

Evolution of Animated Characters in League of Legends World Championship Opening Ceremonies

Which technologies are used to impress the audience, and how does the use of technology evolve between 2017 to 2019?

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ABSTRACT

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EVOLUTION OF ANIMATED CHARACTERS IN LEAGUE OF LEGENDS WORLD CHAMPIONSHIP OPENING CEREMONIES

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This study is about how the use of animated characters in League of Legends World Championship Opening Ceremonies has evolved from 2017 to 2019. Animated characters are digital in-game characters brought to the stage for an opening ceremony performance, and they are created with augmented reality or hologram video projections.

The method used in this research is qualitative content analysis. Qualitative content analysis is done by a shot-by-shot analysis of the opening ceremony broadcasts. Qualitative data is categorized as follows: show duration, song duration, shot duration, shot size, camera or technology (if applicable), shot content, animated characters amount, and animated character sequence duration. The data shows how many seconds animated characters are visible in each of the opening ceremonies, how they are related to the technology used and content relevant to the product. Descriptions of the opening ceremonies are constructed from literature, articles, interviews, and online videos. They create an understanding of the scale of the events and give insight into the decisions behind creative choices for the opening ceremony shows.

The use of animated characters in League of Legends World Championship Opening Ceremonies has grown from 2017 to 2019. Animated characters have become more linked to the League of Legends in-game content and story as well as to the commercial values of the game. Technology has been the driver to create better experiences for the audience. However, the content and artistic values became more important than new technologies creating the best experience for the viewers at the stadium and those watching the broadcasted show.

Key words: League of Legends, esports, augmented reality, virtual studio, xr, holograms, virtual production, in-game characters, motion capture

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1 INTRODUCTION

When people talk about the most significant entertainment events, it is common to hear something about the Super Bowl and its famous halftime show. The Super Bowl is the main event of the NFL, and during the game, there is a 13-minute long halftime show. American football (NFL – National Football League) is the most popular sport in the USA. The artists in this show are top of the line of most famous artists in the world. Super Bowl 2019 had over 100 million viewers.

League of Legends is a computer game, and its eSports series is one of the most popular eSports series in the world. The yearly main event is the World Championship finals with a spectacular opening ceremony. During the past few years, League of Legends has tried to create a "bigger" opening ceremony than the Super Bowl halftime show is. The League of Legends World Championship Finals 2019 got more than 100 million viewers worldwide, breaking the record for the most-watched eSports event. How does League of Legends do this? How can their opening ceremony be "bigger" than the Super Bowl halftime show? League of Legends World Championship opening ceremony artists are not top-of-the-line famous superstars. There must be something more to the whole League of Legends and the eSports scene that makes this possible. The main music acts for 2018 and 2019 were created just for the show, and those bands released only one song. The 2018 and 2019 opening ceremony main performers were virtual groups put together from League of Legends in-game characters, the *champions*. Virtual groups have real artists as voices, and they perform side by side on the stage. By utilizing modern technologies, Riot Games allows the fans can see those digital heroes on the stage performing for them, and they love it.

I have been working with emerging technologies in broadcasting and virtual reality context since 2013, when I started producing emerging media development projects at Yle, which is the national broadcaster in Finland. In 2015 I started my entrepreneurship in virtual reality doing mostly 360VR projects for a variety of customers in Finland and put up the most known 360VR content company in Finland. At the beginning of 2016, I was one of the co-founders in Keho Interactive Ltd. Our group of founders are artists and engineers with broad experience from

telecom technologies, gaming, arts and crafts, and broadcasting media companies. At first, we started as a motion capture studio company but soon focused on creating virtual studio solutions with Unreal Engine. Keho Interactive has a virtual studio software solution based on Unreal Engine, and our most known projects are amongst the most viewed broadcasts in Finland, such as the Winter Olympics and Football World Cup of 2018. During the 2018 Winter Olympics, we produced the historical first "live hologram interview" on Finnish television with our technology (Saarinen 2018).

Emerging technologies can attract an audience even with content that is only used once. Under this lay a potential issue of running out of ideas that the audience would be willing to pay. Riot Games has a reputation for presenting new and exciting technologies in their main events. The 2017 League of Legends World Championship Finals opening ceremony broke records being the most extensive scale live Augmented Reality production at that time. The 2018 ceremony had a band of four virtual characters on the stage made with Augmented Reality and animated with Motion Capture by their human counterparts. The 2019 opening ceremony took the virtual band commercialization even further.

Modern XR technologies are evolving rapidly, and they offer exciting ways to tell stories and make viewers more engaged with live content. Content producers are struggling to keep up with technical development since large scale productions can take a couple of years to produce. That is why I became interested in how the use of technology relates to the use of content and what kind of a difference there is between 2017, 2018, and 2019 League of Legends World Championship Finals opening ceremonies? Furthermore, yes, the eSports scene is exciting! Is there a new kind of audience in eSports, and what are they after? Several audience reports show that the viewership in eSports is growing, and those numbers are not away from the traditional sport viewing ratings. That could mean that those who are watching eSports are a part of a culture of their own. Whichever is the case, it must have something to do with the fact that in League of Legends World Championship Finals opening ceremony, the main musical act is by digital characters from the game, with previously unknown songs. In one of the most significant traditional sports events, the Super Bowl and its halftime show, the

musical act is performed by some of the most famous superstars. Both have more than 100 million viewers.

The main objective of the study is to explore the relationship between technology and content seen in the broadcasted ceremonies, and technologies used to create the experiences. Answers to these questions would be valuable for my company, and the other professionals who are working in the crossing of XR and broadcasting media. This study begins with a description of the research method, continued by a chapter describing the XR technologies in broadcasting. Before the content analysis for the opening ceremonies, a chapter covers the League of Legends and eSports generally. The main part of the thesis is the qualitative content analysis for the League of Legends World Championship Opening Ceremonies 2017, 2018, and 2019. After the findings from the analysis, there is a discussion chapter covering the research questions.

2 RESEARCH METHOD

Player characters, the champions, are the main thing in League of Legends. Modern broadcasting technologies combined with the power of gaming graphics engines make it possible to bring these digital characters to life in broadcasts and events. There are many cases when technology has been more important than content in creating new and exciting experiences for the viewers. Technology-driven experiences can lead to one-off cases and demoing the technology without relevant content will not be able to breakthrough. The League of Legends game bases on a dramatic story, the lore, of its history, and each of the champions have their stories to evoke strong emotions in the players and tournament spectators. League of Legends developer and publisher, Riot Games, has been forced to make space for the lore to evolve, and the story keeps on bringing new emotions for the gamers to live. (Mahboubian-Jones 2017.)

League of Legends World Championship Finals are famous for their spectacular opening ceremonies. Riot Games has been using XR technologies to create intense emotional experiences for their fans in the opening ceremonies. In 2017 Riot Games brought a massive dragon to the stadium with AR graphics. In 2018 they put together a K-Pop band from the chosen in-game characters which performed live on stage as AR holograms in the opening ceremony, and 2019 was time for another band from in-game characters. However, this time there was no augmented reality or virtual reality technologies presented in the opening ceremony. Instead of AR, the 2019 ceremony utilized so-called hologram projections to bring the digital characters alive. Each of the events has been a massive technological effort. League of Legends World Championship opening ceremonies has been continuously using the characters from the game on the stage to surprise the audience. Therefore, this study is focusing on how the characters are made and how their appearance evolves between the 2017 and 2019 League of Legends World Championship Finals Opening Ceremonies.

In the theory part, academic literature is used to cover the topics necessary for this research. For the background information, several online news articles, case studies, behind the scenes articles, social media postings, press releases, and

interviews are used. Because the XR and especially Augmented Reality technologies have reached production quality level recently (compared to multi-camera systems), there is not much academic research literature written about it. For this reason, expert interviews are used to deepen the understanding of this field. The first interview was done with Antti Immonen, a Technical Development Producer from Yle, as he has been involved in building the first virtual studio in Finland for daily basis production. The second interview was done with Jan Løve Groth and Andreas Bretteville from The Future Group, whose technology was used in the 2018 opening ceremony live AR graphics. The third interview was done with Daniel Reynolds from Kaleida, who was responsible for the hologram projections in the 2019 opening ceremony.

The research method for this study is qualitative content analysis, which in this research is a systematic and objective analysis of a broadcasted show. The qualitative content analysis requires the researcher to focus on aspects related to the research questions. The materials for the qualitative content analysis are the League of Legends 2017, 2018, and 2019 World Championship Finals opening ceremony live broadcast recordings from the League of Legends Youtube channel. The data is counted and written into a sheet from the broadcast recordings available on Youtube. The data was gathered by conducting a shot-by-shot analysis to compare the duration for different content used in the ceremonies. The shot-by-shot analysis is used in film analysis to analyze scenes precisely from all needed perspectives. A table is created for each shot in the ceremonies for its duration, shot size, content focus, animated digital characters, and the duration for those characters seen on the live broadcast. (Brennen 18, 2013; Schreier 2014.)

Qualitative content analysis is used to enable the analysis of the relationship between content and technology in the selected ceremonies. The object of the study are the animated characters seen on stage in the ceremony broadcasts. To further understand the data, both technical and content creation related data is gathered from case studies, online articles, and interviews about the League of Legends World Championship opening ceremonies. Together with my professional experience on XR technologies in broadcasting, I was able to get the relevant

qualitative data out of the broadcasted ceremonies with this method. (Brennen 18, 2013; Schreier 2014.)

The shot-by-shot analysis is the only way to break a broadcast into small pieces, shot by shot, and sometimes second by second. By counting each shot and analyzing the technology needed to capture that shot is essential because AR technologies are dependent on camera tracking systems and graphics engines. The cameras used for AR graphics are decided in the pre-production phase, since their location on the venue is essential, and the content design is made knowing what kind of technology is going to be used in the live broadcast. Color-coded timeline visuals are made to visualize the difference between each year's ceremony, and differences between the ceremony structures.

