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# “Mobile Gaming”

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## Introduction

While the computer and console video games used to be the defining forms for digital gaming, mobile games have arguably established themselves as the contemporary, dominant sites for digital play. This development has been rather quick – only taking place in a timespan of couple of decades – and transformative for both the contents and practices of gaming, as well as to the associated gaming technologies and business models. Simultaneously, the detachment of digital play from the fixed location in homes and dedicated video gaming arcades has spread games and play into everyday lives in an unprecedented manner. This pervasive character and ease of access in mobile gaming is connected with several social and cultural changes: suddenly almost everyone seems to own a capable gaming device, and while there has been celebration of mobile gaming helping games to “go mainstream”, there has also been concerns (both by gamers and non-gamers alike) that all the associated changes have not been only for the good.

This chapter will briefly outline the success story of mobile games, the associated developments in the culture of mobile gaming, and highlight several of the relevant debates and research trends of this quickly developing field. We will particularly focus on three major turns or periods of mobile gaming: the early history of handheld gaming devices and cell phones; the smartphone era and the birth of contemporary mobile gaming ecosystem; and finally, the emergence of location-based and mixed reality mobile gaming. We shall discuss the multiple, distinctive features and consequences of such different varieties of mobile gaming, both for the actual gaming content, game development and industry practices, as well as to people who play games – and for the culture and society immersed in gaming.

## From the margins into the mainstream: the rise of mobile gaming

The evolution of mobile communications has been relatively fast process, which yet has led into deep societal and cultural transformations. According to the data gathered and published by ITU, the UN’s International Telecommunications Union, at the end of 2018 there were already more mobile phones than people on the planet. While over a billion people still lived without access to electricity (not to talk about clean water, for example), there were over eight billion active mobile, cellular connections around the world, while the global human population numbers were still below the eight billion mark in late 2018.

Our studies into game playing in Finland show that in less than a decade (2009-2018), the share of people playing games with mobile devices has risen rapidly – from 44 percent to 57 percent. All other devices and platforms that are used for playing games (such as personal computers, video gaming consoles, or playing games in web services such as Facebook) were in 2018 clearly behind in popularity as compared to mobile gaming. (Karvinen & Mäyrä, 2009; Kinnunen & Mäyrä, 2018.)

While such figures are interesting indications of the direction of changing practices and behaviours, the underlying reasons and consequences for game players, gaming content and society at large are rather complex. Much of the change is rooted in the fast developments in the underlying information and communication technologies, and in the manufacture of consumer electronics. The first handheld “mobile phone” that was demonstrated by Motorola in 1971 weighted two kilograms and was a completely different kind of device than the slim and powerful touchscreen smartphones of today. While this technological evolution took place, the understanding of what a “mobile game” is, or could be, was also radically changing. There are several important phases in this history that are good to review in this context, at least in outline.

## Early history and development of mobile games

It is not self-evident what a *mobile game* is, to start with. There is a long history of play and games, and many (if not most) games are not fixed into a particular place. It is easy to carry a deck of cards, for example, and start a spontaneous session of solitaire pretty much anywhere, or any time. There even exists evidence of specific, “traveller sets” of dice and board games being already used two thousand years ago by the Roman emperor Claudius (10 BCE – AD 54; see Joannou, 2007). For many uses, carrying compact playing pieces such as suitable bones or stones might have been preferred by travelling hunters and gatherers, for example. Mobile gaming has multiple other early roots in various travel practices and in early forms of media and technology that have been discussed in research (see e.g. Mattern, 2017; Farman, 2011). Adopting media archaeology approach, Jussi Parikka and Jaakko Suominen (2006) have discussed the changes in mobility practices and mechanical consumer entertainment that laid the foundation for many modern cultural forms, mobile gaming included, particularly during the nineteenth century.

