Trial by Fire: Beginning the Game Designer's Journey

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Abstract: Today's college student is accustomed to receiving a multimedia-rich flood of information. Students often share a game-based culture and prefer activities that are stimulating, engaging and fun. As we compete for the attention of our learners, we see a rise in the use of educational games to attract our students to the online course platform. This paper discusses educational game design issues and offers an introduction to game styles.

Introduction

It would be wonderful if classes were not only focused on building essential skills, but also immersed students in engaging, addictive learning environments. Learners today are accustomed to a multimedia-rich lifestyle. Many find it easy to work with music or with the television playing in the background. Others listen to MP3 players, talk shows and audio books as they perform light-to-complex tasks.

Sensory stimulation is common today, and games add an addictive, immersive environment that grabs a game player's attention and maintains it. Players perform a variety of game behaviors, learn new information and develop skills during gameplay, but may be unaware of the benefits as they struggle to reach the game's goals and objectives.

Activity-based Learning

As we compete for the attention of our students in online courses, it makes sense to leverage and use their needs and interests in our instructional design choices. Activity-based learning benefits from the use of interactivities and games, allowing students to bridge the gap between theory and practice.

The question that comes to mind is whether we confine our vision to digital games or if we include a variety of storytelling, card, board, and paper-based games? Rather than apply limits as to the type of game, it is probably more effective to use the best game style and medium to meet the learning objectives, given the resources and constraints of the project.

Prensky offers a more thorough investigation of how activities and games facilitate learning in his book Digital Game-Based Learning (Prensky, 2001). These concepts are also discussed in the pre-conference materials from TCC 2003 by Corbett and Kearns (Corbett and Kearns, 2003).

The Trial by Fire

Despite the rising interest in games and educational games, one concern is whether instructional designers have the skills and resources needed to design and incorporate them effectively. Opponents of educational game design feel that instructional designers do not have the tools, technology or experience to design a successful game.

Therein lies the journey described as a trial by fire. Instructional designers who are inexperienced game designers learn the elements of good and bad design through trial and error, using the methods and techniques common to both disciplines.

Tools alone are insufficient to guarantee a good digital game design. When concepts and terminology are applied out of context, even a crossword puzzle becomes difficult to complete. It is only by understanding the progression of information, activity, application, and synthesis can we design games that make sense.

Varying levels of sophistication and easy to use tools also alleviate the burden of game construction, especially when combined with a multidisciplinary partnership between designers and subject matter experts. Today, programming skills are useful and add advanced capabilities, but are not required for educational game design.

A successful game design is one that meets its goals and objectives, offers an addictive playing experience, and encourages players to play again in the future. When we add the course objectives and learning outcomes to the requirements, the balance between learning and enjoyment needs to be carefully maintained. One complaint from K-12 students is that the games that emphasize learning are not fun to play.

Game Composition

What makes a game fun and engaging to play? After all, instructional designers use many of the elements commonly found in games, yet these courses may not attract and retain the attention of learners.

Games are addictive. The game objectives compel the player to continue playing. Most games add game diversity so users will play the game to completion numerous times.

They can be independent explorations or social events. Successful games offer a single player and multiplayer capability (Salen and Zimmerman, 2004). For the past ten years, massive multiplayer online roleplaying games (MMORPG) have increased in popularity, replacing the neighborhood pub and online chat rooms with shared game activities.

Crossword puzzles and word games tend to be single player activities, yet there are exceptions, including trivia games and board games, such as SCRABBLE® (Hasbro, 1948). The advantage of single player games is that the learner can play them without others participating, whereas multiplayer games benefit from cooperative or competitive gameplay.

Competition enlivens the gameplay, giving the players a desire to be first to complete the game or to reach certain scores, goals and objectives. While everyone can win in an educational game, the question remains whether competition is healthy in an online course environment.

Game reuse is another consideration. Educational games may focus on single use games that are less concerned with students re-playing the game.

Scoring the game and determining how players complete the objectives and win the game is tantamount to game success. In educational games, the simplest games map to existing course rubrics and grading weights. Through the use of metaphor, we can transform points and grades into gold, treasure, and ranks of mastery.

