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## Developing a Conceptual Model of Service Quality for eSports

Xiuqi Zhu <sup>a,b</sup>, Do Young Pyun <sup>a</sup>, and Argyro Elisavet Manoli <sup>a</sup>

<sup>a</sup>School of Sport, Exercise and Health Sciences, Loughborough University, Loughborough, United Kingdom of Great Britain and Northern Ireland; <sup>b</sup>Faculty of Art, Science, and Technology, University of Northampton, Northampton, United Kingdom of Great Britain and Northern Ireland

### ABSTRACT

In this article, a conceptual model for service quality of eSports events was proposed including four dimensions: competition quality refers to the perceived quality of the actual game itself; physical environment quality dimension stands for the physical surroundings where the service is produced and delivered; event execution quality measures the intangible items in the peripheral service, which can be directly designed or managed by the event organizer; and interaction quality measures the interaction among spectators, such as crowd experience or social factor. The validity of each dimension in other service industries and its suitability in the eSports context are both taken into consideration. At the current stage, the model is conceptualized from existing literature, thus demanding further qualitative and quantitative study.

### KEYWORDS

eSports; eSports event; service quality; spectator; model

## Introduction

With spectator sport gradually growing into a large and competitive industry, a plethora of sport literature has investigated service quality of events and its impact on spectators from various aspects, such as the effect of stadium environment (e.g., Cho et al., 2018; Wakefield et al., 1996), in the context of recreation sport industry (e.g., Ko & Pastore, 2004), in the context of professional sports (e.g., McDonald et al., 1995), and its conceptualization (e.g., Yoshida & James, 2011). However, despite the widely acknowledged importance of understanding spectators' perceived service quality, limited effort on such topic has been seen in the field of eSports. eSports is defined as “a competitive sport performed in a virtual environment in which physical and mental abilities are exercised to create victory conditions through generally accepted rules” (International eSports Federation, n.d.). Video games are goods, but eSports refers to the activities or events of competitive video games, which therefore can be considered a sport service (Funk et al., 2018). Competitions or events hence form the core of the entire eSports industry, around which are established the clubs, media, sponsorships, governance organizations and other elements. Behind the ongoing discussion on the nature of eSports, the economic impact of the industry has been growing with astonishing rates over the last decade. In 2019, US\$950.6 million revenue was generated by global eSports, including US\$56.3 million ticket revenue from 885 major events (Newzoo, 2020). Sponsorship (57.9%) is considered the biggest revenue stream, followed by broadcasting (16.9%), and merchandise and tickets (11%; Newzoo, 2020). In

**CONTACT** Xiuqi Zhu  [x.zhu@lboro.ac.uk](mailto:x.zhu@lboro.ac.uk)  School of Sport, Exercise and Health Sciences, Loughborough University, Epinal Road, Loughborough LE11 3TU, United Kingdom of Great Britain and Northern Ireland.

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fact, the latter source of revenue, merchandise and tickets from events, appears to be surpassing the game publisher fees revenue, making events a core element of the eSports industry structure (Newzoo, 2020).

Given the role of eSports events in the industry, its significance has been rather underestimated in research. There are a few studies that investigated consumer behavior, such as Pizzo et al. (2017) and Qian et al. (2019) on the motivation of on-site spectators and Jang and Byon (2020) on the relationships among eSports players intention to gameplay, actual gameplay, and intention to watch eSports events. However, no study has specifically focused on event quality, even though event quality has been evidenced to be an important factor influencing spectators' satisfaction and behavioral intention in spectator sport (e.g., Theodorakis et al., 2001; Yoshida & James, 2011). On comparison, service quality for many other types of sports has already been investigated, such as football (e.g., Biscaia et al., 2013), basketball (e.g., Crespo et al., 2013), cricket (Mokoena & Dhurup, 2017) and golf (Son et al., 2018). Such studies have conceptualized service quality using a range of dimensions that could provide reference for eSports, but eSports events are different from traditional sport events in a number of ways. The most distinctive difference is the duration. While most spectating sport events tend to last from two (e.g., football) to four (e.g., baseball) hours, major eSports events such as *League of Legends* World Championship Finals could last up over ten hours. Even seasonal games for *Peace Elite League* or *King of Glory Pro League* could last over five hours, which would be the equivalent of two football games. This duration is because eSports has multiple competitions in a single event, which inevitably leads to a unique challenge of attrition. Hence, spectators' perceived service quality of eSports events would have reasonably higher demand of certain elements compared to traditional sport events. This demand could be mainly reflected into two dimensions, which are the physical environment and event execution. For physical environment, eSports spectators rely entirely on the screens to see the gameplays of the game. Therefore, the position and size of the screens are very important to their event experience. For event execution, rooted in video games, eSports contains more recreational elements than traditional sports, such as cosplay shows and game concerts, which are similar to recreational events such as music festivals. Therefore, given the uniqueness of eSports, a bespoke conceptual model of service quality for eSports is needed. Currently, this is still a gap to be filled in the study of eSports.

