Does Platform Matter? A Game Design Analysis of Female Engagement in MOBA Games

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ABSTRACT
Previous research shows that female players participate less in competitive games than male players. However, it is reported that there are more female players are than male players in King of Glory (KoG), one of the most popular multiplayer online battle arena (MOBA) games on the mobile platform in China. This study aims to investigate how can KoG capture the interest of female players. We compared the game design of KoG with League of Legends (LoL), one of the most popular MOBA games on the PC platform. We followed up with a semi-structured interview study with 20 participants about their gameplay experiences on the two different platforms. Our analysis indicates that mobility, sociability, and lower barrier to entry are the main factors that drove female players to participate in KoG.

Keywords
Multiplayer Online Battle Arena Games, MOBA Games, Competitive Games, Game Design, Gender Differences, Game Control, Game platform.

INTRODUCTION
In recent years, female participation is gradually increasing in the gaming industry. Based on the Entertainment Software Association (ESA) 2016 annual report, 41% of the US gamers are women (ESA, 2016). However, female players prefer to play games with non-violent games such as social games, puzzle games, board games, etc., while male players prefer violent games and competitive games (Hartmann & Klimmt, 2006; Inkpen et al. 1994; Lucas & Sherry, 2004; Phan et al. 2012). According to a report from Quantic Foundry (QF), the female participation rate in MOBA games and first-person shooting (FPS) games are only 10% and 7%, and there is only 2% female participation in sports games (QF, 2017). Nevertheless, it is reported that 54% of the players are women in *King of Glory* (KoG) (Tencent Games, 2015), a MOBA game on the mobile platform released by Tencent Games in China (Jiguang, 2017). It is interesting that there is higher female participation than men in KoG given that it is a MOBA game. This surprising phenomenon served as our motivation to understand what led to such high female participation in KoG in China.

In this paper, we report an interview study of players who have played both KoG and *League of Legends* (LoL) (Riot Games, 2009), one of the most popular MOBA games in the world. Our research objective is to understand factors that led to higher female participation in a game genre that has been traditionally seen as overly competitive and less inviting to female players. In the next section, we review the literature on gender differences in competitive gameplay, and game platform research. Then we describe our research methodology which included semi-structured interviews with players of KoG and LoL. Next, we provide a game design analysis on different platforms, and summarize the findings from the interviews. In the last, we discuss features that could be leveraged to design future games to encourage female participation, especially in multiplayer collaborated competitive games.

RELATED WORK

Gender Differences in Competitive Gameplay

Previous research has found clear differences of video game genre preference across gender. Female players prefer social games, music or dance games, puzzle games instead of games with low social interaction and violent content (Hartmann & Klimmt, 2006; Inkpen et al. 1994; Bonanno & Kommers, 2005; Lucas & Sherry, 2004; Phan et al. 2012), whereas men prefer more violent and competitive games (Inkpen et al. 1994; Phan et al. 2012). One explanation for female players not interested in competitive games could be they are less interested in the competitive or violent aspects of play (Cassell & Jenkins, 1998; Hartmann & Klimmt, 2006; Lucas & Sherry, 2004). Specifically, Schmierbach (2010) mentioned that as "competition serves to reward and reinforce aggressive play" (p. 268), female players who are less likely to enjoy competition, are less likely to learn violence as "rewards" in the competitive play like male players do. However, some research found that it is the motivation of players determines their game preferences. People play games for different reasons, and even the same game may have various meanings to different players (Yee, 2006). Based on 2016 Quantic Foundry survey, the primary motivations for men to play games are competition (14.1%), destruction (11.9%), and completion (10.2%), whereas completion (17%), fantasy (16.2%) and design (14.5%) are the primary motivations for women (QF, 2016). It is consistent with what researchers have found. Olson et al. (2008) found that male players use violent video games to express their demands for gaining power as well as their feelings of anger and stress. Hartmann and Klimmt (2006) found that female players prefer games with rich social interaction and dislike "violent content and heavy gender-stereotyping in the presentation of characters" (p. 925). These findings also support the explanations mentioned previously. However, Olson et al. (2008) also found that a considerable number of female players utilize games to express their anger and other emotions. Hartmann and Klimmt (2006) found that social interaction is more important to female players than the gender-stereotyping and violent content in the game. Furthermore, researchers have found that technology integration level and dedicated gaming time would affect the motivation of female players (Royse et al., 2007; Shaer et al., 2017). Female players who spend much time on playing games are usually enjoy mastering the games and are motivated by challenges, and competitive games allow them to achieve these goals (Royse et al. 2007; Shaer et al., 2017). For casual gamers, the motivation could be a sense of self-control and they still put themselves as "outsiders" and consider masculine as the prominent factor in the competitive games (Royse et al., 2007).