Meaningful play

While all play has a purpose and significance (Huizinga, 1955), making it meaningful in an online course requires a connection between the course objectives, the learning outcomes and the game-based activity. The best game style to support the exploration and synthesis of the course material balances the learning styles, the course requirements and the resources that are available to the game designer.

Playability describes a game that learners want to play whereas gameplay reuse attracts users to play again on future occasions, even after the game objectives have been met. Games that are designed for reuse benefit from modularity. Designers can build learning objects or modules that support learning outcomes, expanding the game's benefits and expanding the game environment.

Motor Skills

We have seen how successful games are at building motor skills and eye-to-hand coordination. The first time that a novice computer user touches the mouse, the cursor is hard to control and it feels awkward. By playing simple games, such as

Microsoft Hearts and Solitaire, the user learns to move the cursor and select game components without focusing direct attention on the task.

If the course includes tasks that require motor skill development, then a survey of alternative skill development approaches is the next step. Often, we focus on activities that are similar to real world practices, but it is also possible to isolate the motor skill and consider different ways of acquiring it.

For example, video games may seem like a waste of time, yet they teach users eye-to-hand coordination, logic, strategy, rules, patterns of behavior, and other reusable concepts that apply to activities outside of the game.

Pedagogy and Terminology

While it is tempting to jump right into game design, the real start of the journey begins with an understanding of the course subject and the learning objectives. One common denominator between a wide range of course subjects is that they all introduce new terminology and information on how to apply it.

Games that help students remember and use terminology are common to educational games. These include:

- Word Games
- Crossword Puzzles
- Logic Problems
- Trivia Games
- Flash Card Games

On the surface, these games seem easy to construct. Given an easy-to-use game design tool, such as Hot Potatoes (Hot Potatoes, 2005), the beginning educational game designer is off to a fine start. One challenge is to select meaningful clues and terminology, then to assemble them in a manner that provides a context for players. Without a context for the clues, it is difficult for the puzzle's creator to complete them, much less other players.

The Hot Potatoes software has strong word game design features and it helps the novice game designer organize, structure, and convert the game into an HTML format for incorporation in an online course. It does not address the problem of keeping the player aware of the context, so setting the scene with a good title and description is required.

Games and Simulations

As learners gain a greater exposure to the course terminology, they need to learn to apply it to new situations . Depending on the course subject, the tools, and the available resources, a variety of game choices and styles are available.

Games that simulate or augment reality and allow the designer to control and manipulate the game elements include:

- Roleplaying Games
- Simulations
- Virtual Worlds
- Alternative Reality Games
- Augmented Reality Games

A popular game style in the educational game designer's toolset is the roleplaying game, also called an RPG. The roleplaying game has a variety of possible formats, but the most common format assigns roles to players and has them execute those roles while striving to complete a set of game objectives.

Course designs may already include case studies and scenarios that allow students to visualize the roles that apply the course concepts. Rather than confine the course to a passive examination of these cases, why not immerse the student in this experience and transform the case into a roleplaying game?

Simulations vary in sophistication, ranging from mathematical simulations and graphs to graphical depictions of a 2D, 3D or a 3D immersive virtual world. Virtual worlds range between game worlds of varying levels of quality to immersive 3D virtual environments. Players either view the world on a display monitor or wear head-mounted display devices and other user interaction devices for visualizing, moving and interacting within the virtual world. These game styles are often more expensive than the other choices introduced in this paper.

Second Life is a virtual world that includes free or low cost access and the opportunity for members to add or modify the virtual landscape (Second Life, 2006). Educational game designers can create learning environments within Second Life using the incorporated scripting tools. Additional components can be purchased within the game.

Alternative reality games mix real world and game constructs, reducing the distinction between reality and the game's constructs (Wikipedia, 2006). This game style was popularized on the Internet, adding online communication methods to interact with players via email, discussion boards, online chats, instant messaging, and websites. Since these games use a mixture of media and information through the use of established technologies, alternative reality games

offer an easy to design structure that supports roleplaying scenarios and case study reenactments.

