There are signs that there is too much emphasis on the user-friendliness and usability aspect of a game authoring tool. Having a good game authoring tool is part of the equation but since computer game design is a process and a complex one at that, it is imperative that much more emphasis is put into planning and implementing a suitable curriculum where the design process is of central importance. This fact is aptly noted by [15]: “The choice of an authoring tool is, of course, important, but we find it even more important to scaffold the design process. Many of the design methodologies that emerged from software engineering are not well suited for applications in K-12 education.”

2.5 Learn from Game Design Camps

Current research could be diverted to gauge the effects on learners in readily available computer game design activity settings like the ones provided by commercially-based companies of game design camps. The curriculum employed by these game camps is also a rich source for investigation on how to employ computer game design activities in supporting learning. Perhaps the way to go is to learn straight from the game development industry itself in its professional sense where the curriculum of game design had been modified for school children. It may not be perfect or what the educators envision, but surely the popularity of game camps suggest that the curriculum and activities designed by these providers are in some ways successful. Researchers should also look at the probable differences between computer game design activities learned outside the classroom, detached from the overall curriculum compared to activities conducted as part of the school curricula. Another consideration is, should the activity of computer game design be a separate subject by itself or incorporated as part of a subject (i.e. as a sub-activity) in the learning process?

2.6 What Engages Learners to Design Games?

One area where computer game design activities are obviously useful involves in-depth information regarding the thinking processes of students in the creation and development of a game. This information is ultimately embedded in the games that they produce and an analysis and dissection of the games, during and after creation, could provide useful information on what and how the students were conceptualizing and realizing that conceptualization in the game. However, it can be argued that similar circumstances can be achieved through computer-less game design activities. The question is: are educators introducing computer game design activities just for the sake of having the computer in the picture or is it because since computer game playing is popular therefore computer game designing could be popular as well?

It remains to be seen whether computer game design as an activity will catch on or not. Game playing and game designing are obviously two very different things although closely related to each other. Interestingly, it seems as though current research have the implicit assumption that since the current generation is exposed to playing computer games, they will take on to computer game designing as well. Good games engage players to play, but what engages learners to design games? Possibly, the outcome of using computer game design in learning is to incorporate and illuminate subject content matter of the school curriculum, which in other words, means designing educational games.

3. Conclusion

Computer game design as a learning activity is still new and requires further research to support its use. Researchers need to look more into its teaching model and this requires a hard look on both the teacher and students. Philosophical and psychological questions governing the interest in the activity should be properly addressed as well. In certain aspects of implementation and evaluation, academic researchers could well benefit from the experience and practice of game industry professionals and commercial providers.

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