However, some other researchers stated that the discourses about gender preferences were not about simple binaries like violence and no violence but about considering in different

contexts (Carr, 2005; Jenson & de Carstell, 2010; Yee, 2008). Participants' ages, amounts, consumptions and locations could affect their gaming preferences. Regardless of these sub-contexts, the main reason which hinder female players' willingness to play competitive games in a general social context could be the existing gender-stereotyping and hostile environment. Previous research has found that female players are often perceived as "outsiders" and render both sexual harassment and general harassment due to gender stereotypes (Gray, 2012; Yee, 2014; Nakandala, 2016; Ratan et al., 2015; Taylor, 2009; Tang & Fox, 2016; Shaer et al., 2017). As players become more aggressive in the game world, these stereotypes are progressively internalized and are more likely to be adopted by experts than novices (Bergstrom et al. 2012), which could easily form an unhealthy gaming environment for female players. Research has found the existing gender stereotypes in games (Cassell & Jenkins, 1998; Taylor, 2009; Mou & Peng, 2009; Gao et al., 2017). No matter under-representation of female heroines or hypersexualized female portraits, stereotyped game design not only reinforce the existing gender stereotypes (Martey et al, 2014; Brehm, 2013; Todd, 2012; Schröder, 2008) but has a negative influence on future game design. From above we could see the reasons underlying female players' participation in competitive games are diverse and complex. Different researchers have identified female players with different motivations and preferences in different contexts. Moreover, researchers are still exploring more possibilities and factors towards female players' participation in competitive games. Thus, it is difficult for game designers to generate a systematic framework to increase female player participation. This paper tries to understand the useful factors encouraging female participation from existed successful game design and gives game designers instructions on female participation inclusion.

Gaming across Different Platforms

Much research has been done on gaming across different platforms and controllers to understand their effects on the gameplay experience. Researchers have studied player experience and behavior on immersive virtual environment versus traditional platform desktop (Persky & Blascovich, 2007) and pen and paper platform versus digital platform (Tychsen et al. 2008; Tychsen, 2006). Considering few games are developed across different platforms, game companies typically maintain the same game contents but with different game control devices. Therefore, prior research on game input have studied the differences across different controllers such as keyboard, gamepad, and controllers with different design and functions and how they affect the playing experience including user enjoyment, motivation, engagement, and social behaviors (Birk & Mandryk, 2013; Brown et al. 2015; Gerling et al. 2011; Lucas & Sherry, 2004; Tychsen, 2006; Limperos et al. 2011). Therefore, as more platforms are available to the public, gaming companies have noticed the importance of developing games across different platforms now. This paper aims at making the contribution to game research on gaming across different platforms such as PC, mobile phones, and consoles. Besides, no research has been conducted to explore how different platforms affect female participation in MOBA games in terms of game design. This paper tends to inspire other researchers on studies between game platforms and female participation.

METHODS

Game Design Comparison

We conducted a design analysis that focused on unpacking the differences of MOBA game design on mobile versus PC platforms. We chose to focus on KoG and LoL because 1) The fundamental game mechanics and design elements are highly similar; 2) they are the most popular MOBA games on the respective mobile and PC platforms;

Brown et al. 2015) they are owned and developed by the same game developers.

MOBA Games

MOBA game as a genre was originally derived from the Aeon of Strife map in *StarCraft*. Later, Blizzard Entertainment released *Warcraft 3* (Blizzard Entertainment, 2002) that included a mod called *Defense of the Ancients* (DOTA) that popularized the MOBA genre. MOBA games typically contain the following map layout and game mechanics: two teams with five players each located on opposite ends of the map with the goal of destroying the nexus located in the enemy's base. Three lanes (top, mid and bottom) connect the two bases, and two turrets are located on each lane for each team. Players need to destroy all turrets on all lanes to approach the nexus, for which players need to slay enemies and non-player characters (NPC) such as minions and monsters to level up, get buffs, and earn money to buy necessary equipment from the in-game store.

