

# Mobile Games and the Future of Educational Digital Games

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## Abstract

**The design of Educational Digital Games and Gamification of educational materials can potentially benefit greatly from the rapid developments of Mobile Games in Game Industry. Through a decade evolution, modern Mobile Games broke the boundaries of traditional game designs, obtained many qualities fitting for educational use: They are commonly enjoyable, popular among students, able to utilize fragmented time, and easy to design better established Game Mechanics and third party Game Engines. This article argues for the use of modern Mobile Games as bases for purposefully designed Educational Digital Games in the future.**

## Keywords

**Educational Games, Digital Games, Mobile Games, Gamification.**

## 1. Introduction

Digital Gaming has become something well integrated into the society in the most recent decade: The overall player number in many countries have increased explosively, while the types of games became significantly more versatile to fit different needs of different groups, increasing the playability, player immersion, and average playing time alike. There is no way to over-emphasize the great influence of the modern Digital Gaming industry. Taking the United States as an example: In 2019, there are over 136.19 million players on Mobile Games alone in the United States [1], which has only slightly more than 328 million overall population and roughly 252 million people between the age of 9 and 69 at the time [2]. These numbers indicate that nearly one of every two Americans play Mobile Games at some point during the year, making Digital Gamers perhaps one of the largest communities in the society. It would be a great waste of opportunities not to explore the potential to use this tide of history to the cause of Education. While still small, there is little doubt that the Educational Digital Gaming as well as Gamification and Digitalization of educational materials are blossoming at the same time [3]. There has never been a better time for these efforts to be further pushed into frontline education: The increase of the size of player communities boosted the understanding of Digital Games, making gaming a more acceptable action for the instructors and family members of the students. New generations of Game Engines developed over this decade became suitable for Indie Game developers, enabling almost everyone with proper knowledge to construct their own games of a reasonable quality, even without a large supportive team. All these made further practice, research, and discussions favourable.

In this article, we shall focus particularly on the Mobile Games and why this platform is best suited for educational purpose. More specifically, this article shall explore the unique features of modern Mobile Games that made them popular among student groups and easy to design for educationists and instructors: Its ever expanding player base, its use of fragmented time and low requirement for device, its well established game mechanics and better development environment.

## 2. An Argument for Mobile Digital Games in Education

Now there is a lack of general theory concerning the employment of Educational Digital Games: Admittedly, we lack a comprehensive understanding of almost every part of this very concept. Games and more fundamental biological “playing” remain a topic to further explore till this day; the exact reasons and functions for the playing behaviour as well as a commonly accepted definition for games are vague [4]. Digital Games, in a similar fashion, take numerous forms with different game mechanics, game engines and player platforms. Finally, even the idea of an Educational Game is an umbrella term as well. Games not specifically designed for educational purposes might survive educational purposes intentionally or not, while specifically designed education software might be considered Gamification of learning processes instead of the more traditional idea of an Educational Game for Game-Based Learning [5]. All these differences created confusions and the absence of a unified Educational Digital Gaming theory guiding the use of Digital Games in education, isolating the individual research and attempt in the field to a smaller scale.

It is not reasonable to assume all the existing problems near their answers and solutions. It would be much more effective to work to avoid these obstacles and upon a closer inspection, one would find the Mobile Games perfectly suitable as the type has become well established and popular while enjoying a shorter development period. They are proven to be successful and here are some of their unique features.

### 2.1. The Rise of Mobile Game Market

To the topic of applicability of exploring the educational use of digital software designs, one can easily find the rise of Digital Gaming market the most phenomenal growth. And among all the dramatic developments in Digital Game Industry, the prosperity of Mobile Games is perhaps the most important addition. Until this day, Mobile Game platforms have become the single most common platform for Digital Games. Continuing the example for American game market, one might clearly see the platform occupying the huge market share: In 2019, when the player number of Mobile Games reached 136 million there, surpassing the 145 million of Download Games, the player number of Online Games counted only 62.9 million. The number in China is even more appalling, where according to some optimistic reports, in 2019, the Mobile Game user number counts to 450.66 million. This number indicates over 31.27 percent of Penetration Rate for Mobile Games as a whole, a number far exceeding any other platforms [6]. Although other reports concerning smaller player numbers can also be founded with varying details, there is little doubt that Mobile Games have become the major composition of Gaming Market, with both its size and growth on top of all other platforms.

