Can Casual Game-Design Strategies be Applied to Educational Games

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ABSTRACT
In this essay I will discuss which casual game design strategies should not be applied to educational games and why.
I will be looking at A Casual Revolution in order to determine a proper definition and address Huizinga's "play" in regard to educational games and their effectiveness depending on target audience requirements.

Keywords
Educational Games, Casual Games, Play

1. INTRODUCTION
In order to discuss casual design strategies and how they are applied in educational games we need to establish a solid definition, then compare and evaluate the effectiveness of each strategy. Furthermore I will review the abstract interpretation of educational games to show how casual games as a genre do not apply specifically to how players learn. I will conclude with a review on the effectiveness of current day educational games and deliver my view on the future of educational games.

2. CASUAL AND EDUCATIONAL PLAYERS
In order to assess what elements are important to the discussion on what casual game design elements are important for educational games we need to define what drives players to play each of these game types.

2.1 Casual Players
The stereotypical casual player has the preference for positive and pleasant fiction, commits small amounts of time towards games and dislikes overly difficult games. When exposed to the game, casual players need to learn about the game system, which depends on how usable it is too the player, that is, how easy it is for the player to get started with the game. If the player remains interested after learning the functionality of the game, the casual player will invest time in the game, of which the casual player has limited amounts. A casual game therefore has to be easily interruptable as players do not wish to be punished for pausing their play session, in addition, players do not wish to be overly punished by extreme levels of difficulty opposed to how hardcore gamers desire extreme challenges. Casual players require more positive feedback and the level of overall juiciness in casual gamers tends to be higher than others. [6]

2.2 Casual Player Expectations and Design
Casual players have 5 core expectations that are applied in their design. A casual game will have one or more of these elements but does not require to have all of them to be a casual game. These core elements represent a theoretical approach to casual design that serve as a guideline for creating casual games and form the base of the discussion on which elements are viable to implement in an educational game. Casual games are played for entertainment, pass time and to relax in a safe and enjoyable way.

2.2.1 Fiction
Casual players enjoy positive fiction and in general casual games avoid controversial topics regarding violence, death and sexuality. The narrative, setting and atmosphere of casual games tends to be bright, colorful and positive in nature, avoiding anything that can bring the player in an unpleasant situation. Casual games are designed to appeal to a broad spectrum of players and deliver friendly and accessible fictional worlds to lower the bar of entry to the game.

"*Welcome to the world of Bumps, a casual puzzle game with 99 mind bending levels for long lasting fun. Travel high and low as you explore the spinners in the sky or go under water and see the deep sea delights. Afraid of the dark? don't worry the bats won't bite!!! Collect amazing power ups! Take a ride on the big wheel! Break the chain bridge and lets go rescue the Bumps!"[2]*

Illustration 1: Friendly, colorful, non-threatening and accessible interface

In this example you can see that even the proposed enemies (bats in the dark) featured in the game are not really scary, because the bats don't even bite. (Illustration 1)

2.2.2 Usability

Casual players lack many gaming conventions compared to hardcore players and the amount of knowledge on control systems and technical understanding of both device and controllers is limited. Casual games try to use intuitive visuals and control systems to help the player get started as fast as possible, reducing the initial learning period of the game.

2.2.3 Interruptibility

Casual players do not have large amounts of uninterrupted periods of play-time and desire games that can be stopped at any time, either for a short break or for extended periods where the player does not return for multiple days. This also involves the amount of time a player wishes to invest in a play-session, where a player wants to know beforehand how long a given session will take.

2.2.4 Difficulty and punishment

Casual players expect a well balanced game, where on entry the game is not punishing and the player is given ample time to learn the game mechanics and can explore the functions and game world. Once players have mastered the basics of a casual game the need for depth arrises, where casual players will enjoy an increasing challange. Casual players do not enjoy being punished for failing and most casual games avoid having a lasting negative effect for a player if he fails to complete an objective, players are always able to try again.

2.2.5 Juiciness

Every action taken in a casual game tends to have a positive feedback regardless of the actual importance of the event. Players that enjoy casual games enjoy the positive feedback and enjoy the fact the game compliments them on anything they do. Effectively a casual game stimulates the player by overly exposing positive feedback.