The in-game character avatars are called champions, and there is a wide range of champion selection in MOBA games, which allows players to form various team compositions in the games depending on their preferred strategy. While most MOBA games are released on the PC platform, more and more MOBA games are being released on mobile platforms. Mobile games such as KoG, *Vainglory* (Super Evil Megacorp, 2014), and *Mobile Legends* (Moonton, 2016) are all popular mobile MOBA games around the world today.

King of Glory

King of Glory (or 王者荣耀 in Chinese) is a multiplayer online battle arena (MOBA) game on the mobile platform in China developed by Tencent Games, which is a subsidiary of Tencent (King of Glory, 2017). In July 2017, it was reported that the game had over 54 million daily active players and 163 million monthly active players according to Jiguang, an IDG Capital-backed big data platform (Jiguang, 2017). Specifically, it was reported that female players had outnumbered the male players with 54.1% for the first time in any MOBA games (Jiguang, 2017). This shows the possibility for female players to enjoy playing competitive games such as MOBA games, and the goal of this research is to uncover factors that encourage female players to participate in KoG.

League of Legends

League of Legends (LoL) is a MOBA game on the PC platform developed by Riot Games, which is a subsidiary of Tencent Games. It is one of the most played video games on the PC platform in the world, with over 27 million daily active players and 67 million monthly active players (League of Legends, 2017). Female participation was reported to be 35% in 2017 (Bloomberg, 2017). In this work, it is our goal to compare and contrast player experiences on both KoG and LoL in order for us to understand the differences of female participation in these games, given that they share very similar map layout and game mechanics as they are developed by the same company.

Semi-structured Interviews

We conducted semi-structured interviews with 20 Chinese participants (10 women, 10 men) who were recruited by the researchers on game events and conventions in US from June to December 2017. In order to get more meaningful data and reduce the gender bias, the researchers tried to recruit women and men with equal numbers, and ensure all participants were experienced players on at least one platform. The interviews were conducted in Chinese in person with the consent of audio recording. The audio-recorded interviews were transcribed and translated into English by the first author. All participants participated voluntarily with no compensation. The

interview protocol is adapted from the authors' prior research on MOBA games (Gao et al., 2017) with a particular focus on topics such as what game do the participants mainly play, what motivated them to participate in these games, what in-game role do they usually play, how they communicate with other players, etc. Table 1 details the demographic information for all participants. Table 2 shows the gender distribution regarding their game platform experiences.

Interview Data Analysis

We applied open coding (Cobin et al. 2014) to the translated transcripts. The authors discussed the initial codes. Gaming culture and Chinese culture were considered during the coding process to identify the data more accurately. Affinity diagram (Holtzblatt & Jones, 1993) was used to organize the open codes to iteratively refine emerged themes.

Participant code	Gender	Age range	Education level
P1, P5, P6, P16, P17, P18	M	21-28	Master
P2, P3, P4, P15	M	24-26	Bachelor
P12, P20	F	24	Doctoral
P7, P8, P11, P13, P14	F	23-28	Master
P9, P19	F	24-27	Bachelor
P10	F	20	Undergrad

Table 1: Participant Demographics

Platforms	Women	Men
Both	2	6
Mobile Only	6	2
PC Only	2	2

Table 2: Gender distribution regarding playing experience on different platforms.

GAME DESIGN ANALYSIS

In this section, we compare the game design between KoG and LoL in terms of avatar design, gameplay design, social interaction design as well as tutorial design.

Avatar Design

The avatars, also known as champions, are the core component in MOBA games. Champions have different appearances, backgrounds, and capabilities, and they give players a wide range of options in the game. At the time of writing this paper, there are 134 champions in LoL, including 44 women (33%), 89 men (66%), and one dual-

gender champion (Kindred) (LoL, 2017), and there are 70 champions in KoG, including 18 women (26%) and 52 men (64%) (Tencent, 2017). Although champion gender distribution between LoL and KoG are similar, most of the champions in KoG are depicted based on well-known Chinese historical figures or fictional novel characters. For example, champions like 小乔，大乔 and 吕布 are historical figures from the Three Kingdoms period (220-280 AD) who were documented in the *Records of the Three Kingdoms* (Chinese：三国志). Champions like 哪吒 and 姜子牙 are fictional characters in *Investiture of the Gods* (Chinese: 封神演义), a fantasy novel written during the Ming dynasty (1368-1644).

Figure 1: The input control method for KoG.

Figure 2: The input control method for LoL.