The first idea for this thesis was to study the use of AR-graphics in eSports broadcasting by doing case studies. League of Legends was just a name amongst others, and I did not know much about their opening ceremonies. When studying more the League of Legends World Championship Finals Opening Ceremonies, I realized that there is exciting development seen in the use of AR-technologies. It was clear that the general approach would not be the best way to describe what is happening in these broadcasts, so the focus was aimed at the actual in-game characters brought to the stage and study how they are made. In this phase, all other events were left out of the research, and focus was only on these League of Legends World Championship Finals' opening ceremonies. I wanted to study how technology and content are related to the experience and how the special event is commercialized. This thesis has a separate section for each years' ceremony. In those sections, an overall description is covered of each ceremony, the venue, digital characters' connection to the in-game world, and music video made for the main performance song.

- Which characters are brought on stage in the ceremonies?
- What kind of evolution is seen in the use of technology?
- How the use of technology and characters relate to the commercial value they create?
- What is considered to give the best experience to the viewers?
- How does technology relate to visuality and artistic possibilities?
- How the technology and content are related to creating the experience?

3 XR TECHNOLOGIES AND BROADCASTING

3.1 Virtual Production

Virtual Production is a production method where traditional production technologies (such as tv-cameras and studio systems) are used together with computer-generated graphics systems. The first implementations of virtual graphics in live television are weather broadcasts where the presenter stands in front of a blue or green screen, and the camera image is stationary. The weather map is keyed behind the presenter. Technology at that time did not allow any movement for the camera. After several years of technological development, the graphics processing power in PCs has reached a level where decent frame rate and resolution can be achieved to produce high-quality images on television. Before photorealistic rendering, virtual studio integrations were mostly made to cut down costs. Simple 3D virtual sets are much cheaper to build, and a small green screen studio can be made look a lot spacier. Precise camera tracking made it possible to use multi-camera systems with virtual graphics. (Thomas & Grau 2009, 42-44; Immonen 2019.)

According to Noah Kadner (2019), there are four different types of virtual production:

Visualization

Visualization as a production method is used mostly for preparation for a shoot or visualizing the sequence. Visualizations do not have finalized quality in graphics, but it is suitable for reviewing how the digital content would look, for example, together with the real-world location.

Performance Capture

Performance capture is used for transferring the actor's natural body movements into a digital form with motion capture systems. Motion capture is a process where a human body or an object is tracked in 3D space. The motion capture data is recorded to a computer to be applied to a 3D model. Performance capture is

usually referred to as precise as possible digitalization of the actor's movements and facial expressions.

Hybrid Virtual Production

Hybrid virtual production describes what is commonly referred to as virtual studio production. The subcategories are real-time and post-produced hybrid virtual production. In a green screen studio motion-tracked tv-cameras are capturing the talent, and the green screen is keyed and replaced with the virtual background. In television virtual hybrid production is mostly live studio production, and in movie productions, the keying and compositing are done in post-production.

Live LED Wall In-Camera Virtual Production

The latest addition to the virtual production types is the LED wall production with real-time graphics. The green screen is replaced with high quality LED walls. With the camera tracking and real-time graphics systems, it is possible to create an environment where the virtual projection creates realistic location visuals and light to the studio stage. The live LED wall in-camera virtual production is such a new workflow that there are not many large scale examples of it yet. Golem Creations did the first big production in partnership with Industrial Light & Magic in collaboration with Epic Games: the Mandalorian.



PICTURE 1. Screen capture from behind the scenes material for The Mandalorian. The series is shot on a led screen stage, and Unreal Engine is used to render all the background footage in real-time. (The Virtual Production of The Mandalorian, Youtube 2020)

3.2 Definition of XR and AR

According to Professor Steven M. LaValle (2019, 6), **XR** stands for X realities where 'X' represents all the variants of commonly used acronyms such as X reality, **AR** (augmented reality), **VR** (virtual reality), and **MR** (mixed reality). XR is used to unify these headings, thus making it more convenient to talk about these emerging technologies and related content. XR technologies can be described from three perspectives. An engineer's perspective would focus on the hardware itself, and hardware is not useful without software made by developers. The experience is born when an individual or a group consumes XR content. (LaValle 2019, 38-63.)

Augmented reality, AR, is a form of digital graphics that are placed according to the space that the viewer is. In broadcasted content, AR graphics would be placed into the studio or into the venue where the broadcast production is made. Virtual reality, VR, takes the viewer into a virtual world or space. Essential to VR space is that what is around the viewer is not real. When AR and VR are taken into broadcasting context, the perspective is changed: Virtual reality in studio space context means that the studio space is replaced with virtual reality graphics. AR graphics are placed into the foreground layer of the virtual studio camera feed. AR graphics can be used in the broadcast also without a virtual background. Photorealistic 3D objects in scripted movies and tv-shows are not considered as AR since they are not interactive and not rendered in real-time at the time of the production (Kipper & Rampolla 2012, 1-5).

In broadcasting context, the XR technologies are not referring to content viewed with virtual glasses. In broadcasting, XR technologies are used to create digital content for the production, which is mostly a live broadcast or live recording. XR technologies may be used to digitalize part of the set or studio, and their specific technical possibilities allow graphical elements to be placed virtually on the set as AR elements. When combined with green screen backdrop and keying, the XR technologies can be used for real-time 3D virtual studio production. (Thomas & Grau 2009, 42-47.)

Another way to utilize augmented reality is by using the XR graphics system to create photorealistic elements that are visually similar as they would be real-world objects. Gaming graphics engines with modern high-end consumer-grade graphics cards can produce photorealistic real-time rendering in a virtual studio environment which the viewer is not able to spot as 3D graphics.



PICTURE 2. Screen capture from live virtual studio camera feed recording. The FA Cup trophy as 3D augmented reality graphics in front of a virtual background in a green screen studio.



PICTURE 3. Screen capture from live virtual studio camera feed recording. Fore-ground AR graphics by Keho Interactive in sports studio program by Yle.

3.3 Virtual Studio

A virtual studio is a space where a studio set is created with computer graphics. The essential element in a virtual studio is the possibility of replacing the background with graphics, which is usually achieved with green screen backing and chroma key system. Virtual studios can be built with a partial green background when the outcome is a hybrid set where real set elements are combined with virtual background and elements.

Green screen can be used without a real-time virtual studio system, and keying is done in post-production during VFX production.



PICTURE 4. A real-time still frame where the left side is the image from the camera and the right side is the real-time feed from the virtual studio system.

The virtual studio is traditionally referred to as a green screen studio, which is a space where the floor and walls on the shooting direction are covered with green chroma surface. Green backing is lit with soft light as evenly as possible for the best keying and matte result. (Foster 2015, 58.)

Virtual studio system has certain essential elements:

- Green screen studio as the production space
- Multi-camera system to produce the video signal

- Virtual graphics system to create a real-time 3D set
- Tracking system to align real and virtual cameras
- Chroma-key hardware or software that combines virtual set with foreground subjects

In a green screen studio without real subjects such as furniture, the whole environment is created artificially with 3D graphics. Objects and talents are composited into this virtual set with a matte signal. (Foster 2015, 311.)

A hybrid studio set combines a virtual 3D set and real objects: floor, raisers, furniture, and other physical objects. In this way, it is possible to have "best of both worlds" when talents can have real objects around them, and green backing makes it possible to place the studio in any location with virtual graphics.

3.4 Holograms in broadcasting

The hologram was invented in 1947 by Dennis Gabor, a Hungarian scientist. Gabor was awarded the Nobel Prize for Physics for his invention, and the first holograms presenting 3D objects were created by Yuri Denisyuk in USSR, and Emmet Leith and Juris Upatnieks in the United States back in 1962 (Johnston 2004, 29–51). A hologram does not have a specification that would precisely describe how it is technically achieved. For ordinary people, a hologram means an image that appears to hang in the air. Holography is the technique for capturing 3D images to be presented as holograms (Saxby & Zacharovas 2015, Chapter 1). Traditional holography does not have anything to do with AR holograms used in any kind of virtual broadcasting production. In broadcasting context, holograms are referred to as those foreground subjects or objects that are made with digital graphics.



PICTURE 5. Screen capture from Yle Sports news web page. A historical moment in Finnish television. The first live AR hologram production in Finland by Keho Interactive. (Saarinen 2018)

AR hologram is a foreground (as opposed to a background or virtual background) object created in real-time in the broadcasted image. Many times, in press releases about AR holograms in broadcasted shows, the hologram subjects are mostly digital humans or digitally animated characters.

There is a significant difference whether the hologram is seen on location (on the stage, for instance) or just from the broadcasted video content. When the digitally animated characters are created with AR graphics to the broadcast feed, the audience at the venue can only see those characters from the screens and not on the stage. If holograms are made with projecting the image to a transparent projection surface on the stage, the audience at the venue can see the digital characters on stage. However, their movements are restricted to the locations of the projection surfaces and their relation to camera angles.

3.5 Motion tracking

Motion tracking is required in different forms with virtual reality related productions. Real-world cameras need to be tracked. Actors need to be tracked to create their digital counterparts. Objects need to be tracked to either have them presented in digital space or to move digital objects, e.g., from foreground to back of the real-world objects



PICTURE 6. Motion capture cameras attached to the truss system at the motion capture stage.

Motion tracking is used to track real-world subjects to be produced in a virtual environment. When rendering virtual background or augmented reality graphics for broadcasting, tv-cameras need to be precisely tracked to align them with the virtual space, which is combined with the real-world video signal. A virtual camera is created in the 3D virtual space with the same values for focal length, focus point, position, sensor size, and other relevant variables for achieving a realistic perspective related to the real-world studio.

Digital humans get their realistic movements from the motion capture process. 3D characters resembling humans can be animated in real-time with motion capture systems. Motion capture is a technology where an actor is wearing a special suit that can provide tracking data for animating 3D characters. Motion capture data made with actors are created in real-time, but the process requires a so-called cleanup phase to remove glitches and unwanted movements from the animation.