2.3 Educational Players

Educational players are players that have a set expectation from their game, however can be split into two main categories. Simulations and games for children. Simulations are then further defined as experimental and symbolic simulations, each of which has a different approach to what a player expects and how a players learns from the respective system. Games for children place players in a competitive setting, with potentially fictional rules, whereas simulations place players in a professional function or have to deal with a professional task in which the game mimics a situation as closely as possible or presents factual data to the player in order to create conflicts where players need to predict or evaluate situations in order to learn potential outcomes. [4]

2.4 Educational Player Expectations and Design

Educational games can be divided into 3 types, games for children, experimental simulations and symbolic simulations. Each has different elements that define its player interaction.

	Games for children		Simulations	
		Experimental		Symbolic
Setting:				
Transferred to another world	x	x		x
Purpose:				
Competition	x			
Professional Role		x		
Professional Task				x
Event sequence:				
Typically linear	x			
Non-linear or branching		x		x
Mechanics:				
Set of rules	x			
Dynamic variables		x		x
Player is a component of the scenario and executes tasks according to a role		x		
Player interacts with database to discover scientific principles				x

2.4.1 Fiction

Educational design has the goal to teach, either an applied skill or a scientific principle, yet there are many games that use fiction as a layer to present the game to the player. It is counterintuitive to have a simulator that is presented with a fictional layer as its purpose is to simulate a realistic experience, so there is a clear indication that positive fiction is not a required element in educational games. Looking at military training simulations we can clearly see that negative elements will be present in these games and the overall setting and atmosphere will not match casual game design conventions. In addition, simulators tend to be highly specialized towards learning a specific skill set associated with a profession, not aiming at a broader audience. For children these games can benefit from having a layer of fiction with avatars and playful setting in order to promote play and immersion.

2.4.2 Usability

Although experimental simulators will use mimetic controls wherever possible, for example; flight simulators, symbolic simulators have only limited use of these input devices, as they focus on learning scientific principles instead of physical skill. Also due to the potential use of an educational aid alongside existing knowledge a simulator can have a high level of requirements before a player can start using it, where learning how the control system works can actually become the goal of the simulator. For children it is important that the focus lies on the learning of the game content and not on the control system, which creates an opposite requirement based on age.

2.4.3 Interruptibility

Experimental simulators are made to train in uneasy situations, for example learning how to opperate on a patient, but also how to remain focussed during such a procedure for extended periods of time, where taking a break is not allowed as part of the simulation. Players will be forced to spend extended period of time, even against their will to learn what is required. Due to the dynamic developement of a simulation it is impossible to tell how long a session will last, making educational simulators very uninterruptable and play-session lenght unpredictable. Yet when looking at more knowledge based educational games it becomes favorable again to be able to pause the game in order to allow the player to research a topic whenever the player pleases, further increasing the potential learning value of a play-session. This results in interruptability being highly dependent on the type of learning associated with the game.

2.4.4 Difficulty and punishment

Whenever a player is confronted with a dynamic simulator the difficulty relates to the players previous performance, creating an unpredictable outcome and potentially volatile difficulty curve, this is for example related to unexpected changes during a simulation and where the player takes a suboptimal decision, where players have to learn why this choice was a lesser one and experience what will happen in such a situation. For symbolic simulators the amount of knowledge the player already has about the topic determines his difficulty curve, but when missing one essential piece of information it can cause a spike in the potentially flat curve. In both situations the difficulty and punishment for failing result in a far harsher outcome than a casual game. However when applied to an educational system for children a slow introduction with increasing difficulty in linear fashion is desirable making difficulty dependent on the target audience.

2.4.5 Juiciness

Simulators are realistic and therefore the feedback is supposed to be as realistic as possible as well, as juiciness creates an exaggeration of feedback it is not at all related to simulator gameplay. However for a children it is very relevant to have positive feedback onf progression. This creates another casual design element dependant on content and audience.

3. CASUAL VERSUS EDUCATION GAME DESIGN

When designing for casual games there are many factors that influence if a player perceives a game as casual. If a game features a considerable amount of these elements the casual player is more inclined to overcome less casual design elements within the game. Examples of casual design elements include; Positive fiction, mimetic controls, Limited requirement of game conventions, accessible interface interaction, fixed-screen gameplay, automatic saving, self-installing, interruptible gameplay, deepening gameplay, Many of these design elements can apply to an educational game, however there seems to be no constant or universal way to state that any type of educational game will always use a standard set of the casual design paradigm. This leads me to argue that the problem does not lie in the casual design paradigm but in the definition of what a educational game is.

4. EFFECTIVENESS OF EDUCATIONAL GAMES

To show how games can be successful in education I will review two experiments, the VR-ENGAGE and WoW-inschool.