Taking an educational approach, one might easily find this enormous player base an advantage for educational use. Large player base means a high probability for target students to accept Mobile Games, when used for educational purpose. According to one research, 29 percent of all players are between the age of 10-20 [7]. According to another, over half of the Mobile Games players are either students or young adults, and the share of players under the age of 25 had been greatly increasing since 2013 [8]. Clearly, there is a popular base in both K-12 and college students for Mobile Games.

### 2.2. The Easy Accessibility of Mobile Games

The popularity of Mobile Games among the teenagers and adolescents are even more favourable, when considering how it was achieved through some unique advantages. Noticeably, the great player number was possibly built through the low requirements of Mobile Games for device, and thus a better use of fragmented time. Although only a very small number of players are dedicated Mobile Games Players, many people are open to Mobile Games. For example, among the enormous Mobile Games player base in China in 2019, only 7 percent of

the players claimed to play Mobile Games longer than 3 hours a day. Instead, 78 percent of the players claim to be playing Mobile Games less than 2 hours a day, likely fragmented free time after school or work. Another important aspect for Mobile Games is that many tend to be socially built, aiming to fulfil the needs of social connections for its players. According to the same research, we find over half of players claim to have obtained their information of games through conversations among friends [9]. 36 percent of players name the ability to interact with friends as their main motivation to play Mobile Games, ranking the most common reason among all other proposed ones. It can also be proven from the most played Mobile Games, in 2019, among the most commonly downloaded and most profitable Mobile Games, most have multiplayer modes to be played with friends, with many would further specifically focus on the online multiplayer gaming [10].

Fragmented playing time gives Mobile Games better chance to fit into the school schedules: They do not require expensive game platforms, and more importantly takes lesser time to enjoy. Nowadays Digital Games have vastly different playing mechanics and User Interaction Designs, making them look distinctive from each other. The traditional AAA game titles tend to have extremely high-quality images with a playing through time varying from dozens of hours to potentially hundreds of hours, played either on a PC or specifically designed Game Consoles. In 2015, Bethesda Game Studio released the Digital Game named Fallout 4, which needs an average of 27.5 hours only to finish the Main Story line [11]. The Witcher 3: Wild Hunt released by CD Red Project in the same year has even longer playing through time, requiring an average of 52.5 hours for its Main Story Line and possibly 179.5 hours to finish everything in the main game without counting additional purchasable contents [12]. These games take even longer to finish than a usual college class in a quarter-based university and are thus clearly not ideal to be forcefully introduced into the school schedule. Mobile Games, no matter the collection games, low budget cards/chess games, or the 2D based Side Shooters, on the other hand, can be played on personal Smartphones with each game round lasting minutes on some occasions. For example, the famous Mobile Games Azur Lane from Manjuu and Yongshi encourage their players to finish each combat run in less than 120 seconds, and does not rely on continuous main story line to complete the narratives [13], making them far more ideal for students.

Although exploring the existing Games with long playing through time might be possible in the teaching process, it is possible only given a large number of students already have become players themselves. The focus of social interaction between players of the Mobile Games, on the other hands, makes them more ideal in comparison. The enablement of social engagements with fellow players would in this case very likely make Mobile Games perfect for spreading in student communities, where students might join to play together with their peers.

### **2.3. The Innovations in Game Mechanics**

Modern Digital Games as a whole has developed a set of commercially successful patterns of Game Mechanics over the years, allowing new games to be created in numbers. At the same time, continuous innovations in exploring possible Game Mechanics have become more and more common, with experimental games from Indie developers increase in numbers in many platforms. Combined, these new realities allowed a much better understanding into the games and a much richer experience in Game Designing.