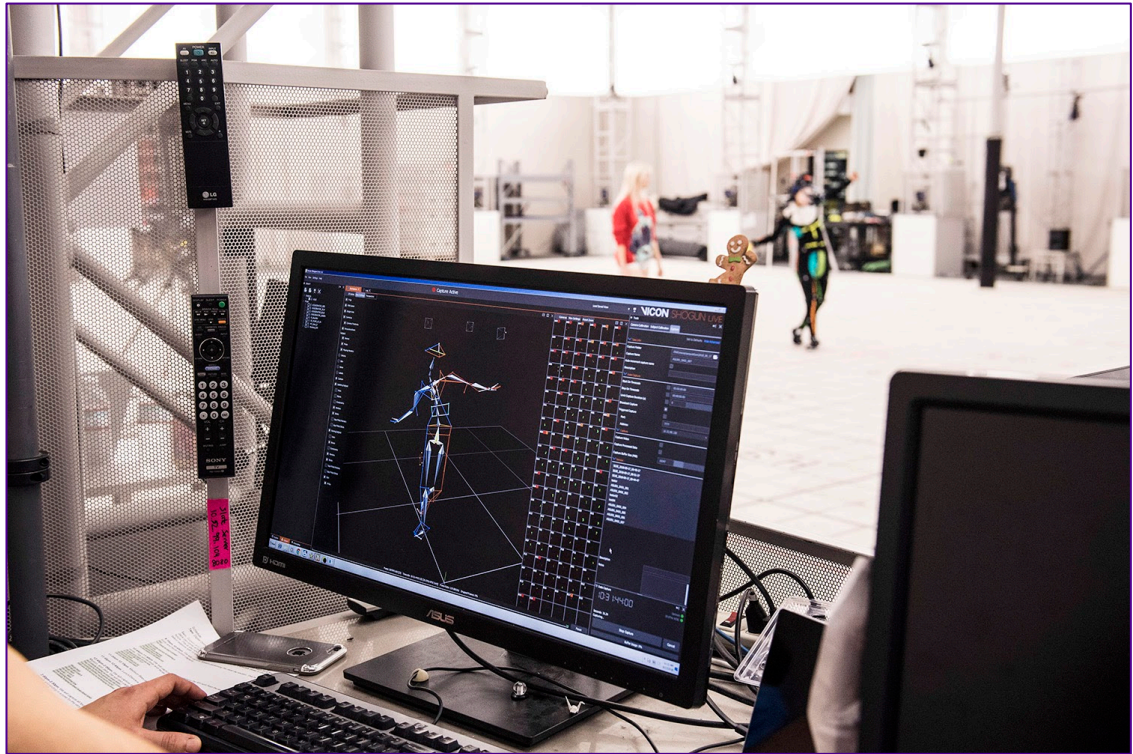


PICTURE 7. Studio cameras tracked with a motion capture system.



PICTURE 8. K/DA Pop/Stars project artists are wearing motion-capture suits. (Riot Games 2018)

There are several camera tracking and motion capture systems available. All of them require external hardware or software to function, and there is not just one technology or solution that could be a master solution for creating tracked virtual content.



PICTURE 9. Motion capture systems transform actors' movements to virtual 3D data in real-time. (Riot Games 2018)

Unreal Engine in broadcasting

A game engine is a software development environment that is meant to be used for creating game content for selected platforms. PC games need to work efficiently with consumer-level hardware, so the players could enjoy their games without investing too much money on their computers. Efficiency is one of the critical aspects why Unreal Engine has made its breakthrough in virtual and augmented reality graphics in broadcasting in recent years. Traditionally broadcasting graphics systems have their engines developed without the restrictions for consumer hardware and costs. That can lead to costly software. It means that with using a game engine to run graphics, there is a possibility to achieve better

performance with less investment in hardware than it would be with traditional broadcasting hardware. (Immonen 2019.)

In 1998 Epic Games developed a first-person shooter game Unreal and the Unreal Engine was made for that game. After the first release, Unreal Engine has made it to generation four when released on March 19th, 2014. First, it was a monthly subscription for game developers and free for schools and universities. Just one year later, Epic decided to release Unreal Engine 4 for free, and they moved to a royalty business model where the users will pay royalties to Epic Games if they make revenue using Unreal Engine 4.

The Unreal Engine made it possible to develop new solutions for virtual studio systems. The Unreal Engine has become one of the most used graphics engines for creating virtual content for video production, and it is used by such companies as the Zero Density, The Future Group, Ross Video, and Keho Interactive. (Immonen 2019.)

4 LEAGUE OF LEGENDS AND ESPORTS

League of Legends is one of the most popular games in the world. It was released in 2009, and its player base has grown all the time. Riot Games have not released the exact number of players in League of Legends; the count is estimated to be well over 100 million players in the world. (Kollar 2016.)

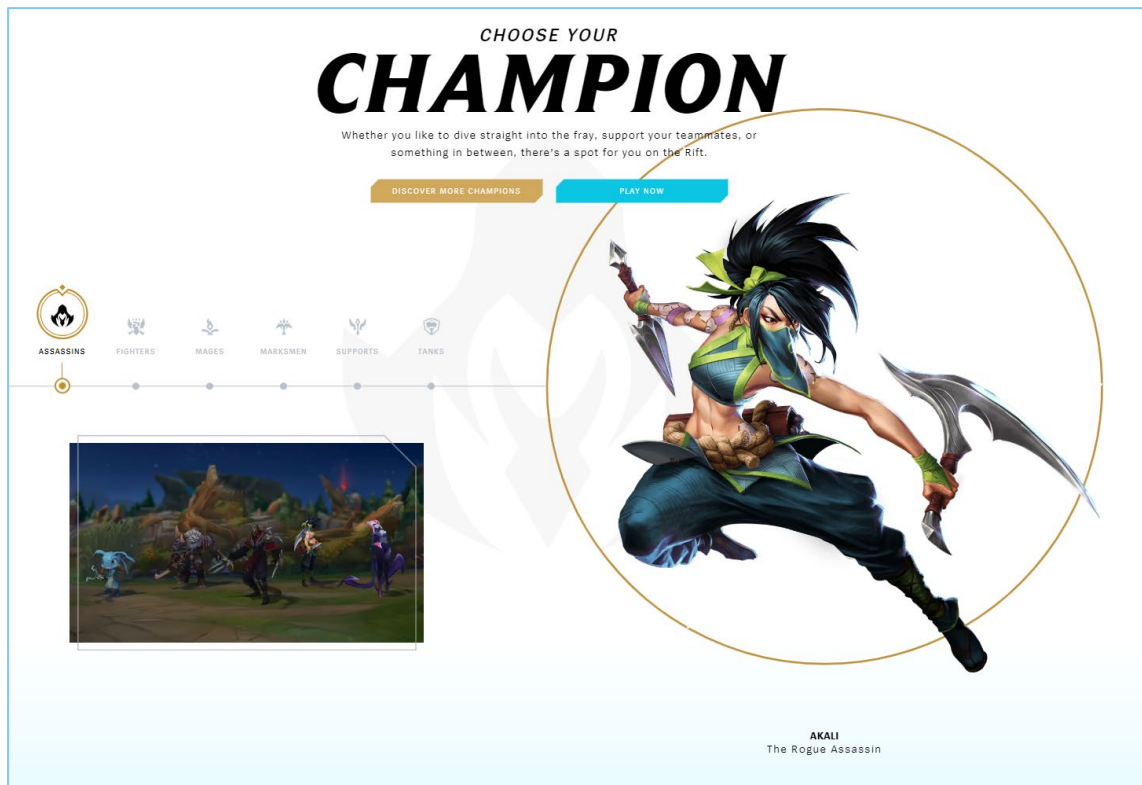
League of Legends is a multiplayer online battle arena strategy game where two teams of five players are battling against to destroy the other's base. Players can select their character from a list of over 140 champions. Each of the champions represents different playstyles, and their categories are assassins, fighters, mages, marksmen, supports, and tanks.



PICTURE 10. Gameplay screen capture from League of Legends TFT on mobile. (League of Legends web page n.d.)

Champions have different looks, skins, that players can buy from online stores. Skins cost mostly between 5-10€, and they only can be used to the selected champion. Riot Games has been releasing new skins for special events like the world championship finals 2018 for the K/DA virtual K-pop group, which was

formed from four champions: Evelyn, Kai'Sa, Akali, and Ahri. These champions were brought on stage as AR characters in the 2018 world championship opening ceremony.



PICTURE 11. Screen capture from League of Legends web page. Choose your champion. (League of Legends web page n.d.)

4.1 League of Legends in eSports

A research group from Tampere University developed a scientific definition for eSports: *a form of sports where the primary aspects of the sport are facilitated by electronic systems; the input of players and teams as well as the output of the eSports system are mediated by human-computer interfaces* (Sjöblom, Hamari, Jylhä, Macey & Törhönen 2019, 5).

Esports audience is new, and the eSports itself is young. What comes to eSports production, it can be much more diverse than traditional live sports broadcasting, with potentially hundreds of real-time camera and game signals, when traditional sports events can have mostly tens of camera signals. The League of Legends World Championship Finals' opening ceremonies are like every other live show

multi-camera production. The difference in eSports multi-camera production starts as the games begin.

4.2 League of Legends international tournaments

In League of Legends tournaments, eSports teams compete against each other. League of Legends World Championship tournaments has become the most prominent eSports event in the world annually. There are twelve professional leagues for League of Legends from all over the world. Teams compete to gain access to the Mid-Season Invitational and for the World Championship every year. The four premier leagues have three spots each to the world championship, and remaining spots go for the winners of the play-in regions. The 2019 League of Legends World Championship was settled between 24 teams.