From the operational perspective for practitioners, a context-specific service quality measurement is necessary in order to understand customers' satisfaction and behaviors thoroughly and comprehensively (Dagger et al., 2007). In well-developed industries, there are industry-specific service quality models developed with strong validity, such as the e-service quality model (e.g., Santos, 2003), health service quality (e.g., Dagger et al., 2007), and service quality for airlines (e.g., Kuo, 2011). Because perceived service quality has a direct impact on customer satisfaction and further on their revisit intention, the profitability of professional sport organizations is largely influenced by the service quality provided (Anderson & Sullivan, 1993; Dagger & Sweeney, 2007). The global COVID-19 pandemic has resulted in increased consumption of digital entertainment, such as online gaming, eSports viewing, and videogame streaming (King et al., 2020). Traditional sport has resorted to eSports to produce competitive entertainment, such as "NBA 2K" for basketball, and "FIFA 20" for football, where professional athletes joined eSports games (Ke & Wagner, 2020). Increased players, audience and contents of eSports bring more

potential and new challenges for eSports events when the pandemic passes. For example, the content of future FIFA events could be extended to the competitions between professional football sport players and professional FIFA eSports players, which could attract spectators from both the game and the sport. The potential challenges could include how to create the actual football ambient for the spectators at the new events. Overall, with the constant diversification of content of eSports events and advancement of technologies in the interaction between spectators and the competitions, the demand for event management increases. To better understand and meet such demand in the new generation of eSports events, it is essential to sustain eSports spectators' satisfaction and encourage their revisit intention. Therefore, it is of critical importance for the eSports industry to develop its own service quality model.

Overall, both academia and industry are calling for further study in spectators' perceived service quality in the context of eSports. The purpose of this study is to develop a conceptual model of service quality specifically for an eSports event. This allows this study to supplement the existing literature on sports events service quality, form a reference for future researchers who are interested in eSports, and provide a tool for eSports practitioners to understand customers' expectations and perceptions of a good quality event.

### **Proposed measurement model of service quality for eSports events**

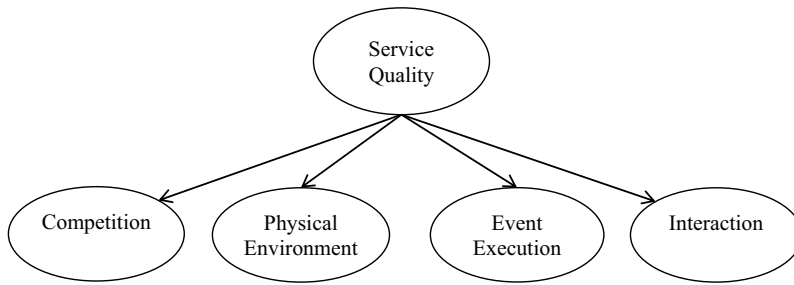
The proposed model of service quality for eSports event uses a first-order measurement model. Since SERVQUAL (Parasuraman et al., 1988), first-order measurement models of service quality have been adopted by many researchers and are widely used in examining the relations of service quality with other constructs, typically with satisfaction (e.g., Mokoena & Dhurup, 2017; Tsuji et al., 2007; Van Leeuwen et al., 2002). The development of measurement models of service quality is a topic attracting scholarly attention for decades, during which time a number of key studies have provided insightful information on dimensions to measure the construct (e.g., Brady & Cronin, 2001; Dabholkar et al., 1996; Grönroos, 1984; McDougall & Levesque, 1994; Rust & Oliver, 1994). In particular, based on previous studies, Brady and Cronin's (2001) work proposed a model with three dimensions (i.e., interaction quality, physical environment quality and outcome quality). Interaction quality includes three subdimensions which are attitude, behavior, and expertise; physical environment quality includes ambient conditions, design, and social factors; outcome quality includes waiting time, tangibles, and valence (Brady & Cronin, 2001). The model of Brady and Cronin (2001) is considered rather generic and thus applicable for other service industries, as it has the flexibility to include more dimensions and subdimensions related to specific service industries (Pollack, 2009).