Gameplay Design

Different platforms require different methods of input. A keyboard and a mouse are required for input on the PC platform, while the touch screen is the input method for the mobile platform. Figure 1 shows the input control method for KoG on a smartphone (Tencent, 2017). A virtual joystick is created for the left thumb to control the avatar movement, and clickable virtual buttons are designed for the right thumb to attack and cast spells or abilities. LoL requires the combination of a keyboard and a mouse. The mouse is used to control avatar movement and select items, and keys such as Q, W, E, R, and other number keys are used for attack, casting spells or abilities, and consume or activate items in the inventory (LoL, 2017). (See Figure 2)

Besides the differences between input control methods, several game mechanics that are common in MOBA games on PC platform such as LoL are adapted to be suitable for KoG to be more playable on the mobile platform. First, all players have full vision of the map, which means players don't need to place wards and fight to gain vision of the map in the game. However, KoG provides another mode called the fog mode, in which players could experience the fog of war just like in LoL. Second, the number of abilities for each champion is reduced from 5 in LoL to 4 in KoG, and the required level to learn the most powerful skill of a given avatar is reduced from level 6 to level 4.

Social Interaction Design

While LoL players need to register for accounts to log in and need to acquire other players' IDs in order to add them as friends, KoG has omitted these tedious tasks by allowing players to log in using either a QQ account or a WeChat account. QQ and WeChat are the two most popular instant messaging applications in China developed by Tencent. Thus, players could communicate and play with their friends on social media immediately after login, and they could send daily gifts to their friends and invite their friends to play together (see Figure 3) (KoG, 2017). Additionally, KoG incorporates the mentoring system of massive multiplayer online role-playing games (MMORPG). An experienced player could join forces together with a new player to help new players become more familiar with the game quickly and gain experiences and rewards by completing specific tasks together.

Figure 3: Interface of the Friends tab.

Tutorial Design

LoL provides a complete tutorial in which players are introduced to all necessary information in the beginning of the game, whereas KoG provides a series of interactive tutorials for new players to learn and practice (see Figure 4(a)) (KoG, 2017).

Figure 4: (a) Series of interactive tutorial in KoG (left);
(b) incremental reward task structure in KoG (right)

In addition, KoG provides an incremental reward task structure that helps them to get familiar with the game mechanics and environment with careful scaffolding (see Figure 4(b)) (KoG, 2017).

FINDINGS

Based on our analysis of game design and interview transcripts, we identified the lower barrier to entry, mobility, sociability, and avatar perception as key factors that drove female players to participate in KoG.

Lower Barrier to Entry

Since MOBA games typically have a high learning curve at the beginning (Gao et al., 2017), it is very difficult for new players to get comfortable with the game. By reducing the difficulty level of the gameplay and input control as described in Gameplay Design section, Tencent Game developers made the game easier for players to learn. These changes also reduce the time required to play one round of KoG. In our interviews, all participants mentioned that KoG was very easy to learn, the game control was simple and intuitive, and it has a low learning curve. Participants also reported that the interactive tutorial series, the incremental reward task structure, and the mentoring system made KoG easy to learn for the new players.

> P2: *"KoG is easy because the virtual joystick is highly fault-tolerant, which could provide a good gaming experience to most players."*

> P6: *"I think the mobile gameplay is very convenient and simple compared to PC. KoG also requires less playing skills and strategy and is friendly to new players."*

> P7: *"KoG is much easier than LoL. It enlarges the cast range of champions and provides functional tutorials for new players. Therefore, new players could get in very fast."*

P10: "My friends all recommend KoG to me. I was not interested in MOBA games before, since KoG is much easier to control and play, I tried and found it pretty interesting."

However, although KoG lowered the entry barrier for mobile players to broaden its audience, it frustrated the players who prefer the traditional style of MOBA games. For instance, there are 4 participants (2 women, 2 men) who chose to play MOBA games (i.e., LoL, DOTA) only on the PC platforms. When asked what prevented them from playing KoG, they provided the following rationales:

P13: "I do not play KoG because it is not fun to me. I like to play LoL because it requires more serious strategy and teamwork. I also think the screen on the mobile phone is too small for MOBA games to gain complete control."

P16: "I don't play KoG mainly because there are too many terrible teammates. Since KoG decreased the gameplay difficulty, a lot of players only play for fun. They don't care about the teamwork or win rate, which destroys my playing experience completely."

From above we could find that the demand for game complexity and the attitude towards gameplay vary among male and female players playing on the PC versus mobile platforms. Some of our participants made the following comments:

P2: "Although KoG has more players and gross than LoL, it can't take LoL down. They have different target users. LoL is more about strategy and teamwork whereas KoG is for social and entertainment."