Name	Region	Main location	Teams
League of Legends Championship Series	 North America	Los Angeles	10
League of Legends European Championship	 Europe	Berlin	10
League of Legends Champions Korea	 South Korea	Seoul	10
League of Legends Pro League	 China	Various	17
Pacific Championship Series	 TW/HK/MO/SEA	Online	10
Vietnam Championship Series	 Vietnam	Ho Chi Minh City	8
League of Legends Continental League	 CIS	Online	8
Turkish Championship League	 Turkey	Istanbul	9
Campeonato Brasileiro de League of Legends	 Brazil	São Paulo	8
Liga Latinoamérica	 Latin America	Mexico City	8
League of Legends Japan League	 Japan	Tokyo	8
Oceanic Pro League	 Oceania	Sydney	8

Chart 1. League of Legends professional teams in 2019.

5 QUALITATIVE CONTENT ANALYSIS OF THE LEAGUE OF LEGENDS WORLD CHAMPIONSHIP FINALS OPENING CEREMONIES 2017-2019

The method of the study qualitative content analysis (Schreier 2014). Subjects for the analysis were derived from the research questions related to the animated characters that are seen on stage in the broadcast. The data was gathered by doing a shot-by-shot analysis of the opening ceremony broadcast recordings. The qualitative content analysis was used for studying the animated characters and their duration in the broadcast. Additional material was gathered from various sources such as online articles, news, press releases, case studies, and web pages. To be able to understand the relation of technology and content, additional material was used to analyze the used technology, and to interpret the data from the qualitative content analysis. Expert interviews were used to gather further understanding for the analysis.

The main materials for this research are the live recordings from the League of Legends World Championship opening ceremony broadcasts. The live broadcast recordings are available from the League of Legends Youtube-channel, where they are made available from the recorded live stream. These ceremonies have roughly the same content and duration: the ceremonies are approximately 15 minutes long, and they all have two or three song performances, and the last part is the presentation of the trophy and finalist teams. The differences in ceremony structures are visualized in a timeline comparison picture on page 30.

A shot-by-shot analysis is used to gather data from these ceremony recordings. The shot-by-shot analysis is a sheet where every shot is analyzed from the ceremony broadcast. An overview of the content and duration are listed from the segments that are not analyzed. Accurate analysis is made from the part of the ceremony where the animated characters can be seen on the broadcast, which is relevant to this research. Relevant content means the animated characters that are part of the show, the song, or the performing group. All other graphical elements are left out because the focus is on the virtual characters and subjects. The in-game characters on the stage are the subjects for this research as they

are the characters from the game and subjects for fandom. Other digital visual elements are mostly created for the overall appearance.

All these events had different technologies for creating new experiences for the audience. AR-holograms require real-time virtual graphics and camera tracking systems. Projected holograms require distinctive projection surfaces, and they are not created with real-time virtual graphics systems, plus there is no need for camera tracking systems. Both ways have different limitations and different advantages. It is essential to know these technologies when the show is planned and designed. This research analyses the technologies from the broadcast feed, Riot Games' press and behind the scenes images, videos from Youtube filmed by the audience, technology providers' behind the scenes materials, case studies and social media posts, and from online articles and interviews. An image is made from each of the venues, pointing out the relevant technologies used to create digital characters on to the stage.

The preliminary shot-by-shot analysis data showed that there are these variables that should be focused on: shot size, camera movement, shot content, animated characters, and their duration. As for the accuracy in the shot-by-shot analysis, a one-second timeframe is used in every shot. It is not essential to focus on shot changes in frame-level accuracy as the show is edited live. The videos were played from Youtube and paused second by second to write down shot sizes and their content and the use of technologies. There is a separate column for animated characters' content and duration. The part of the show which has animated characters in it is named as the **character sequence** to separate the animated character content sections from the whole ceremony. The character sequence is a separate sequence from the song performance or transitional parts of the show. The character sequence starts when the animated characters are visible or audible in the broadcast, and ends when they are no longer seen. In this way, there is data to analyze technical and dramatic aspects of the use of animated characters on the stage. The shot-by-shot analysis was a reasonable way to classify the data. It is used to gather data on a sheet from each of the ceremonies. From that analysis, it can be counted how much of the animated character content was visible during those sequences since the characters are not visible throughout

the whole sequence. The 2017 and 2018 ceremonies had only one main sequence for the animated characters when the 2019 ceremony animated characters were also used to trick the location of the artists, and there is a second short sequence for that separate from the main sequence.

The sheets are not the best way to understand linear storytelling and dramatic choices in the ceremonies, and for that, there are simple timeline graphs to visualize the structure of each show. Timeline charts are shown and explained in each ceremony's chapters, and they are side by side at the findings chapter.

The stadium ceremonies are essential because the audience creates an atmosphere for the show. The experience must be as good as possible also in the video feed because it is seen by millions of viewers around the world.

The final chapter of this thesis will discuss these questions:

- Which characters are brought on stage in the ceremonies?
- What kind of evolution is seen in the use of technology?
- How the use of technology and characters relate to the commercial value they create?
- What is considered to give the best experience to the viewers?
- How does technology relate to visuality and artistic possibilities?
- How the technology and content are related to creating the experience?

The timeline comparison, found from the next page, is a rough division for each of the segments in the opening ceremonies. The character sequence is highlighted in bright green. Song performances are colored with red, and transitional stage action is colored with blue. Orange color is for pre-made video content.

	TIME	CONTENT		TIME	CONTENT		TIME	CONTENT
League of Legends World Championship 2019 opening ceremony broadcast recording	00:00	COUNT DOWN	League of Legends World Championship 2018 opening ceremony broadcast recording	00:00	COUNT DOWN	League of Legends World Championship 2017 opening ceremony broadcast recording	00:00	COUNT DOWN
	00:28	SHOW START		01:24	SONG #1 - SEQ START		00:21	VIDEO INSERT
	00:58	SONG #1		01:27			01:00	
	02:02	SONG #1 END - SEQ #1 START		02:00			01:55	STAGE PERFORMANCE
	02:24	SONG #2 START		03:00			02:00	
	03:00			04:00			03:00	
	04:00			04:30	SONG #1 END		03:49	SONG #1
	05:00			05:00	TRANSITION		04:00	
	05:40	SONG #2 END - SEQ #1 END		05:10	SEQ END		05:00	
	06:00	SONG #3		06:00	VIDEO INSERT		06:00	
	06:26	SEQ #2 START		07:00			06:20	TRANSITION
	06:34	SEQ #2 END		07:15	SONG #2		06:55	SONG #2
	07:00			08:00			07:00	
	08:00			09:00			08:00	
	09:00			10:00			09:00	
	09:19	SONG #3 END		10:45	SONG #2 END		09:28	SEQ START
	09:30	TEAMS		11:00	TEAMS		10:00	
	10:00			12:00			10:06	SEQ END
	11:00			13:00			10:45	TEAMS
	12:00			14:00			11:00	
13:00		15:00		12:00				
13:59	SHOW END	15:49	SHOW END	13:00				
				14:00				
				14:53	SHOW END			

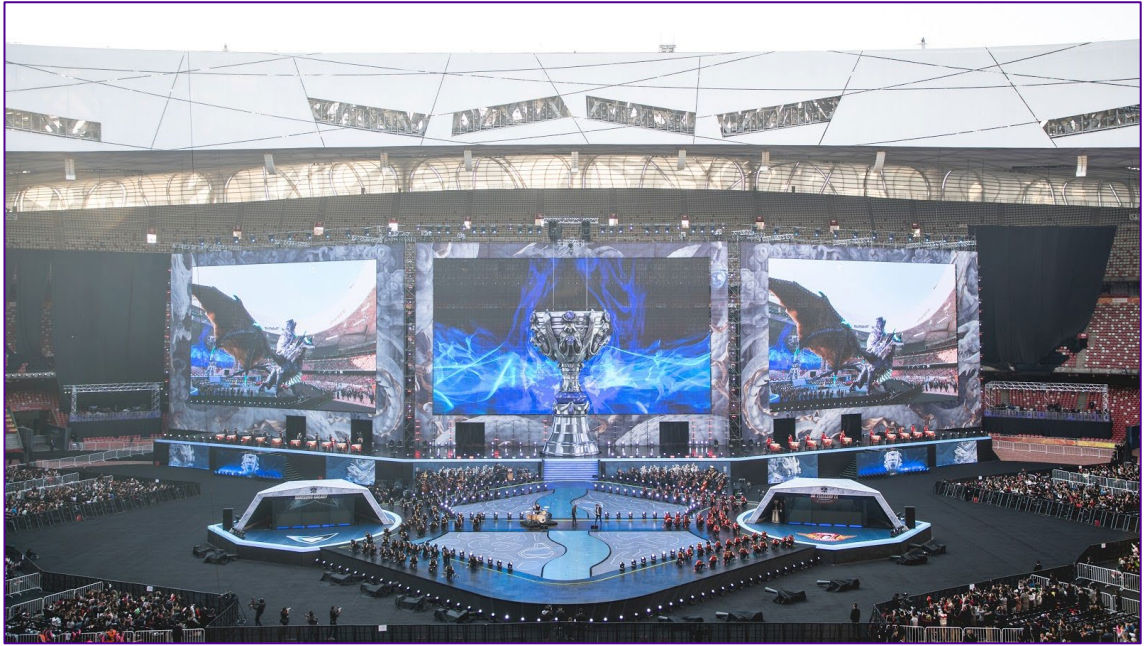
PICTURE 12. Timeline comparison of the 2017-2019 finals' opening ceremonies

5.1 2017 – "The AR Dragon."



PICTURE 13. The "Bird's nest" Beijing National Stadium. (LoL Esport Photos 2017)

2017's world championship final was held at the Beijing National Stadium, known as the "Bird's nest" that has 80 000 seats. In the ceremony, 40 000 seats were available, and they were sold out the same day they came available. 2017 was the first year when League of Legends World Championship Finals broke its viewership record with nearly 100 million unique viewers (Pei 2019). While the scale of League of Legends World Championship Finals requires a great venue, the experience must be delivered via video stream as powerfully as possible because of the massive number of viewers around the world. The 2017 League of Legends World Championship Finals Opening Ceremony was awarded in 39th Sports Emmy Awards with the Outstanding Live Graphic Design award. This was the first time an eSports event won a Sports Emmy, and the rivals in its category were NBA All-Star Weekend, the NBA Finals, and ESPN/ESPN2's college basketball. The Super Bowl halftime show is ineligible for the Sports Emmys as the rules of the award state that it does not constitute as sports content (National Academy of Television Arts & Sciences 2016-2017).