According to past literature, there have been various dimensions of service quality in different industries (see Table 1). Some dimensions are generic, while some are relatively more industry specific. In order to develop the service quality dimensionality for eSports events, the validity of each dimension in other service industries and its suitability in the eSports context are both taken into consideration. Given the specific context of eSports, the current proposed model contains four dimensions, namely competition quality (i.e., "what"), physical environment quality (i.e., "where"), event execution quality (i.e., "how"), and interaction quality (i.e., "who"). The model is presented in Figure 1. The dimensions are developed based on the review

**Table 1.** Comparison of service quality scales for spectator sports events.

Spectator Sport Service Quality Scale	Author(s)	Dimensions
Scale of service quality in professional team sports (TEAMQUAL)	McDonald et al. (1995)	Tangibles Responsiveness Security Empathy Reliability
Scale of sportscape service quality for spectator sport	Wakefield et al. (1996)	Facility parking Facility esthetics Scoreboards Seat comfort Layout accessibility Space application Signage
Scale of service quality for professional hockey games	Zhang et al. (1998)	Core function Game-support function
Scale of public sports and leisure center quality	Howat et al. (1999)	Personnel Core Peripheral
Scale of consumer perceptions of service quality at sporting events	Kelley and Turley (2001)	Game experience Convenience Concessions Showtime Employee Facility access Fan comfort Price Smoking
Scale of spectator's perceptions of service quality in professional sports (SPORTSERV)	Theodorakis et al. (2001)	Reliability Responsiveness Access Tangibles Security
Scale of service quality in the sport spectator satisfaction model	Van Leeuwen et al. (2002)	Core product Peripheral product
Three-factor structure for sport service quality	Westerbeek and Shilbury (2003)	Core sport product Service coproduction Sportscape feature
Scale of service quality in recreational sports (SSQRS)	Ko and Pastore (2004)	Program Interaction Outcome Physical environment
Scale of service quality at action sports event	Tsuji et al. (2007)	Core product Peripheral product
Scale of service quality at sporting events	Yoshida and James (2011)	Game atmosphere Crowd experience Opponent characteristics Player performance Facility access available Seat space Frontline employees
Scale of event quality in spectator sports (SEQSS)	Ko et al. (2011)	Game quality Augmented service quality Interaction quality Outcome quality Physical environment quality

of a plethora of sport and eSports studies, in combination with the real eSports context. Each dimension is then elaborated upon below. The suggested items for each dimension are presented in Appendix.



**Figure 1.** Proposed measurement model of service quality for eSports event.

### **Competition quality**

Competition quality refers to the core product, measuring spectators' perceptions about the quality of the actual game itself (Biscaia et al., 2013). This dimension has also been referred to as outcome quality (e.g., Brady & Cronin, 2001; Grönroos, 1984; Ko & Pastore, 2004) or technical quality (e.g., Phonthanakitithaworn & Sellitto, 2018; Yoshida & James, 2011) in the context of spectating sport. The core service, which in this context is the competition, is usually uncontrolled by event organizers, whereas the other dimensions could be directly planned or influenced by them (Biscaia et al., 2013; Tsuji et al., 2007). Common attributes for this dimension include team performance (e.g., Ko et al., 2011; Yoshida & James, 2011), quality of opponents (e.g., Mokoena & Dhurup, 2017; Phonthanakitithaworn & Sellitto, 2018), star players (e.g., Greenwell et al., 2002), and valence (e.g., Brady et al., 2006). Several researchers considered these elements as outcome quality (e.g., Biscaia et al., 2013; Phonthanakitithaworn & Sellitto, 2018), or technical quality of a sporting event (e.g., Yoshida & James, 2011). Although the items or subdimensions of this dimension (i.e., competition quality/core product quality/outcome quality/technical quality) vary across different studies, overall, it represents the service outcome, which directly contributes to service quality perception of the core service. In the current model, this dimension stands for the perceived quality of skills and performances, of the characteristics of the participating team and player, and of the commentator.

To specify, similar to other sporting events, expertise in-game skills with excellence, creativity and well-executed maneuvers are the main reason that spectators go to the event (Funk et al., 2009; Trail et al., 2000). In eSports, professional players can achieve 400 to 500 actions per minute (APM), compared to about 50 APM by recreational players (Funk et al., 2018). This indicates that the play from the professionals is almost a hundred times more intense than average players of the game. Such difference would be fully reflected in the games for the spectators, which is also part of spectator's motivation and expectation of watching an eSports professional game. Perceived quality of the participating teams and number of star players could also potentially influence spectators' perceptions of the competition quality (Mokoena & Dhurup, 2017; Tsuji et al., 2007). For example, spectators' perceived quality of a game between two world champion teams such as IG and FPX is much likely to be better than a game between two college teams, even if the kills or time length of the two games are the same.