Most directly, it is possible to see contemporary mobile games emerging specifically from at least two precursors: firstly, from the long history of the physical toys, cards and other playing pieces, and secondly, from the early computer and video games. The miniaturisation of electronics has proceeded fast, and already in the late 1970s the first generation of simple, handheld electronic games were made commercially available. Such included *Mattel Auto Race* (Mattel, 1976) and *Merlin* (Parker Brothers, 1978). Probably the most popular line of products in the evolution of single-purpose, mobile electronic gaming devices was the *Game & Watch* product series originally manufactured by Nintendo in the years 1980-1991. While the computer and video gaming and the underlying technologies continued to evolve, even into extensive virtual game worlds, it was the earliest video game generations that demonstrated the simple and clear formulas of game design that remained influential for mobile gaming for decades.

Many of the early entries into mobile gaming were basically attempts to reproduce some successful earlier arcade video game in a form factor suitable for small-scale electronics. Not much original innovation in terms of actual gaming content was going on at this phase, as apart from Nintendo, these were primarily consumer electronics manufacturers attempting to emulate video games, rather than companies with some game design know-how of their own. One example of this is how Nokia, the Finnish company which became a leading mobile phone manufacturer in the 1990s and early 2000s, implemented *Snake* (Nokia, 1997) into their handsets. *Snake* was used to pilot some technologies that became popular only later, such as an infrared link functionality allowing player-versus-player action. The typical use of *Snake*, as for most of early mobile phone games, nevertheless was for single-player gaming (Kuorikoski, 2015, p. 49).

As Internet and online gaming started to grow in popularity, there were many expectations directed at mobile Internet and gaming. The first industrial standard for mobile Internet was called WAP (for “Wireless Application Protocol”), released with much hype and marketing in 1999. Compared to the visually striking and technically advanced forms that computer and console video games of the era were reaching, the mobile gaming in the late 1990s could provide only rather modest offerings. A typical WAP game was a slow-paced black-and-white experience on a small screen; these games could basically just display text, or small static graphics screens, and each player action was followed by a rather lengthy waiting period, as the next screen was slowly downloading from the server over the cellular connection. However, the future potential surrounding the field was already seen at the time. Mobile handset manufacturer Nokia was a good example of this as well. They invested heavily into mobile gaming, and even moved to launch a dedicated, “N-Gage” series of gaming phones (2003; 2004). To circumvent the limitations of slow downloads, games for N-Gage phones were distributed gaming-cartridge style, in memory cards that were packaged in video game styled boxes.

The evolution of mobile gaming took several, diverging directions from the start. Christian McCrea (2011) has discussed two related and parallel developments, distinguishing between ‘mobile’ and ‘portable’ games and play – while the mobile games are focused on delivering fast and easy distraction, the portable gaming aims at home console or computer game styled, challenging gameplay of deep involvement and long play-cycles, adapted to small devices.

## Smartphone era: a revolutionary turn in mobile gaming

In discussions of mobile devices, it is often stated that iPhone by Apple (2007) revolutionised the entire industry. It is notable that this transformation was not brought about by any single technological breakthrough. All elements of the original iPhone had been available before, but the novel user experience provided by the highly simplified, touchscreen-based user interface made the impact of iPhone greater than the sum of its parts. The final key element in the success of the iPhone was introduced in 2008: the App Store. There had been several attempts to establish online stores for sales and digital distribution of software before Apple’s iOS App Store, but when combined with the increasing popularity of iPhone, the mobile “app ecosystem” suddenly exploded. The number of small pieces of mobile phone software – apps – available in

the built-in iPhone store grew from initial 500 into millions that are available today. There were parallel developments particularly in Google's Android ecosystem (also first introduced in 2008).

With the new generations of cellular networks (3G, 4G, 5G), powerful and relatively affordable touchscreen consumer devices, and constantly updated stream of software and services, the contemporary landscape of mobile gaming looks very different from that at the turn of the century. The understanding of what mobile games are, and can do, has changed accordingly.

The early phases of mobile game design were often focused on miniaturisation and simplification of existing video games, largely due to the limitations of the available computing power, memory, and restricted user interfaces in small handheld devices. As research and development moved forward, it became more apparent that mobile games could have some unique strengths that other gaming platforms could not provide. Our own research group in Tampere, Finland, was taking part in this development in the early 2000s, and it is interesting to reflect on how the early expectations and analyses have come true (or not) during the first two decades of "mobile era".