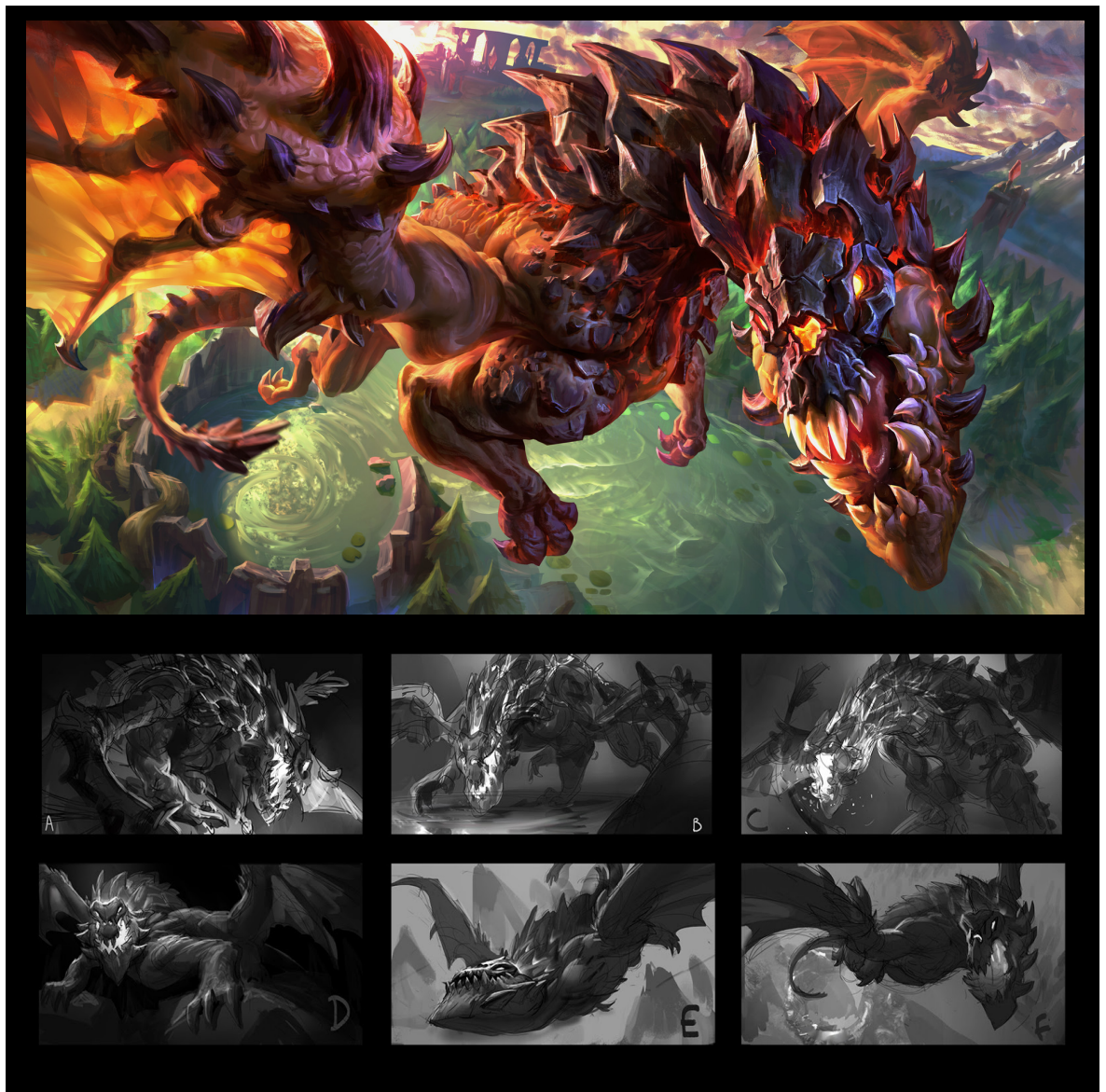
PICTURE 14. The audience at the stadium can experience the AR dragon from huge led screens. (LoL Esport Photos 2017)

The only animated character on the stage in the 2017 League of Legends World Championship Finals Opening Ceremony was the massive AR dragon: the Elder Dragon from League of Legends. There are five types of dragons in League of Legends: Cloud, Infernal, Mountain, Ocean Drakes, and the Elder Dragons. In the League of Legends Wiki dragons are described as *a special group of reptiles that may reach near-giant sizes*. Dragons have a role in the combat mechanics, and the Elder Dragon is the strongest of the dragons and it is the final dragon to summon against the playing team. Elder Dragons are epic, massive, scary creatures that would make a perfect on-stage character to create memorable experiences for the fans. According to a behind-the-scenes story by Ariel Horn and Justin Restaino, a dragon flying into the stage had been a joke for years before the 2017 opening ceremony. At the time when those jokes were told first, there was not any realistic solution to make live AR-graphics at this scale. (Horn 2017.)



PICTURE 15. Ionian Market being attacked by a Dragon. (League of Legends Universe n.d.)

The character sequence started with a dragon roar sound effect after two-thirds of the ceremony and ended 42 seconds later. The total duration of visible animated characters (or a single character, the dragon, in this case) was 38 seconds. The whole opening ceremony had 122 individual camera shots, and only three shots had AR-graphics or animated characters in them. As the dragon flies inside the stadium, there is an audible gasp by the audience in the broadcast. The audience cannot see the AR dragon inside the stadium, but the experience is strong enough from the huge video screens above the stage.



PICTURE 16. Dragon splash concept art by Riot Artists Cesar Rosolino and Mike Azevedo. (Rosolino n.d.)

5.1.1 A brief description of the 2017 ceremony

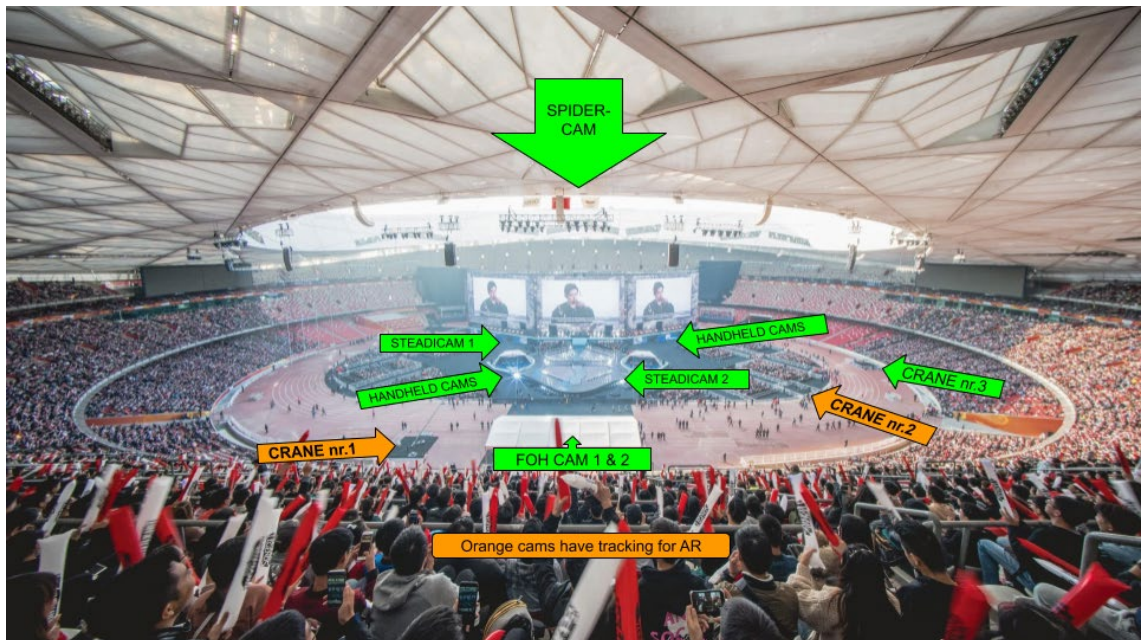
- 00:00 The opening ceremony starts with a video insert with testimonies from players who tell how the game has affected their lives. Right after two minutes, the stream goes live from the stadium stage, where the host takes over. The host walks on the stage, and the steadicam is showing the massive amount of dancers on stage.
- 02:45 Image cuts to a spidercam shot which opens up showing the whole stage, and its large led screen floor on its boundaries.