As for commentator quality, Lee et al. (2014) highlighted that commentators contributed to the competition quality in LoL events by studying the spectator group for S7 League of Legend World Finals. Commentators are personnel of the event. Personnel is usually

included as an individual dimension (e.g., Brady & Cronin, 2001; Dabholkar et al., 1996; Greenwell et al., 2002; Kelley & Turley, 2001; Mokoena & Dhurup, 2017), or part of functional quality for its interaction with spectators (e.g., Biscaia et al., 2013; Chelladurai & Chang, 2000; Ko & Pastore, 2004; Ko et al., 2011; Phonthanukitithaworn & Sellitto, 2018). However, in the context of eSports events, commentators contribute to the actual competition process, rather than delivering service to individual spectators, such as ticket staff or stewards. In fact, spectators could book tickets online, find seats by signs, and check any updated information regarding the event on their mobile devices. Therefore, instead of interaction, it is the commentators' expertise, such as the understanding of games, memory of players' data, and passionate commendation that potentially has strong impact on the spectators' perceived event experience or service quality.

### **Physical environment quality**

As part of peripheral services, physical environment quality has been well documented to be one of the most popular dimensions in service quality evaluation since the tangible dimension in Parasuraman et al.'s (1988) SERVQUAL (e.g., Brady & Cronin, 2001; Cant & Wiid, 2012; McDonald et al., 1995; Mokoena & Dhurup, 2017; Parasuraman et al., 1988; Rust & Oliver, 1994; Wakefield et al., 1996). It has been termed differently in prior service quality literature, such as tangibles (McDonald et al., 1995), sportscape feature (Westerbeek & Shilbury, 2003), and some other more specific elements including layout accessibility and signage (Wakefield et al., 1996). Foroughi et al. (2014) found that physical environment is a significant variable affecting fan satisfaction in the context of professional football events, which is in line with the general perception of the importance of the sportscape in earlier literature (Greenwell et al., 2002; Koo, 2009; Mullin et al., 2007). Byon et al. (2013) highlighted those stadiums, amenities, and venue accessibility are key and reflective component of peripheral service quality. This dimension stands for the physical surroundings where the service is produced and delivered (Bitner, 1992; Brady & Cronin, 2001; Cant & Wiid, 2012; Dabholkar et al., 1996; Ko et al., 2011). There are some differences when defining this dimension in different industry contexts. For example, ambience, design and social factor (e.g., volume of business in the surroundings, such as the amount and quality of customers) were initially included in this dimension when it was developed by Brady and Cronin (2001), but Ko and Pastore (2004) replaced social factor with equipment in the context of recreational sport. Greenwell et al. (2002) included facility access, scoreboard, layout and all other physical elements under the dimension of physical facility. Kim et al. (2013) also included all physical factors in one dimension, which was physical surroundings. In short, although there are certain extents of discrepancies in what elements should be included in this dimension due to the variance in research contexts, physical environment is included in most, if not all, service quality studies. In the current proposed model, this dimension focuses on ambience, equipment, and facility design.

Ambient conditions include "nonvisual aspects of service environment such as temperature, lighting, noise, scent, and music" (Ko & Pastore, 2004, p. 165). Not only tangible parts of the sportscape features matter to the spectators' experience, but other senses arising from the tangibles could contribute to the service delivery process, such as the auditory and olfactory factors (Wakefield & Blodgett, 1996). In League of Legends, as another example in the eSports context, when a dragon is slayed (different elemental dragon would give

different additional power to the team who slays it), the light on the stage usually flashes in a certain color depending on which element the slayed dragon has (e.g., red for inferno, brown for mountain). During the S7 League of Legends World Finals, there was a giant elder dragon who “flew” around the stadium over spectators’ heads using augmented reality technology, along with for both teams just like in the game’s battleground. The spectators in the stadium seemed satisfied with such ambience. In addition, as parts of ambient condition, facility cleanliness and maintenance also affect spectators’ perception of the service (Hansen & Gauthier, 1989; Ko et al., 2011).