P4: "I think KoG can't replace LoL because they have different target users. LoL players usually those who have more time to play, and KoG is opposite. I could gain more self-gratification in long-time playing."

P19: "KoG might take away some market share from LoL, but it will not replace LoL. It is because users have different needs, so these two games would have their own core users and market."

It supports previous findings that players have different purpose towards gaming, especially among players with different level of time dedications (Hartmann and Klimmt, 2006; Royse et al. 2007; Yee, 2006; Shaer et al., 2017). Serious gamers who dedicate much time to playing games usually demand games with high difficulties and challenges just like P13 and P16, so they want the game to be complex, and want the teammates to be dependable. However, most casual gamers play games to kill time or to social with other gamers, so they want the games to be less difficult and time consuming. Therefore, for serious gamers, mobile platforms might not be a good platform for them to play. It also supports the result of a previous research that female players who spent more time on gaming are more likely to play on a computer or a console than on mobile phones (Shaer et al., 2017).

It is evident that KoG developers made a conscious decision to sacrifice complexity for playability on mobile devices in order to broaden its scope to the public. Such tradeoff is considered to be positive for players who prefer social and casual games, which require less time dedication. However, it could be undesirable for serious gamers, who seek high game complexity and gaming performances.

Mobility

Smartphones are highly portable, and they are carried by people at all times. Mobile games, particularly casual games, are often used to kill time when there is downtime (e.g., commuting on public transport). ESA reports that Americans spend a third of the commuting time playing games on mobile phones and tablets (ESA, 2016). Therefore, designers of mobile games must take the ever-changing context and the mobile nature of the environment. In adapting LoL on PC to KoG on the mobile platform, the game design removed some features to reduce the total time cost for each round of the game in order to accommodate the mobility aspect of mobile platforms. Our participants indicated that the mobile nature of smartphones makes it easier for users to play without the limitation of location and device hardware.

> P8: "I like KoG because it takes less time for each match. It is not like PC games which take a long time, and it has less delays."

> P13: "The mobile game requires less time, which is good for killing time. LoL takes a longer time commitment to set up and play, so it is more difficult to get into the game when you're constantly on the go."

> P19: "It takes less time to play one round in KoG, and it is also very convenient to play using a smartphone because it's always with me."

Besides, the mobile feature also makes it possible for people to meet up and play the game together in a collocated fashion. This collocation would facilitate the frequency and quality of communication between players, which lead to higher team performance (Huffaker et al, 2009). Some of the participants mentioned that they prefer the face-to-face communication while playing, so they usually gather together first then play together.

> P3: "I usually communicate with my teammates face to face, and we usually meet first then play together."

> P4: "I play with my friends most of the time, and we always communicate offline."

> P10: "I usually play with my friends if we meet in person."

In this case, PC platforms usually face many challenges regarding team communication. For example, verbal communications are usually accomplished through text and voice chat. However, text chat is distracting in the time-limited competitive games (Innocent & Haines, 2007), and players might feel difficult to type while controlling the avatars. Besides, despite the poor voice connection quality, voice chat sometimes causes player's confusion on who is talking (Halloran et al. 2004), especially when mixed with game sounds (i.e. background music, sound effects).

However, although mobile platform could bring more mobility, convenience, and communication to players, it causes other unintended consequences that could negatively impact the gameplay experience as well. Our participants mentioned that people dropped offline more frequently than in traditional MOBA games like LoL.

> P5: "There are always people who would drop offline intentionally. Some of them might've encountered network problem, but some others just quit during the game because they have to go. It is much more common to quit on the mobile phone."

> *P6: "I know there are some players who drop offline due to being interrupted by friends, poor network connection, incoming calls, and battery issues."*

To avoid this problem, P9 uses the tablet to create a better gaming environment for KoG:

> *P9: "I usually play on my tablet, because sometimes there are incoming calls to my mobile phone while I am playing, which is annoying. In addition, sometimes the network is poor on my mobile phone, and the WiFi connection on my tablet is much more stable."*

Therefore, while the mobile nature of smartphones makes it more convenient for players to play a quick round of KoG while being on the go, thereby making it more attractive for casual gameplay, connectivity, hardware, and interruptibility issues could all affect gameplay experience in significant ways.