- 03:49 First song starts
- 06:30 Second song starts with a grand piano intro, and it is shot with the steadicam on stage. Steadicam picks up the singer at 6:55 right before she starts to sing the Legends never die.
- 07:44 The editing pace picks up, and the tripod placed telelens camera changes rapidly from medium shot to medium close up and follows dancers quick movements. This shot feels like it has a meaning, and it creates new tension with different camera choreography. It is followed by a spidercam wide shot to a steadicam shot of the singer.
- 08:14 The first close up shot of the singer as the song dynamic eases up a bit. After this, the song C-part begins to grow the tension towards the chorus again. Images are done with a lot of movement with the spidercam and steadicam.
- 09:01 Again, the same telelens shot with rapid zoom to medium close up of the singer. Soon after two wide shots, the image cuts back to the tripod-mounted camera following the singer.
- 09:28 During medium close up of the singer, there is a roaring sound, and the camera rapidly zooms and looks around from where the sound comes. Camera movement is intentionally made to look imperfect to create tension.
- 09:31 The image cuts to a crane shot that has a shot from the stage and quickly tilts up to the sky and picks up the AR dragon. At the stadium, the AR dragon is seen on the led screens above the stage. The dragon roaring is heard through the PA system.
- 09:40 A thunderous roar is heard, and the crane number one follows as the dragon flies over the stage. Image cuts to crane number two, which continues to follow the dragon. Next, the image cuts back to crane number one, which follows the dragon to the end of the AR sequence at 10:06.
- 10:24 Both teams walk to the stage
- 10:45 End of the song
- 10:54 The host takes over
- 11:37 Team presentations
- 14:49 The end of stage ceremony



PICTURE 17. Screen shot from the live stream. (Opening Ceremony Finals 2017, Youtube 2017)

5.1.2 Technology at the 2017 opening ceremony

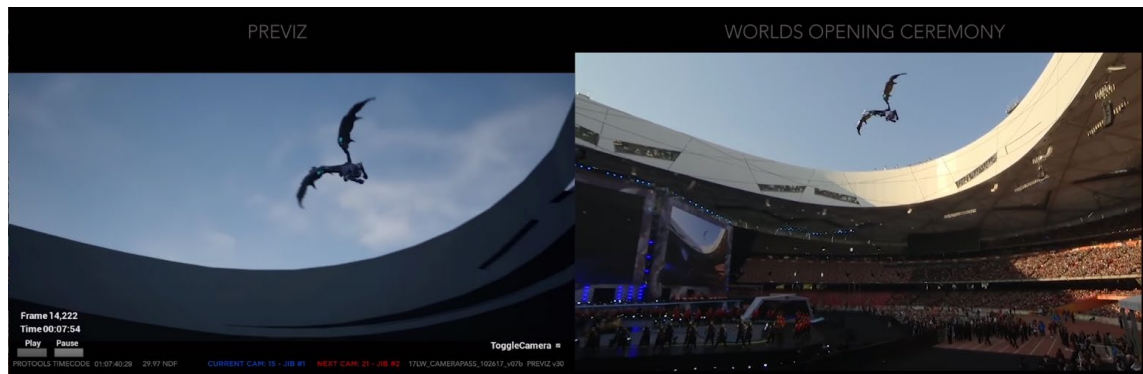


PICTURE 18. Camera locations at the 2017 stadium. (LoL Esport Photos 2017)

There are several cameras used in this production, but only two of them are tracked cameras to enable the use of real-time AR graphics. Tracked cameras are crane numbers one and two. From the opening ceremony broadcast can be

seen at least two steadicams, three camera cranes, a spidercam, multiple handheld cameras, and remote-operated cameras and two tripod-mounted cameras at the front of the house (FOH - meaning the white tent in the center of the image). Camera tracking technology was a product called StypeKit, by a camera tracking company Stype, which is a tracking system that can be added to existing camera cranes. It was installed to two camera cranes, one on the left, and the other on the right side of the stage area. The real-time graphics solution for live AR was the Reality Virtual Studio by Zero Density, a virtual studio solution company from Turkey. (Horn 2017; Bretteville & Groth 2019.)

The stadium was laser scanned to a 3D model six months before the show, and the whole show was designed and pre-visualized in 3D graphic animations.



PICTURE 19. Screen capture of a case study video. Previz and the same frame in the live broadcast. (ED SIDEBYSIDE, Youtube 2017)

5.2 2018 – "The AR K-Pop band"



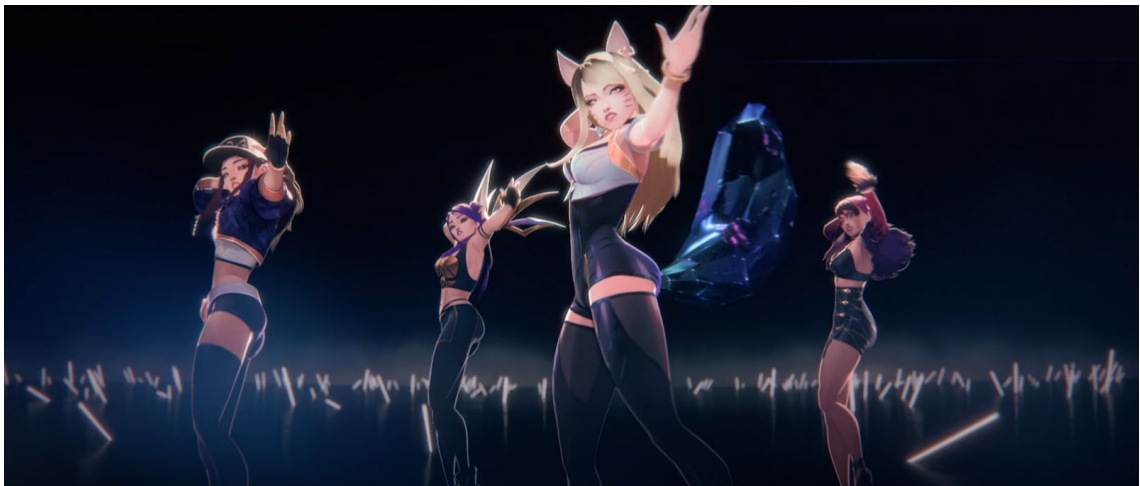
PICTURE 20. Incheon Munhak Stadium. (LoL Esport Photos 2018)

2018's world championship final was held at the Incheon Munhak Stadium in South Korea. Stadium's capacity is more than 49000 seats, and for the finals, there were 26000 tickets available where from the first batch were sold out in a matter of seconds.



PICTURE 21. Screen capture from 2018 opening ceremony (Opening Ceremony 2018, Youtube 2018)

The opening ceremony starts again with an original song, which is this time composed for a group called K/DA. Its voices are real-world artists Soyeon and Miyeon of K-pop group (G)I-dle, and American singers Madison Beer and Jaira Burns. The group was put together only to release this one single: the song called POP/STARS. K/DA characters are League of Legends champions: Kai'Sa (voice: Jaira Burns), Akali (voice: Soyeon), Ahri (voice: Miyeon), and Evelynn (voice: Madison Beer), were brought live on stage as animated augmented reality characters (Alexander 2018). This time the animated characters were commercially used more than previous years AR dragon, which did not have a connection to in-game purchases in League of Legends. K/DA characters skins were introduced at the end of October 2018 before the World Championship Finals, and they were available as in-game purchases for the players. The price for each of the K/DA skins was about 8 euros per piece. Skins will not give any powers to the character, and it is just for looks.



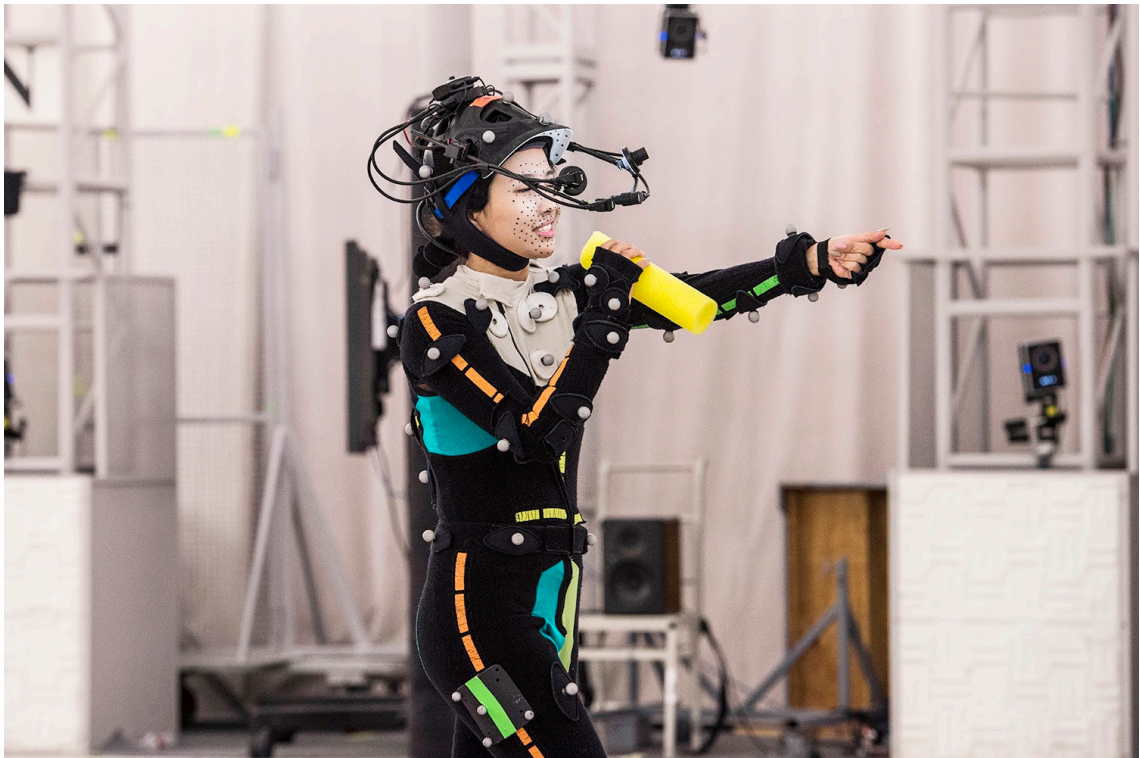
PICTURE 22. Screen capture from K/DA official POP/STARS music video. (K/DA POP/STARS, Youtube 2018)

The music video of K/DA performing its original song POP/STARS was released 3.11.2018 on the day of the finals. The music video got 13 million views in just 48 hours after its release. POP/STARS single took the first place in K-Pop charts for Apple Music in the USA (Crecente 2018), and it peaked as the number one on November 17th, 2018 at Billboards K-Pop song chart for World Digital Song Sales (List of K-pop songs on the Billboard charts, Wikipedia 2020). In May 2020, the music video has over 331 million views on Youtube. The song made into the virtual reality hit game Beat Saber! (Beat Saber Press Release 2018.) Riot

Games has released more than 100 different K/DA merchandise, such as K/DA Akali Unlocked statue for 85€ in Riot Games online store.