Equipment was popular in the literature of recreation service quality, under the dimension of tangibles (e.g., Mackay & Crompton, 1990; Theodorakis et al., 2001), core product (e.g., Howat et al., 1996), or physical environment quality (e.g., Ko & Pastore, 2004). Equipment was rarely considered in spectating sport event services because customers are not actively involved in the sport. However, eSports spectators’ spectating experience heavily relies on equipment since any internet disconnection or hardware issues cause interruption to the game. For example, there was a 90-minute pause due to technical issues in the 2019 LoL Mid-season Invitational. It was not only a great burden to the players and commentators because they had to stay in position as requested by official rules, but also a negative influence on the spectators’ experience because the whole event was significantly delayed. The size and distance of screens also greatly affect eSports spectators’ experience as the performance of the players can only be spectated on screens.

Facility design refers to both the functional (practical) and esthetic (visually pleasing) nature of the facility’s layout and design (Bitner, 1992; Brady & Cronin, 2001; Ko & Pastore, 2004; Ko et al., 2011; Mokoena & Dhurup, 2017). Facility design was well documented in the context of sports. For example, Theodorakis et al. (2001, p. 433) used the item “the stadium being visually appealing” to measure the quality of tangibles in professional sports, which was adapted from Parasuraman et al.’s (1988) facility design. Yoshida and James (2011) posited that the esthetical feature of the facility also greatly influenced spectators’ perceived service quality. Overall, physical environment is the dimension, which covers the tangible and intangible elements in the environment where the event is delivered to the spectators in eSports.

### ***Event execution quality***

Although it is the core sport products (e.g., competition) that encourage people to come to the event (Westerbeek & Shilbury, 2003), spectators are still likely to form positive evaluations of service encounters regardless of competition results (Greenwell et al., 2002). Apart from the physical environment, there are also other attributes that are directly managed by event organizers, which are classified as event execution quality. This attribute measures the process quality of the competition organizing, which refers to how the competition is “organized, monitored, and controlled” (Shonk & Chelladurai, 2008, p. 595). This dimension includes intangible items in the peripheral service, which can be directly designed or managed by event organizers (Van Leeuwen et al., 2002). In eSports, physical environment is mostly managed by the stadium owner instead of the event organizers, apart from ambience as it was introduced in the previous section. For example, the company Jingdong owns its home stadium in Beijing, but when there is competition held in it, it is the company VSPN that is in charge of the services. Another example could be that Riot used the Shanghai Pudong Football Stadium for S10 World Finals. Instead of the physical environment elements such as



seat distance and facility layout, what Riot as the event organizer is able to decide is the schedule on the day, what free giveaways to provide, and what entertainment such as cosplay shows could be provided in the event. Therefore, by definition, this dimension refers to the elements in the process of organizing and delivering the events by event's organizers, such as operating time (Ko & Pastore, 2004) and augmented service (Ko et al., 2011).

Under this dimension, operating time is included in a series of service quality studies from recreation sport industry to spectating sport industry (e.g., Howat et al., 1996; Ko & Pastore, 2007). Many studies have supported the importance of a convenient schedule in a sport event (e.g., Hightower et al., 2013; Kelley & Turley, 2001; Phonthanakitithaworn & Sellitto, 2018; Shonk & Chelladurai, 2008). Although Ko et al. (2011) included operating time as a dimension of game quality, according to Byon et al. (2013), compared to the competition, which is formed by the players, operating time is still a controllable and intangible service attribute by the management. Therefore, it is classified as part of event execution quality together with augmented services.

Another element which represents this dimension is augmented service, which stands for the perceived quality of secondary products offered in the events (Ko et al., 2011), such as in-game promotions, activities other than the competitions, and concessions (Kelley & Turley, 2001). In eSports events, typical examples of augmented service include cosplay shows, stage performance (e.g., dancing and singing), and in-game prize draws, the purpose of which is usually to either create a more eSports-like atmosphere or to fill in the time gap between games. Augmented services were also documented as important components in service quality (e.g., Kelley & Turley, 2001; Ko et al., 2011; Tsuji et al., 2007). Because there are usually multiple competitions in an eSports event, operating time and augmented service such as supply of food and drinks would greatly influence spectators' stamina, experience and perceived service quality. For example, on the *World Cyber Arena 2014*, the event organizer arranged too many competitions in one day, so the last competition ended at around 1 am in the next morning, while the competitions for the next day were going to start within seven hours. Another example could be the lack of food and drink on whole day long events during *2016 LoL Demacia Cup*, where foods and drinks were not allowed to take in the venue for security reasons. Spectators either left early or had to order takeaways and eat it outside of the venue between competitions. This dimension reflects event organizers' ability to plan, organize and deliver the event, which has a direct impact on spectators' experience on the event day. It shares a similar conceptualization to the functional quality (i.e., how it is delivered) in Grönroos's (1984) Nordic model in eSports context.