While much of the commercial mobile game development energy was driven to overcome the multiple technical and business challenges of this emerging industry sector, the interest of researchers and innovators was early on targeting what could be a "truly mobile" game. This was based on the realisation that mobile phones are first of all built for communication and maintaining social relations. Furthermore, as the device is intimately connected with the daily life and movements of individuals, the future potentials could lie in various "contextual" gaming applications, that take such information as the time, place or situational context into account while offering novel gaming experiences. In our MOGAME research project (2003-2004), we conducted a future-oriented user study, discussing alternative scenarios for the future of mobile gaming in several focus group interview sessions. The potential players at the time were particularly concerned about the playability and security of future, location-based mobile gaming (Ermi & Mäyrä, 2005). Drawing from such studies and technologies available at the time, we were able to design, implement and test an early location-based mobile multiplayer game in our research project ("Songs of the North", see: Lankoski et al., 2004). But it took more than a decade before the use of location information and mixed reality became a mainstream phenomenon, with the launch and exceptional success of *Pokémon GO* (Niantic, 2016). During the intervening years, however, there were several important developments in the gaming culture that affected the directions game design and game playing would take.

## Mobile gaming as casual gaming

In his book *Casual Revolution*, Jesper Juul (2010, p. 10) writes how game audiences and game designs co-evolve: "The audience learns a new set of conventions, and the next game design can be based on the assumption that the audience knows these conventions, while risking alienating those who do not know them." It can be argued that in the last decades, the game culture has simultaneously evolved into multiple, even mutually conflicting directions. While the passionate fans and hobbyists of complex computer and video games have taken part in

pushing certain genres into ever more ambitious forms, large parts of the population were left behind from those developments. In our 2008 survey study, only about eight percent confessed to being a gamer or game hobbyist, while the majority of people actually reported playing games – many even quite actively (Kallio, Kaipainen & Mäyrä, 2008). When our survey instruments explicitly mention that playing solitaire or lottery games or filling in a crossword puzzle are also considered game playing, we get a more comprehensive picture where about 88 percent of the population reports playing something at least monthly, and almost everyone confesses having played something (Kinnunen, Lilja & Mäyrä, 2018). Yet, the majority of these people appear to feel excluded from game culture, or at least do not accept being a “gamer” or game hobbyist as a part of their identity.

Mobile phones have had an important role in the transformation and “mainstreaming” of video gaming in society. This change has taken place during the wider developments of casual gaming and play cultures becoming visible parts in late modern culture and society. A parallel development has taken place in social media, where services like Facebook began to reach substantial populations and also distribute games as one element of the platform, simultaneously to the rise of the modern smartphone. A formative moment for the future success took place when the Facebook Platform and API (which makes third-party services on top of Facebook possible) was released in May 2007. It should be noted that also in Facebook, the first generation of games were derivative: for example, a *Scrabble* (Brunot, 1938) clone *Scrabulous* (Lexulous, 2007) became popular. A series of games like *Zombies* and *Vampires* (Commagere & Olson, 2007) were designed to utilize the social network and game mechanics as a viral distribution and marketing strategy. As the casual gaming style of Facebook games was fine-tuned, more ambitious, yet accessible games like *Happy Farm* (Five Minutes, 2008) and *FarmVille* (Zynga, 2009) emerged.

The game design of casual games was inseparably intertwined with their business models. Advertisements and micropayments became linked with time-based game mechanics that were designed to lock players into loops of visiting and revisiting the game to plant and harvest their virtual crops at regular intervals, for example. Much of these developments were soon repeated in mobile phone gaming – for better or worse. For example, the mobile game developer Supercell released in 2012 a mobile “farming game” *Hay Day*, which replicates and develops further much of the design and game mechanics of *FarmVille*, including the freemium business logic.