For some time, researchers have been attempting to isolate certain features shared only among Games to define the concept of Gaming. Digital Games, following this line of thought, are essentially part of the larger recreation industry, with many subsequently trying to separate them from other forms of entertainments. Noticeably, in the handbook written by Ryan Schaaf and Keri Engel, several features are listed as the features thought to be commonly shared by games: Challenge, Rules, Interactivity, Feedback, Conflict and Goals. While these are excellent summarizations, many innovations during the recent decade made them not as universal as

before and following the expansion of possibilities of games, we can see how well developed modern games have become.

Challenge, for example, is an element no longer obvious in modern idea of Games, especially Mobile Games. Traditionally, game designers would try to set certain scenarios and within these boxes, they would create obstacles for players to overcome. Often functioning as a hook to provide satisfaction when overcome, these challenges supply pleasure to the players and allow them to enjoy their achievements. The early Tomb Raider games are excellent examples, with the combat system simple and somewhat disappointing but the puzzle-solving challenging enough to create their own player base. Many popular modern Mobile Games, however, no longer set clear scenarios and obvious obstacles to attract the attention of their players, using mechanics like the system of collection to offer the satisfaction. There are two major methods to downplay the challenges in game playing: First, many Games outright removed or significantly decreased the mechanics of punishment for failing, or made the challenges not necessary parts of the game play, making the attempts to overcome difficulties far less challenging or avoidable. A good example is the Love Nikki-Dress Up Queen from Nikki Games, a Dress Up game surprisingly popular and well received. The game essentially encourages players to collect Digital outfits and the collection is achieved either through long time playing or digital purchase. Losing a combat does not carry negative impact and the player can choose to take the challenge at any time of their choice [14]. The challenge element thus comes from the player's willingness to further push the storyline and obtain certain outfits, rather than artificially created problems or scenarios.

Goals or Outcomes, likewise, are much more blurred and better explored nowadays. Many Digital Games tend not to give a linear playing experience, thus creating Game Goals completely determined by players if they ever have one. Best example in this case is the franchise of The Dark Pictures [15]. Little combat elements can be found within the games and the players simply control the behaviours of certain characters by making choices to influence the final outcome of the story. The goal, in the game, is not specifically pointed out and the exact way to achieve a certain goal is hidden to the players as well. The entire gaming experience is based upon the player immersion as the game plots unfold itself, making it similar to films and novels. Films and novels, as storytelling ways, do not require the audience to have a pre-set goal.

Even Feedbacks of Digital Games could function in a highly untraditional way now. The most obvious innovation is the delayed feedback mechanics, making the consequences of player action appear much later. Another important way to create untraditional Feedbacks is to hide the possible alternative consequence from the players. In 2015 Indie Game Her Story, players only interact with the Game by search and play short clips [16]. The only Feedbacks of the game are the videos available through searches, which are not essentially a Game Feedback. People could essentially achieve similar feedbacks in any kind of media conveying information: If one reads a book, the book presents its lines. If one watches a video, the video unveils its motion pictures. The Feedbacks only functions as a game mechanics along side its game setting and player immersion in Her Story, greatly extending the boundaries of traditional idea of Game Feedbacks.

It does not mean that the traditional defining characters of Games or Digital Games are no longer applicable. On the contrary, modern Digital Games is a very broad concept with many possibilities, and when talking about their educational use, it means that potential designers have a good pool of templates to use for Game Mechanics. There are many well tested designs used in many games, and many innovative designs requiring less technological inputs to achieve.

## 2.4. The Other Side of Distraction

One unchanging character highly unique to Digital Games, different from presenting Challenges, Feedback reactions or clear Game Goals, is the high Enjoyability. A game might not provide abundant Challenges, timely Feedbacks or Player Goal, but for a game to become a playable game, it must have the capability for people to find pleasure in it. Digital Games are particularly enjoyable comparing to many other recreation activities, and it would be unwise to ignore the potential risk of addiction in this discussion.