### **Interaction quality**

Interaction quality is another widely adopted dimension across service quality scales. In the proposed model, this dimension mainly refers to the spectator–spectator interaction. Although employee–customer interaction is included in other studies (e.g., participation sport), such interaction is very limited in eSports events (e.g., spectator sport). The personnel who could have an impact on a spectator's perceived service quality of the event actually contribute to the competition quality instead of interaction quality since their performances contribute to the competition per se. In reality, most interaction experiences the spectators encounter are with other spectators. For example, if spectators

do not follow rules or regulations such as standing up or picking up a fight during the games, it would significantly influence spectators' experience (which is why there are now home seats and guest seats separately for many eSports stadiums).

In comparison, good interaction experience happens when spectators discuss the event together while attending it or singing and cheering for their teams together, similarly, to football fans chanting in a stadium. eSports has developed its own style of cheering in the stadium as a culture, and such interaction experience among spectators is the key difference between watching online and at venues. A classic example in eSports is when a game starts, spectators shout "TSM, TSM" together. This first started in the US in 2012 when the team, Team Solomid (TSM) dominated in North America. Then, people from other regions, starting from west Europe, began to shout TSM in the beginning of games even when TSM was not actually playing. It has gradually become a humor tradition to shout TSM in any eSports games in the last ten years. There are other traditions which were developed from specific teams or events in eSports that form part of the culture and are embodied in interaction among spectators. Therefore, it is reasonable for spectators to expect this kind of interactions with other people, which hence contributes to their perceived quality of an event.

To further elaborate, this dimension measures the interaction among spectators, such as crowd experience or social factor, which have also been widely included in many scales (e.g., Brady & Cronin, 2001; Cant & Wiid, 2012; Ko & Pastore, 2007; Morgan & Summers, 2005; Yoshida & James, 2011). Brady and Cronin (2001) developed the concept of "social factor," which is believed to have a significant impact on customers' perceived service quality. This attribute originally refers to the impression of other customers, whether other customers would influence the quality of service delivered, and whether the service provider is aware that other customers potentially affect one's perceived service quality. In eSports, such influence from social factors remains significant. For example, in large eSports events, organizers usually provide themed or specially featured give-away souvenirs, which are sometimes put on each seat for spectators in advance of the event. As spectators enter the stadium at different times, sometimes spectators who come in earlier take multiple souvenirs from different seats. A very recent case is the S10 World Finals when Riot gave each spectator an S10 themed robe on their seat, but many spectators complained online after the game that they did not have anything on their seat. As it is not for sale and is perceived as part of the price they paid for the ticket, some spectators were rather disappointed. In this case, the behaviors of other spectators left a bad impression and had a direct impact on spectators' experience at the event.

Although the inter-spectator interaction quality was not generally recognized in the early service quality literature (Chelladurai & Chang, 2000), it has become more common after Ko and Pastore (2004) brought this dimension up in the sport context, which was then adopted by SEQSS in the spectating context (Ko et al., 2011). The level of interaction among eSports spectators is high, which plays a significant role in the perceived service quality of the whole event, because a large crowd of fans who cheer and cry together is one of the most important components for an event in stadiums (Agnew & Carron, 1994; Yoshida & James, 2011). Overall, it is without doubt that other spectators contribute to spectators' perceived quality of interaction in an event. Therefore, this construct is to measure a spectator's perception of event quality related to the role of other spectators.

## Discussion and conclusions

Despite ongoing debate around the sport nature of eSports, conceptual underpinnings of service quality in previous sport literature provide insight into understanding eSports spectators' perceived service quality, due to the similarity shared between traditional sport events and eSports events. The conceptualization of the four dimensions in the proposed model is thus rooted in reliable and empirically supported studies, while at the same time, in combination with the specific context of eSports, taking into consideration the culture and expectation of eSports spectators. The four dimensions are discussed individually below, followed by suggestions for future research.

The first dimension, competition reflects the core of eSports definition. Although scholars have given different interpretation to the term eSports, the aspect of competition is considered essential (Jenny et al., 2017). When justifying eSports as sport, its competitive nature is believed to differentiate it from video games (Witkowski, 2012). Hence, for spectators, the quality of the competition forms an essential part of their overall perceived quality of the event. For eSports event organizers, this competition quality is not always under their control. On the one hand, although in some events it is up to the organizers to choose what teams or players to be invited to the event, in many cases the teams are the winners of different stages in a tournament or season especially in mature leagues. On the other hand, even when two well-reputed teams with superstar players are going to play in an event, the actual game quality still depends on the performance of the players in the game. The uncertainty of their performance and the results contribute to the charm of eSports, so does the unpredicted perceived quality of an event. It is worth noting that, with increasing in diversity of eSports event format or content (e.g., tournaments, cups, off-line events organized by live-streaming platforms, nonprofit recreational tournaments, view parties), the competition quality might not always be the core quality. There are now recreational eSports events organized by live stream platforms or game publishers, which invite pro-players or celebrities to play with general players. The game results in such events are taken less seriously by both players and spectators. Therefore, a potential limit on the conceptualization of the current dimension is that it mainly applies to eSports, where the results of the games are taken seriously by both players and spectators at the event.