PICTURE 23. Screen capture from K/DA POP/STARS music video comments on Youtube. (K/DA POP/STARS, Youtube 2018)



PICTURE 24. Miyeon is performing motion capture for the character of Ahri. (Riot Games 2018)

K/DA characters were animated with motion capture performed by their real-life counterparts. Choreography for the song was created by Ellen Kim, and the dancers for the choreography are Bailey Sok, Stevie Dore, Ellen Kim, and Eileen Harman (K/DA - POP/STARS Dance - Behind the Scenes, Youtube 2018). In the stage, the artists are dancing and singing with the AR characters. Parts of the official music video is played on the screens behind the stage during the song performance.

The name K/DA stands for Kills, Deaths, and Assists ratio, which is used in League of Legends tournaments to display teamwork and skill (Kill to Death Ratio, League of Legends Wiki 2020).



PICTURE 25. Screen capture from K/DA choreography video. (K/DA - POP/STARS Dance - Behind the Scenes, Youtube 2018)

5.2.1 A brief description of the 2018 ceremony

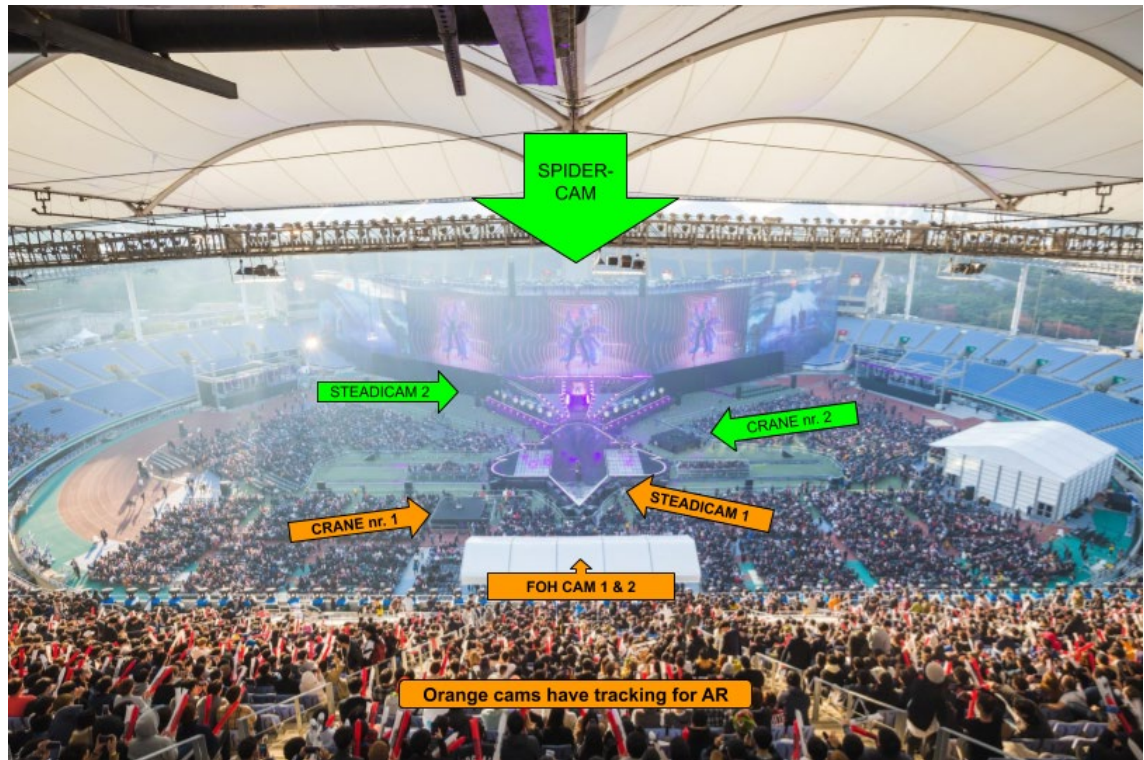
- 00:49 Countdown video
- 01:21 Steadicam shot from the led screen to the stage
- 01:27 Song starts, and K/DA AR characters walk on stage in the first shot and stop for a group pose
- 02:15 Human singers are first time in same shot side by side
- 02:43 Rap performance by the character of Akali and Soyeon
- 03:10 The character Ahri levitating over the stage
- 03:19 All AR characters dancing in the same shot
- 04:00 The character Kai'Sa summons light and pyrotechnics
- 04:14 The characters and human artists dancing in the same shot synchronously
- 04:30 Song ends in a shot where the characters are posing in the middle, and the human artists are on both sides of the stage.
- 04:38 Camera zooms into the character of Ahri, and she opens up a portal to the world of League of Legends. As she walks into the portal, dancers and artists leave the stage.

- 05:10 The character sequence ends, and recap video of previous tournaments begins
- 07:15 The trophy is revealed on the stage. Second song performance begins
- 10:45 Song ends, and the hosts come to the stage
- 15:49 After team presentations the ceremony ends



PICTURE 26. Screen capture from the 2018 ceremony broadcast. Kai'Sa in the middle. (Opening Ceremony 2018, Youtube 2018)

5.2.2 Technology at the 2018 opening ceremony



PICTURE 27. Camera locations at the 2018 stadium. (LoL Esport Photos 2018)

The 2018 opening ceremony featured live AR technology again. The multi-camera setup was similar to the previous opening ceremonies, with several cameras capturing the action. Another interesting element was the moving stages that were utilized after the character sequence. This time there was motion capture technology used to animate the characters. Camera tracking was provided by Stype, the same company as the year before. However, this time there was also a steadicam using a Stype Redspy tracking system and a tripod camera along with a crane camera both equipped with StypeKit tracking. The live AR graphics were generated with Unreal Engine based virtual studio system by The Future Group, a virtual studio solutions company from Norway. The Future Group released their virtual studio and AR production software named Pixotope in January 2019. What comes to the technology for creating animated characters to the stage the 2018 opening ceremony was not significantly different from the 2017 ceremony. The difference is more in how the technology is used, and more tracked cameras are needed for dynamic editing and capturing the real dancers and AR characters from various angles. (Bretteville & Groth 2019.)

5.3 2019 – "The Virtual Hip-Hop group"



PICTURE 28. True Damage, a hip hop group formed from the League of Legends champions. (LoL Esport Photos 2019)

The 2019 League of Legends World Championship Finals were held at AccorHotels Arena in Paris. This time the venue is an indoor arena with around 19 000 seats for the event opposed to the 2017 and 2018 outdoor stadiums, which had seats for tens of thousands of viewers. The 2019 League of Legends world championship finals broke all records for viewership in eSports broadcasts again. Peak viewership topped 44 million simultaneous viewers, and the total amount of views went over 100 million. (Webb 2019.)



PICTURE 29. The 2019 League of Legends World Championship Finals venue. (LoL Esport Photos 2019)

The audience was expecting Riot Games to create a show again with augmented reality content in it. However, this time the organizers did not want to use the same technology because it was already done two years in a row. An indoor stadium made it possible to use 3D Holonets created by a company called Kaleida. Holonets were used most of the ceremony for projecting hologram visuals to them. The main focus in the ceremony was again a virtual music act, and again there was a new band put together for the event. (Webster 2019.)

Holonet also made it possible to trick the artist to another location on the stage, which would not be possible to achieve with just AR graphics on the broadcast feed. While the Holonet is a significant part of the overall visual appeal of the stage in the ceremony, the appearance of in-game characters live on the stage is the main thing. It is worth noting that the audience did not react to the Holonet projections before the first projection that contained animated characters in it, which was the bubble explosion after the first song transitioning to the appearance by the main act. According to Daniel Reynolds, the director, and producer at Kaleida, the reaction videos from Youtube are an excellent source for studying how people react to the show. In our discussion, Reynolds told he was surprised

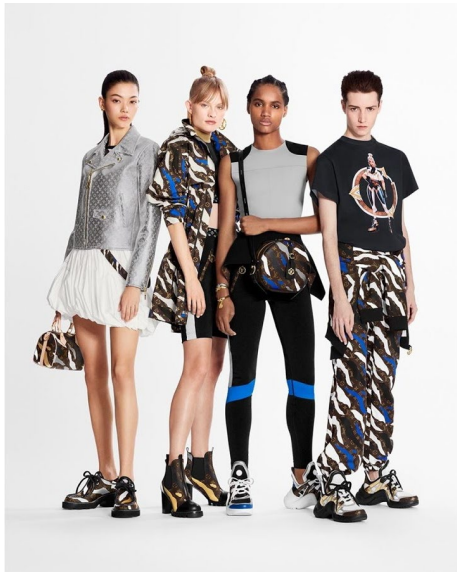
by the fact that viewers were not that impressed by the holographic projections until the bubble came, and the first artist was blown away from the stage by it. Reynolds was responsible for the Holonets at the 2019 event. (Reynolds 2020.)

In the final opening ceremony, Riot presented a virtual hip hop group called True Damage, and one of the group members, Senna, was brought as a new champion in the game before the finals. On the stage was an appearance by the whole group coupled with their digital counterparts, which were projected to transparent net surfaces around the stage. Again, Riot Games released a skin batch for True Damage characters, and K/DA Akali, who was the only character for last year's virtual group, got an update to True Damage Akali with a new look. These skins are available as in-game purchases in League of Legends. (Samples 2019.)



PICTURE 30. Qiyana Prestige Louis Vuitton skin. (Louis Vuitton 2019a)

This time there were even more commercial aspects to the creation of True Damage: Qiyana's (one of the characters) True Damage Prestige Skin is designed by Louis Vuitton. Players can unlock the Qiyana Prestige Louis Vuitton skin by playing an in-game event and using tokens throughout the world championship event. There was a second Louis Vuitton skin for the character of Senna planned to release in 2020. (Stravropoulos 2019.)



Along with the True Damage Prestige Skins for Qiyana and Senna Louis Vuitton designed the travel case for the League of Legends World Championship Trophy. The case had a visual role in the opening ceremony when the trophy was revealed. On December 9th, 2019, the League of Legends x Louis Vuitton capsule collection designed by Nicolas Ghesquière was available for fans to order.