Augmented reality games uses a mix of real and virtual elements to provide a sensory rich gaming environment. One example is the Human PacMan game released in Singapore to support military and scientific research (Knight, 2004).

Student-Driven Design

In addition to the instructional designer and the subject domain expert, students can also participate in the design of a game. In some instances, the game design activities are as important as the gameplay.

At the NMC Conference on Games in December 2005, two presenters from Oxford and the University of British Columbia introduced a game platform called Ancient Spaces that first year students are co-developing (Griffin and Lomas, 2005). These students are not required to have sophisticated programming or graphics design skills, yet are modeling ancient civilizations using Maya. These rendered worlds are then added to a evolutionary multiplayer gaming environment that is scheduled to open in summer 2006.

Each term, a new group of students contributes to this growing virtual world, becoming a part of the Ancient Spaces community. In addition to being a participatory game design, it is an immersive environment, allowing students to experience the architecture and archaeological discoveries of Ancient Greece, Rome. Students can also add models and societies as they are unearthed during recent archaeological expeditions as the game world expands.

Playing to Win

Each of the topics introduced in this paper could be the subject of a much larger discussion. This is also true of game objectives, scores, and winning the game. In essence, a game needs to offer incentives or players will have little motivation to play. The use of metaphor and common course constructs, such as course rubrics and grading scales, ease the transition from current course designs to the use of game-based rubrics.

Before adding a game to a course, it may be useful to transform the grading scale into a game, then to consider the normal course activities that could serve as mini-games. If some students are unwilling to participate in the games, then the normal infrastructure remains in place to support them and their needs.

The Ancient Spaces example uses meaningful play, flowing the normal course activities into a creative, immersive activity. While gameplay is minimal during the early design phases, the students are creating a marvelous virtual world where they will be able to visit and play.

Instructional Design Meets Game Design

What can instructional designers do to introduce games in their course designs? Getting started in educational game design begins with understanding the different types of games, their strategies and why people play them. The best game designers play a lot of different games.

With the course and learning objectives in mind, the designer can look for analogies that will help students apply and learn the concepts. Games that teach statistics may be as simple as playing the Monte Hall game or various dice games. Board games, card games and dice games may be adapted for use in an online course, using PowerPoint, Flash, a game engine, or a custom application.

Roleplaying games (RPGs) use scenarios and roles to help students visualize and experience real-world practices. These games sometimes use humor to capture the imagination of online learners. The nice thing about roleplaying games is that they do not require sophisticated tools or programming skills. RPGs require clearly defined scenarios, roles, and a set of rules to guide the game play. Adapting a case study or project for use in a roleplaying game scenario is a good choice for instructional course designers.

If the learning goal is to strengthen the student's understanding of basic terminology and rules, then some mix of crossword puzzles and trivia games may be effective. The design time may be relatively short once the clues, words and goals are identified. Downloadable software tools, such as Hot Potatoes (UVic Humanities, 2005), help instructional designers create games very quickly, permitting time for playtesting and refinement.

Effective game designers play a variety of games and strive to understand their behavior. Familiarity with games that are outside of the desired game genre adds breadth to game designs. The influx of diverse patterns and behaviors contribute to a new game's design and stimulate the learners' interest.

Once a game is designed, it needs to be tested by participants who are unfamiliar with its design. The test methods for a game are similar to any software system and include playtesting. Playtesting differs from system or functional testing as it evaluates the behavior of the game from the learner's viewpoint. Unlike user interface testing, playtesting includes free play and may evaluate student behaviors that were not anticipated.

Conclusion

Games offer incentives for students and enrich an online course. Games, interactivities and immersive learning environments engage the learner's attention, offer opportunities for meaningful play and enhance learning retention.

While it may be daunting at first to add games to a course design, the course rubrics can become the infrastructure for the game scores, setting the stage for adding mini-games and larger game activities. Using a modular game-design style allows game designers to introduce game components and test them for playability.

Game design alternatives range from low cost, less sophisticated solutions to virtual worlds and expensive simulations. In educational games, the goal is not glamour or elegance, but to provide an enhanced learning experience that meets the course and learning objectives.

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