Secondly, physical environment has been a dimension since SERVQUAL (Parasuraman et al., 1988). The time spent in the stadiums by eSports spectators is no less than football spectators as the games (best of 3, best of 5 or best of 7) usually last much longer than 90 minutes. Therefore, physical environment has an impact on the experience and perceived service quality of eSports spectators. With the advance of technologies, new devices are likely to be designed for more immersive spectating experience. Professional eSports stadiums and stages are usually well decorated specifically for eSports, with audience area where the number of screens could ensure they enjoy watching the game while sitting comfortably, and live-stream office which has sufficient and suitable equipment for broadcasting, as well as professional eSports equipment and top-quality internet. Some stadiums also provide computer areas for spectators to play games, VR area, and other entertainment such as rock climbing. Examples include the home stadiums for Royal Never Give-up (RNG) in Beijing, and Fusion Arena, which is the home stadium for Philadelphia Fusion in Philadelphia, US. On the one hand, there are many questions yet to be answered, such as how the elements and services in the stadiums are perceived by customers, how well they are operated and managed, and how is their financial performance. On the other hand, their existence shows that eSports requires more from the physical

environment than general sport stadiums. Therefore, in the future, there might be more elements to consider under this dimension, which would constantly play an important role in spectator event experience.

Thirdly, event execution has not been conceptualized using the same term as in prior sport literature, but the process quality of a competition event has been documented since Shonk and Chelladurai (2008). In most service quality studies, the process of service delivery has been recognized as an important dimension. It is part of functional quality in the Nordic model (Grönroos, 1984) and an independent dimension in Rust and Oliver (1994) three component model. In eSports, this dimension is also becoming more prominent and discriminant from the other dimensions. Originated from video games, eSports contains elements of computing, media and sport (Jin, 2010), so it is an intersection of multiple industries including video game, sport, media, and recreation. Also, an increasing number of celebrities from other fields, such as Olympic champions, actors, singers and idols, have joined eSports events as special guests. For example, a famous actor Wang Yibo was invited to the PUBG 2021 World Invitationals, which attracted a huge number of fans to attend the events. In such cases, people care more about execution quality (i.e., who are invited, what the guests do) instead of competition quality, as compared to a sport event, it is more of a recreational or entertainment event. For example, it would be interesting to watch Lionel Messi to play a League of Legends against Cristiano Ronaldo, or to see Leonardo DiCaprio to play Overwatch with pro-players, even though they are not expected by the spectators to execute good maneuvers or to deliver an exciting and high-quality game. In short, this dimension reflects the importance of event service design and delivery.

Lastly, interaction quality could be traced back to one of the features of service, which is the inseparability of production and consumption (Parasuraman et al., 1985). Although it originally refers to the interaction between service provider and receiver (Parasuraman et al., 1985), in the context of eSports events, the behaviors and quality of other spectators contribute critically to the perceived quality of service performance, which is especially distinctive in major spectator sport events, where fan interaction forms a significant aspect of the event quality (Ko et al., 2011). The atmosphere, crowd experience and social factors are largely constituted by eSports spectators themselves. Therefore, spectators' attitudes and behaviors inevitably contribute to the overall perceived service quality. Interaction quality is closely linked with the culture and values shared by the eSports community and is related to people's self-identity as an eSports fan or enthusiast. There are traditions, rules, languages or chants that are not known to outsiders. Therefore, people might perceive interaction quality differently in the event depending on their knowledge or expectation. In some eSports events where social or entertainment activities are the core products, the quality of personnel and customer-personnel interaction could have potential influence on people's perception of event quality. However, most eSports events are still organized around competitions where customer-personnel interaction is minimal. Future research might want to investigate further into different service quality models for different types of eSports events.