The research of casual games on Facebook and mobile platforms suggests that they are symptomatic of wider change in the directions digital game cultures were taking. The immersive and challenging games developed in such genres as adventure, role-playing and strategy computer games were based on the expectation that a player would be willing and able to dedicate tens, or perhaps hundreds of hours into progressing and learning in a game. The needs and life situations of many people are different. The preference for simple, ritualistic and non-immersive games became increasingly clear in the early 2000s, and casual social and mobile games were able to cater for those players. Game playing was not necessary the primary activity for such, heterogeneous user groups, and such games were played for numerous, also instrumental reasons – for passing time, for getting mind off from work, or for

creating and maintaining personal space, for example (Mäyrä et al., 2017). Related to this, both the discourses surrounding gaming changed and new casual design values emerged in the industry (Kuittinen & al., 2007; Kultima, 2009).

Some studies connect this change to gender-specific play patterns. The argument is that males and females appear to have somewhat different priorities and orientations in gaming, in average, and mobile gaming in “bite-sized chunks of time” (around 5-10 minutes) on one’s smartphone while commuting could be something that appeals more easily for women than games that are designed for dedicated, multiple-hour long sessions (Cohen, 2009). Female game players also appear to have preference for casual game genres, and in surveys of large player populations such popular game type as family or farm simulation games, and “match-three” games (e.g. *Bejeweled*: PopCap Games, 2001; *Candy Crush Saga*: King, 2012) mostly have female players – 69% of women against 31% men, in the Quantic Foundry (Yee, 2017) data, which is based on over 270,000 players’ responses. It should be noted though, that such socio-culturally mediated gendering of game playing can change, as gender representations in the gaming content and the gendered or discriminating practices in game fandom and games development change (Shaw, 2015; Chess, 2017; Anable, 2018).

While mobile gaming has undeniably broadened the audience of gaming, it has generally not received similar appreciation and approval as games on more traditional platforms. As long as mobile games have existed, they have been considered as a less serious or less valuable form of gaming that is suitable just to fill gaps before having the time to get into “real games”. The casual nature of mobile games has further decreased their status among gamer communities. In gamer discussions mobile games are devalued as being less “real games”, which is a problematic development. These attitudes and discussions exclude large parts of audiences and their preferences and effectively function as gatekeepers for new audiences (Consalvo & Paul, 2019). The devaluation of mobile gaming reflects how male-dominated game culture still is, and how much certain design conventions and complexity is valued, simultaneously discrediting games with lower threshold of entering. Due to the gender division in casual games, the excluded audiences are typically female-dominated, further emphasizing the exclusionary and discriminatory dynamics affecting gaming communities.

## Freemium model and mobile games: the changing ecosystems

The revenue models for mobile games have changed throughout time from pre-installed attractions and selling points of the device itself and pay-per-play SMS message games. While the games and their revenue models have evolved, the significance of the economics of them have dramatically increased. At the time of mobile games arriving on smartphones, the games typically applied what is called premium business model, which means that they had a one-time purchase fee. Due to the saturation of the market, the prices quickly came down, making it difficult to sell mobile games for higher prices. The free-to-play model was an answer for this problem. In this model, games are offered for free to download and play, but show in-game advertisements and offer voluntary in-app purchases during gameplay to collect their income.

Players can typically spend money to advance faster, make playing easier or more convenient, unlock content, or customize their game world.

Free-to-play games had already proven to be successful in other platforms such as online multiplayer games and social network games. However, bringing the model into mobile platforms (roughly from 2010 onwards) ended up being one of the biggest success stories in game business. It is also a crucial factor in how mobile games became as large phenomenon as they are today. In less than a decade, the development escalated to a point where almost all top-grossing mobile games had adopted the model. In a somewhat problematic dynamic, most players play these games for free, and from the small minority of paying players, majority of the revenue is gained from a small number of high spenders. According to a market study, as few as 2% of mobile free-to-play game players spend money on the game (SWRVE 2016), although, the division is highly dependable on the game. Drawing high profits and being dependent on a small number of high spenders has been criticized as exploitative. There are multiple social and psychological techniques these games rely on to drive a small portion of players to become high spenders (Shi et al., 2015; Zagal et al., 2013).

The market for mobile free-to-play games is highly competitive and dominated by companies with the possibility to gain enough players from their existing player-base or through paid acquisition such as advertising. While companies such as Supercell and King have stayed in the peak of the top-grossing list for several years, new and smaller companies might not make enough with their games for them to be profitable to upkeep.