Sociability

Sociability is a key, if not the most important, feature when playing multiplayer games. ESA report that Americans are increasingly relying on multiplayer games as a means to socialize with others (ESA, 2017). Prior research found that both female players (Hartmann & Klimmt, 2006, Inkpen et al. 1994, Lucas & Sherry, 2004, Phan et al. 2012, Royse et al., 2007) and male players (Olson et al., 2008; Yee, 2006) prefer games with the support of social features. Specifically, in Royse et. al's (2007) research, female players even consider social features more important than violent and gender-stereotyping gaming features. KoG supports social interaction by leveraging social media account login to tap into the player's existing social network as well as incorporating social interaction design features such as the mentoring system to encourage communication, interaction, and coordination among players.

About 90% of the participants in our study play MOBA games with friends, and those who only play KoG (6 women, 2 men) reported that they were introduced to playing KoG because most of their friends were playing it. Specifically, some participants regard it as a social game, which helps them hang out with their friends.

> *P1: "I play KoG for social reasons; it is interesting only if I play with the people I am familiar with."*

> *P7: "I think KoG is really good for socializing, I play it with my roommates all the time at first, then I play with my friends who I haven't been in touch with in a long time."*

> *P9: "I usually play with my friends. We usually play when we hang out together."*

> *P19: "I think KoG is a social method. For example, friends could play together while waiting to eat in a restaurant. It could get a lot of social-driven players like me."*

The ability for Tencent Game to rebrand a competitive MOBA game such as LoL as a casual social game is instrumental in encouraging female participation in KoG.

Avatar Perception

Previous research has found that avatar appearance would affect player's in-game performance (Peña et al. 2009; Yee & Bailenson, 2007; Gao et al., 2017). As we

have previously mentioned, the avatar design in KoG is based on well-known historical figures or fictional characters in fantasy novels, which might encourage people to play due to their familiarity with the characters. Based on the report from Penguin Intelligence (PI) which is a research institute owned by Tencent, female players in KoG care more about champion appearance than male players, which is consistent with previous research results (Gao et al., 2017), while male players in KoG care more about historical context of the champions than female players (PI, 2017).

In our study, three of our participants (P8, P17, P18) mentioned that they wanted to play the game because they liked the aesthetics and champion design of KoG.

> P8: "I like KoG because the champions are relevant to the Chinese culture and are very good-looking."

> P17: "The reason that I started to play KoG was that my friends had posted the pictures of Xiaoqiao (Chinese name: 小乔) and Daqiao (Chinese name:大乔) (female champions in KoG) on Wechat, and I think they are so good-looking."

> P18: "The champions in KoG, are based on historical figures, which make me feel at home."

Avatars generated from well-known historical figures establish a connection between avatars and players. This connection might result in a more comfortable playing environment, which attracts people to play. Moreover, the avatar appearance influences players as well. Avatars designed with high aesthetics are more likely to attract players to play.

Conclusions and Future Work

This paper explores the main factors that drove female players to participate in KoG in a study that involved game design analysis and semi-structured interviews with 20 experienced MOBA players. The results show that lower barrier to entry, mobility, sociability, and avatar perception are the main factors that led to the increase in female participation in KoG. Since mobile platforms provide strong mobility and sociability, female players are more likely to play with their friends using mobile devices though serious female players might still stick to PC platforms for high gaming complexity. Therefore, game designers should consider the features of different platforms during the design process. For games on PC platforms, since the mobility is limited, game designers could focus on improving the sociability of game and having different game modes at different levels of difficulties to include more female players. Moreover, game designers could also make efforts to avatar designs. Avatars, with aesthetics and having backgrounds that people are familiar with, are more likely to get female players engaged. For games on mobile platforms, besides maintaining the current mobility and sociability, game designers should also consider the offline problem such as low battery and poor network connection which players mentioned to enhance experiences for players. Regarding female players have an extremely low participation rate in MOBA games and other competitive games, it is important to consider these factors in the game design process, so game developers could continue to design games that are friendly and inviting to female players in the future. The findings of this research could inform game design in other game genres with similarly low female participation rate, especially in multiplayer collaborated competitive games.

Recently, Tencent released the international version of KoG called *Arena of Valor* (AoV) (Tencent Games, 2017), previously called *Strike of Kings*. The AoV avatar designs and gameplay are different from KoG. Future studies could focus on comparing AoV with KoG and LoL to unpack differences in cultural influence and how game design could impact female participation at the international level. Furthermore, AoV is also released on Switch, a video game console developed by Nintendo. Future studies could be conducted on exploring more user-related design features across different platforms.

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