The COVID-19 pandemic clearly draws the world's attention to eSports. An increased number of online spectatorship due to the stay-at-home mandates and quarantines during the pandemic could potentially promote the interactions between traditional sports and eSports. New media technology innovation would also contribute further to the content generation for both online and offline spectators, such as simulation which mimic sport programmes or predict game results. Sportification of games and gamification of sport, which stem from technology

upgrading, enrich the scope of event execution- and physical environment-related service attributes for eSports events. The sports audience has continued to move to live-streaming platforms (Ke & Wagner, 2020), which indicates an increase in people's demand for socialized and disintermediating experiences. Interaction quality is therefore conjectured to play a more important role. Competition quality remains as the core service quality dimension in the future, but spectators are likely to have different expectations in the game content. For example, if the event has a real basketball game between the *NBA K2* players, the spectators are unlikely to take the game result into the perceived competition quality of the event.

In summary, the proposed model lays a foundation for future research to investigate and understand spectators' perceived service quality of eSports events. At the current stage, the model is conceptualized from existing literature, thus demanding further qualitative and quantitative study. Data analysis on interviews with eSports events spectators could refine the proposed model, whereas the measurement scale for the model could be validated via exploratory and confirmatory factor analysis. The current conceptualization not only provides a reference for future researchers who are interested in eSports, particularly those who wish to connect knowledge in sport with the eSports industry, but also offers the theoretical support and instrument for practitioners such as eSports event organizers to better understand their customers. It would also be valuable for sponsors who are interested in understanding spectators' experience in eSports to better design their sponsorship strategy. Therefore, this study yields both academic and practical implications, which provide answers to a call from both areas. In addition, so far, the kinesiological studies on eSport have mainly focused on health concerns and appropriate treatments of eSports athletes (Zwibel et al., 2019), while limited research has addressed the potential issues of eSports spectators. Given the long hours spent by spectators at eSports stadiums, it is worth investigating the physiological and psychological mechanisms of spectators' movement, such as the effect on lower limbs by sitting for over ten hours, the pressure on their cervical spine while watching the screens at different angles and distances, and other risks of getting injured while squeezing in and out the stadiums after the event or in the breaks between competitions. By understanding the spectators' perception and proprioception at eSports events, we provide a foundation for future studies to understand and investigate such issues.

## Disclosure statement

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## ORCID

Xiuqi Zhu  <http://orcid.org/0000-0002-6836-7357>

Do Young Pyun  <http://orcid.org/0000-0002-0467-0699>

Argyro Elisavet Manoli  <http://orcid.org/0000-0001-7484-4124>

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## Appendix. Suggested items for the eSports service quality scale

Competition Quality	
Mokoena and Dhurup (2017) Theodorakis et al. (2013)	Commentators, hosts and reporters' professional knowledge Competitiveness of the games Games are usually fast and flowing High level of play Spectacular games Players perform well executed plays Team plays hard all the time
Further suggested eSports context specific items	In-game camera and replays are able to capture the key moments without distorting the fluency of game display Relevant, informative and interesting statistics are shown in the game promptly
Physical Environment Quality Yoshida and James (2011)	This stadium's architecture gives it an attractive character This stadium is decorated based on an appealing theme The walkways are wide enough to handle the crowds This stadium provides enough space to handle the crowds
Tsuji et al. (2007)	Ease of entrance Spectator viewing locations Video screens Seating availability Event site cleanliness
Further suggested eSports context specific items	The size and location of screens provided in the arena are comfortable to watch  There are enough screens to deliver the sense of immersion at the event There are sufficient rest areas throughout the event
Event Execution Quality Ko et al. (2011)	The operating hours of the events are convenient Game times are convenient Up-to-date information is available on events/team Information about the event is easy to obtain The show combined with the game is entertaining The show is just as exciting as the game The concessions offer a wide variety of foods The quality of food of the concession stands impresses me
Yoshida and James (2011)	The XXX giveaway items are high quality The XXX sell an impressive assortment of memorabilia
Suggested eSports context specific items	There are needed breaks throughout the event Various themed-merchandise selections of this eSports event are available There are no game delays or interruptions due to bad internet connection The technology applied at the event creates good atmosphere
Interaction Quality Foroughi et al. (2014)	I am generally impressed with the other spectators Spectators follow rules and regulations I feel a sense of family among the fans at the event I really enjoy the social interaction in the event I have quality time with my friends/family at the event
Phonthanukitithaworn and Sellitto (2018)	I get excited by being with other fans who are cheering, yelling, singing and screaming for their team The crowd energy that I feel at games gets me excited To hear the crowd cheer is fun
Suggested eSports context specific items	The ambience in the crowd makes me feel deeply involved in the event  There are tags or topics at the event which I enjoy sharing on my social media account.