As free-to-play model requires players to make in-app purchases during gameplay, the games have to be designed with the model in mind. This means that mobile free-to-play games share many design features. As the revenue is gained during gameplay and not beforehand, typically the games are never-ending, offering constantly more content and updates to keep the players interested and the games profitable. Similarly, as players need to be encouraged to pay for extra content, the games can include intentional hindrances and inconveniences, that can then be skipped with money. For instance, *Candy Crush Saga* includes levels that are made more difficult than others, designed to monetize the game and driving players into buying items to pass the levels. In *Pokémon Go*, the inventory sizes are limited, which increases the effort the player needs to use on item management. Inventories can then be enlarged with money or in-game currencies.

To prevent a player from advancing through the content too quickly, many mobile free-to-play games include waiting or grinding in their mechanics. This is connected to monetization as well, as players can pay to skip timers or boring content with money or in-game currency. For instance, *Candy Crush Saga* has incorporated mechanics of lives, which are consumed when the player fails to pass a level. Lives can be regained by waiting, paying, or with the help of other playing friends. In *Harry Potter: Wizards Unite*, spell energy is used for most actions in the game. Players can regain the energy by visiting inns by walking or by using in-game currency.

It is important to note that while the top-grossing charts have been conquered by free-to-play games, games with other revenue models still exist on mobile platforms.

## Location-based and mixed reality as the future of mobile gaming?

There are several technological advancements that have been incorporated into mobile devices, which the games have then taken advantage of. In addition to the general increase in processing power, these include touch screens, accelerometers, camera inputs, and location tracking.

Location data has been used in mobile games for as long as the technology has allowed it, but mostly in research prototypes, indie experimentations, and small commercial games that stayed on the margins of gaming. *Ingress* (2012) from Niantic reached enough commercial success to sustain the game, but it was not until the company released their second game, *Pokémon Go* (2016), when location-based games reached a mainstream status. *Pokémon Go* combined a popular, well suited brand, a successful marketing campaign and also managed to create a hype around the upcoming game (Mäyrä, 2017; Alha et al., 2019). The game was both easy to approach and included new, exciting playing styles that the broad audience was not yet used to. *Pokémon Go* opened gaming experiences to audiences that had not yet previously played mobile games (Koskinen et al., 2019).

After the success of *Pokémon Go*, other companies produced their own location-based games to get their share of the increased interest. *Walking Dead: Our World* (Next Games, 2018), *Ghostbusters World* (Next Age, 2018), *Jurassic World Alive* (Ludia, 2018), and *Harry Potter: Wizards Unite* (Niantic, 2019) all combine a known brand with the gameplay that involves physical movement. None of these games have reached a similar success as *Pokémon Go*, but some nevertheless have reached commercial profitability. The future of mobile gaming will most likely feature even more attempts both to bring location-based gaming into big crowds, and also create smaller, location-specific installations.

It is interesting to note that while games such as *Pokémon Go* and *Harry Potter: Wizards Unite* both include AR features to catch creatures in “real environments”, this feature is rarely used. Using the feature makes the creature appear and move against the surroundings recorded with the smartphone’s camera, but as catching is harder and the battery is drained faster, most players turn it off (Paavilainen et al., 2017). To reach more widespread popularity, technology needs not to be an obstacle for playing the game and provide real added value to it. Location-based AR game *Minecraft Earth* (Mojang, 2019) tries to tackle this by including building Minecraft environments in AR mode, and making it possible to join other players to build these cooperatively. In a wider picture, the direction of location-based gaming has oscillated between artistically, societally and commercially motivated developments (Leorke, 2019).