Admittedly Digital Games are rather commonly believed to be too enjoyable thus potentially addictive, with public activists and scholars alike bringing concerns over time as a major point of critiques over the decades. On the one perspective, these statements do prove that such games are commonly pleasant for a huge base of players. On the opposite perspective, they also set Digital Gaming up as a threat to effective learning. There are two takes: First, At least a noticeable group of players are essentially influenced by the games deep enough to cause addictive pattern behaviours. Second, however, such potential problems are identifiable and preventable, with several researches even concluded that Gaming itself is not the major cause relatable to these problems. 2014 Research done by Geir Scott Brunborg and colleges claimed that adolescents experiencing problems related to Video Games are likely to be related to other problems of life as well, Gaming itself does not necessary cause negative consequence [17]. Among related factors, social environment and personal status are also found related to Internet Addiction or Online Gaming Addiction through Eui Jun Jeong and Doo Hwan Kim's research in 2011 [18]. In 2010, Antonius J. Van Rooij explored the possibility to provide help to Gaming Addiction through social approach [19], while in 2013, a group of scholars including Chuan bo Weng investigated the pathological and biological level of Gaming addition [20]. These researches used different terms for Digital Gaming and researched from different perspectives, but collectively prevented the demonization of Gaming. In the much better informed and perhaps more enlightened environment today, Digital Gaming should be considered something controllable for students when used correctly.

From the educational perspective, in order to educate on a certain topic, the instructor could literally use almost every means capable of conveying information to the learners: Be that a fictional story through films, a written descriptive passage on books, or face-to-face direct verbal interactions in lectures. The means of teaching varies, and the effectiveness changes based on the contents, the instructors, the learners, and the environments. While many see the use of Digital Games in education as a potentially profitable future market, there is more than financial gains from the perspective of educationists: The uniqueness of Digital Games is exactly their high enjoyability, their great capability to bring joy and pleasure to the players and thus acquire both their willingness to play on and focus during the playing. The other side of addiction and distraction, in this case, is continuous interests and focus.

## 2.5. Better Development Environment

Either the Gamification of educational process or the utilization of Educational Digital Games, there has been a good history among educationists and instructors. From earlier days of computer software developments, groups of pioneers have been working to develop software programs to accommodate their needs in education practice. A distinctive figure for these attempts is the rather smaller size and short develop length: From 2006 to 2008, scholars from 26 countries and regions gathered for conference on the topic of E-Learning and Digital Entertainment. Eight researches and experiments on E-learning platforms were recorded and all of them were limited to a rather small level. Jia Jiunn Lo and colleges focused a research on a Digitalized Writing lecture, reaching as far as the interactive algorithm between the Database [21], Writing Composer and Error Analyzer. The experiment from Zacarias F. Fernando reached but the level of interface in their English language u-Teacher idea [22]. One of the larger

research conducted by Yvonne Klisch and colleges in 2011 managed to collect data from a group of 444 students when exploring the effectiveness of a Science Education Game, which is a significantly larger number but still relatively small considering the general size of many educational institutions and the Game Industry [23].

While it could be a potential problem for Educational Digital Game designers when the third party Game Engines were far rarer and less available, modern days there is a far better Indie Game development environment for any non-professional designers to create their own Games. Some of the reasons for the rise of Indie Games include a larger and more international market, more diverse developer communities, more accessible art and coding materials, as well as a general revive of active pursuit of creativities. Mobile Games are particularly good at adopting this new feature: Game Engines like Unity offers good support for Indie Mobile Games like nothing before, specifically aimed to provide individual or small groups of designers opportunities, making it possible for Educationists even frontline instructors to use. The release of Mobile Games is also much stabilized now after peaking at the middle of last decade: The amount of available Mobile Games on Google Play stopped its decrease in 2018 and started to slowly grow again [24]. While the amount of release number in Apple Store continued to drop, the revenue was not significantly decreased [25]. Both are good indication of a healthier environment.

### 3. Conclusion

Digital Educational Games have been a hot topic for years and upon our review of modern Digital Gaming market, it does seem that the moment for them has finally arrived. Educational Games are, essentially, games; the developments in modern Digital Game markets could be deeply felt by Educational Digital Game developers as well. Most noticeably, among all these advantages from better third-party engine, larger player base and more accessible resources, the Mobile Games took most advantages. They have become such an essential part of social life that most young people one time or another must have tried or witnessed the playing experience. Should a Digital Educational Game be developed now, it would be extremely recommended to base it on the Mobile Platforms using Mobile Game mechanics. And one would be excited to see further development of Educational Mobile Games in the coming years.

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