4.1 VR-ENGAGE

In 2005 Virvou et al, conducted an experiment using ITS (Intellegent Tutoring System) and the game VR-ENGAGE to prove that in a classroom environment a game developed for educational support can improve overall performance of children. Noteworthy elements of these finding include the increased engement of children previously noted as having trouble to focus and paying attention in class, the majority of improvement was noticed from students that priviously had lower grades and that the game system did not negetivly influence the already sufficiently performing students. It must be mentioned however that children struggeling with the VR system did recieve help in operating the game system. This shows that an educational game can work in a learning environment, can engage players better then classes can or at least perform on par, sustain performance and pose the problem with learning a complex system if players struggle with understanding the game system. A remarkable complaint from some students was that they had expected more game objects, interaction, better graphics and gameplay. This opposed to the potential problem where some students required help to operate the system in order to play, I.e. Not accessable enough, yet a part expected a more complex, in-depth game. This hints towards a potential problem even within the same target audience in terms of age. The shift in requirements in design paradigm is already present at a yougn age as the players that expected more from the game where all previously exposed to other games. [7]

4.2 World of Warcraft

In 2009 the WoW-inschool project has been working towards testing if the game World of Warcraft can be applied in a learning environment. Using a well known and non-educational game in a learning environment has not been unheard of and by using such a popular game the amount of players that can become engaged in the learning material can potentially increase. Both Jane mcgonnigal and Lucas Gillispie have shown successful independent experiments in applying World of Warcraft in a classroom environment and both note an increased level of engagement, increase in student performance and overall increase in class attendence. What is noteworthy is the case of World of Warcaft is that the information being traferred to students is inherant of the game design and mechanics, teaching economy, english and other topics that did not require any modification of the game. Yet World of Warcraft is not percieved as an

educational game, it is a hardcore game with no built-in system that allows for education. [5]

4.3 Treasure Hunt

In 2012, during the TOTEM Summer School Mobile Mixed Reality Game Jam Hackathon, I was able to work with a team to create a mixed reality game using mobile devices to produce a simple educational game aimed at twelve year old students that would teach them basic levels of algebra. In this game the player walks around in the physical world with a mobile device, a phone or tablet, and is posed with riddles. These riddles challenge the player to find the pirate treasure in the real world. Yet the player uses the virtual world to navigate, using google-maps and the GPS on the device. Once a player completes a riddle the player receives a number that equals the amount of spaces the player has to take in a indicated direction. There the player digs for a new riddle and the game continues. The riddles by themselves are not algebra questions but use creative writing to mask that they are actually math problems. What the game tries to prove is that you can mask an educational topic by creating a interaction layer that engages the player, instead of trying to engage the player with the potentially boring content of the educational topic. In conclusion of this this project we noticed that creating an educational game requires very little time and if a proper framework is established the content creation can be transferred to the teacher instead of a developer. Creating such a framework is currently being done at FIT Fraunhofer, creating a platform for designers to produce AR-games with little to no programming knowledge. With such a tool any form of education can create content specifically related to the topics that have to be taught. [1]

5. PLAY AND LEARN

"*All that us mysterious or make-believe by nature approaches play; moreover, it must be that the function of fiction or diversion is to remove the mystery.*" [3] Play has been described as learning in a safe environment, a simulation of real life encounters, to learn and experiment without the consequences of poor performance. It is because of this that I want to argue that in any game, in any situation where play occurs, there is education. Regardless of whether there is fiction, simulation or just entertainment. As long as there is a factual applicable skill or knowledge based hidden within the game system a game can be educational. The definition used for educational and casual games does not allow for a set list of elements that identify a game as such. This leads me to believe that a game is educational based on whether the player can learn from it. I.e. The game has an element of information that the player does not and if this information is transferred the game is educational. For example if a twelve year old plays a game that is in english and encounters a word that the player does not know yet is able to figure out the meaning of the word, the game is educational. Yet if another players plays the same game and already knows all the information in the game including the meaning of the word that was posed to the other player, the game is not education for that player. This brings me to the point where I believe that a game can always be educational depending on the target audience and the player that has an interest in a topic. Whenever a player is exposed to any form of information that he did not have previously it becomes an educational experience through play. The question that remains is if the player wants to learn a educational game must be an active deliverer of knowledge, however if a player is not motivated to learn a game will be more beneficial if it has a *mysterious* layer, hiding the educational element in a layer of entertainment of otherwise.

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