## Discussion

While high production value “AAA” games on PC and console platforms have evolved as immersive audiovisual and narrative experiences, mobile games tend to offer different kinds of experiences. The technological restrictions that are due to the smaller screens, limited input possibilities and lower performance of the hardware all have their effects on the platform, making mobile phones especially suitable for casual games. The casual nature of mobile games is what has made them as successful and helped them reach larger audiences than any other game platform, but within the gaming cultures, this is not greeted only as a positive development. Mobile games are often treated as a lesser form of gaming. One of the reasons for opposition to the rise of mobile gaming is the perceived threat it presents to established forms of gaming. At the same time, the mobility and sensors in smartphones have opened new opportunities, as witnessed by the rise of location-based games. Possibly the most controversial and debated feature of contemporary mobile games is the free-to-play revenue model, and fears of the model ruining game culture have often been voiced (Alha et al., 2014), and the rising ethical issues have already been met by efforts to regulate the gaming industry. However, as the model has become more common, it has also started to become normalized, and the revenue model has already become largely accepted as a part of certain kinds of games. Furthermore, new generations are embracing mobile devices as an equal gaming environment to other gaming platforms.

Smartphones are always present and offer constant distractions for the mind when needed. Mobile gaming sessions require less preparation than most other games and can be played anywhere, anytime. This makes mobile games also susceptible for problematic and excessive use. Nevertheless, according to a meta-study by Panova and Carbonell (2018) on smartphone addiction, it might be more suitable to talk about problematic use than actual addiction in the context of mobile gaming. The constant presence of stimuli and distractions has become problematic to many, and the excessive use, impulse control problems, and negative consequences that can harm relationships and work are present in problematic smartphone use, but there is not enough evidence to warrant speaking about wide-spread mobile gaming addiction in society (Billieux et al., 2015; Panova and Carbonell, 2018). On the other side, breaks with mobile gaming can relieve stress (Snodgrass et al., 2014) and thus function as a counter-force to a hectic, performance-oriented society.

The rise of casual and mobile gaming can also be considered within the context of changing norms, values and attitudes. A smartphone in the pocket is an opportunity for game play to become more pervasive, but people will not play games (not at least as much), if they feel powerfully sanctioned against it, or if their culture and society emphasises contrary values and behaviour models. The increasing presence and popularity of mobile game playing may be an indication of higher emphasis and cultural significance being placed upon play and playfulness in society, more generally. One discussion line in this area concerns the vision of “Ludic Society”, or “Era of Games”, where play, games and associated ludic practices would become culturally dominant in a late modern society (see e.g. Zimmerman, 2015; Mäyrä, 2017).

While children's play has had an accepted place in society for the modern period at least (Aries, 1965), adult play has been a much more tightly regulated and controlled area. Yet, there are indications that as the relationship between work and leisure is changing, along with the move from an industrial society to late modern society, there is also an increasing need for adult creativity and playfulness (Florida, 2004; McRobbie, 2016). In contemporary and future society, there is also a growing demand for people who can fluently interact with data and information, and engage in a creative manner with interactive representations, simulations and other kinds of dynamic, complex systems. The middle-aged adults entering the streets, playing *Pokémon Go* and other location-based, augmented or mixed reality games with people younger (and older) than them might be a signal of broader "ludification" of culture and society: game playing is one normal, acceptable or even appreciated element in almost everyone's lives.

The alternative, critical perspectives into the rise of mobile gaming and augmented reality technologies are nevertheless also important to take into account. The commercial exploitative monetization strategies that often focus on small, vulnerable minority of users, already have cast a shadow on the ethics of the entire mobile gaming industry. Furthermore, if we consider a potential future development where multiple "augmented layers" of gaming realities are imposed on top of our shared social and physical spaces everywhere we go, possibly even with the help of prosthetic technologies such as always-on AR eyeglasses (as the logical next step from our increasingly obsessive smartphone usage patterns), there is a real danger of increased social fragmentation, radical loss of privacy, and manipulation of perceived reality with commercial or political motives. In this line of thinking, the future of mobile gaming would provide novel opportunities for alienation, exploitation and even oppression.

The history of debate on various video game effects nevertheless suggests that it is typical to overestimate the impact of games on our lives. While the trend towards pervasive and even compulsive use of smartphones is today well documented and debated, the few existing studies on this topic suggest that people who could be described as "addicted" to checking their smartphones constantly are more drawn towards the social media updates than mobile gaming (see e.g. Jeong et al. 2016). Mobile gaming, with all its creative and stimulating potential nevertheless also remains embedded within this wider, problematic trajectory.

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