PICTURE 31. The League of Legends x Louis Vuitton capsule collection. (Louis Vuitton 2019b)



PICTURE 32. The 2019 World Championship Trophy was revealed from a travel case by Louis Vuitton. (LoL Esport Photos 2019)

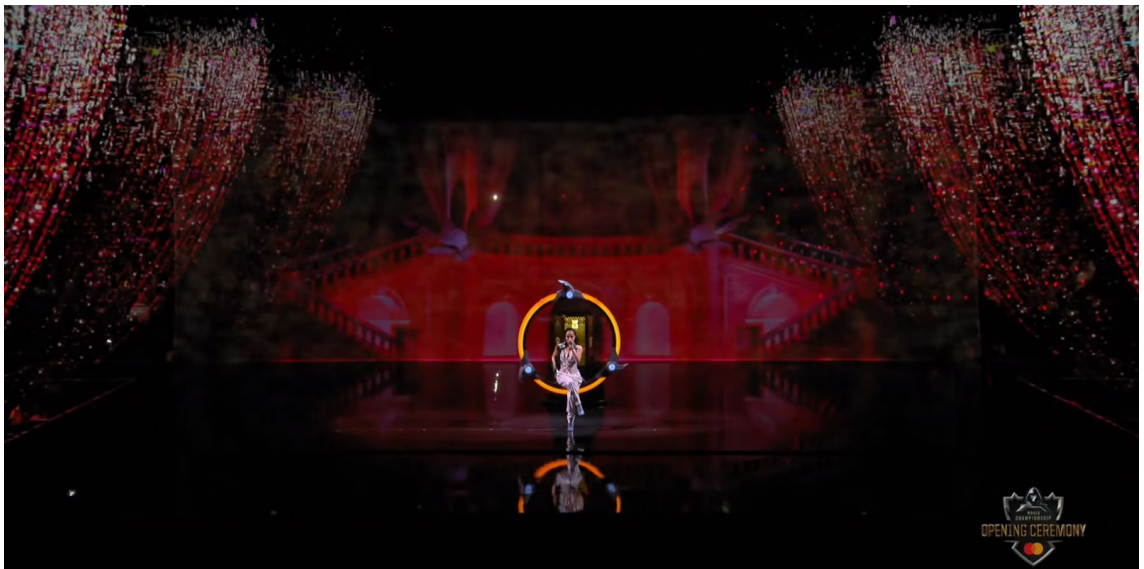


PICTURE 33. Screen capture from the GIANTS Behind the Scenes choreography video. (GIANTS Dance, Youtube 2019)

The choreography for True Damage GIANTS was made by The Kinjaz, who are famous for their choreographies and performances for significant events. Most of the choreography was performed by stage dancers and not so much by the artists like it was in the 2018 K/DA act, which was mostly choreographed vocals and dance act. The official True Damage music video was made by The Line Animation Studio, and it used multiple techniques such as 2D animation, 2D animation, VR cameras, painted backgrounds, and live-action footage from Paris. There are visual and choreographic connections between the music video and the stage show at the opening ceremony.



PICTURE 34. Screen capture from GIANTS music video Qiyana singing. (True Damage, Youtube 2019)



PICTURE 35. Screen capture from 2019 opening ceremony. Qiyana singing. (Opening Ceremony 2019, Youtube 2019)

5.3.1 A brief description of the 2019 ceremony

- The recording starts with a 20-second countdown as the finalist teams are projected to the silver screens above the stage.
- 00:30 Camera zooms into the trophy casing, and images of the finalist teams appear on the silver screens above the stage.
- 00:54 Both teams are standing on the stage, and their team logo graphics are projected to the Holonets

- 00:58 Image changes to a medium shot of the first artist and the song starts
- 01:40 Image cuts to a very wide shot showing the whole stage and all the screens. Dancers are doing choreography on the stage and screens are showing game graphics
- 02:00 The artist walks to the center of the stage while singing the last lines of her song. When she stops, there is an explosion projection to the front center Holonet. Real dancers and the vocalist from the stage are transformed into the hologram projection and blown away in slow motion animated graphics. This is the first time when animated characters appear on the stage.



PICTURE 36. First holographic projection at the 2019 ceremony containing animated characters. (LoL Esport Photos 2019)

- 02:09 The main animated character sequence begins
- 02:24 The song performed by TRUE DAMAGE begins. The first part is performed by the character of EKKO
- 03:17 The character SENNA is presented
- 03:23 The character QIYANA is presented

- 03:34 The character AKALI appears to the stage with QIYANA
- 03:44 Akali performing solo
- 04:06 EKKO, SENNA, QIYANA, AKALI on the stage in the same shot with their human counterparts
- 04:30 Stage goes dark. YASUO is introduced
- 04:39 The part in the sequence begins, where the human artist of YASUO, Duckwrth, is teleported to different locations on the stage as a hologram
- 05:08 All the artists on the stage with hologram characters in the same shot
- 05:34 The song ends. All characters posing with human artists
- 05:51 Third song performance begins
- 06:26 Artist turns into a hologram. 2nd character sequence begins
- 06:30 Second artists position is faked with a hologram projection
- 06:44 2nd character sequence ends
- 08:02 Trophy is revealed
- 08:40 Teams on the stage
- 09:20 Song ends, artists leave the stage
- 09:30 The host comes to the stage. Team presentations
- 13:59 End of the ceremony



PICTURE 37. TRUE DAMAGE in real life and the digital counterparts projected to the 3D Holognet on the stage at the LoL World Championship finals 2019. (LoL Esport Photos 2019)

5.3.2 Technology at the 2019 opening ceremony

The multi-camera production in the 2019 opening ceremony had different technical demands than the previous years' live augmented reality productions. The 2019 show featured projected holograms, so they are projected to fixed surfaces on the stage. This means that camera angles and focus points play a significant role in how realistic or enjoyable the holograms look. Augmented reality holograms are related to the virtual stage and placed on the real stage as they would be physical subjects. In this way, tracked cameras can follow AR subjects as they would be real. Projected holograms are just 2D projections on flat transparent surfaces, so the camera angles and shots need to be just as planned because the projections and their locations will not react to the camera movements.



PICTURE 38. The right side floor level view of the 2019 stage. On top of the stage are eight silver screens, and hanging between the stage are four 3D Holonet projection screens. (Kaleida)

The 2019 venue was rigged with four 3D Holonets: three on the front of the stage and one behind the center stage. The Holonets were fixed on their places during the opening ceremony. The hologram projections were created with fourteen ultra-short-throw video projectors, each putting out 35 000 lumens. Large surface projections on top of the stage were created with traditional projection screens and video projectors. The Holonets that were used in this event have a gain of up to 0,85 lumens. In this case, it was essential to be able to get as bright holograms as possible to match the brightness to the projection screens above. Holonet has a significantly less reflective surface than traditional screens, so it needs to be lit with more than one projector to be able to match the brightness of traditional screens. (Reynolds 2020)



PICTURE 39. Front view from the audience showing how the silver screen projections continue to the transparent 3D Holonets on the stage. (LoL Esport Photos 2019)

5.4 Findings

In 2017 and 2018, the AR-holograms are a separate and unique part of the overall experience. Traditionally projected holograms are used throughout the whole ceremony of 2019 world championship opening, and the animated characters are just one part of the projections. In these cases, the audience has a different focus on both technologies and content created with them.

2017

The 2017 opening ceremony had only one animated character on the stage, which was the Elder Dragon from the game. The dragon is not a playable character, and there are no in-game purchases that could be linked to that character. The dragon was timed to the dramatic peak point of the show just before the main song performance ends and the team presentations begin. League of Legends released a music video of the main song composed for the opening ceremony,

and the song did not have references to the dragon. The song was named *Legends Never Die*, referring to a theme in the game, and the music video content was from the League of Legends world and story.

The dragon was made with real-time AR graphics and two graphics engines, and two tracked crane cameras. The AR dragon was visible 38 seconds in the broadcast. The duration of the character sequence was four seconds longer because the dragon sound was heard before the cameras caught it flying over the stadium. The character sequence is the time between when the first sound or graphics was used during the show to the last second it was used. The AR dragon was used only during the main song performance.

2018

The 2018 opening ceremony had the four champion characters from the game performing as a K-pop band on the stage. The virtual band members are player characters, the champions, from the game. The band characters were presented with new skins designed for them, and the opening ceremony was their first performance. Players could buy these skins as in-game purchases. The music video made for the virtual band was tied to the whole performance in the opening ceremony. The choreography was similar in the music videos as it was in the opening ceremony performance. The music video showed only the characters with their new skins that came available for in-game purchases. As the band was made with AR graphics in the opening ceremony, the visual look was different from the music video that was not made to look like 3D graphics as it instead looked more like 2D animation.

The band was made with real-time AR graphics with three graphics engines and three tracked cameras: a steadicam, a tripod camera, and a camera crane. The character sequence started with the song, but the characters stayed on the stage after the song was finished. The duration of the character sequence was 257 seconds, from which the characters were visible 83 seconds during the song performance and 40 seconds after the song—making it a total of 123 seconds for the animated characters on the broadcast.

2019

The 2019 opening ceremony featured a five-character virtual band, and one of them was from the previous year's virtual band. These characters also had custom skins designed, and they came available as in-game purchases for the players. A new type of commercial collaboration was made with Louis Vuitton, who was responsible for two new in-game skin designs for two of the band characters. The visuals designed for this year's music video were strongly related to the visuals in the opening ceremony. The overall style and look for the animated characters were close to the look in the music video. Hologram 2D projections made it possible to have a similar style in the music video and on the stage. The style could have been done with AR graphics, but that would have diminished the idea of AR graphics that are typically designed to look 3D and so that they can be seen from every angle as they would be real.

This time the technology was not live AR graphics, and there was no camera tracking used, so there were no interactive elements in the animated characters. The characters were made with hologram projections that were achieved with several synchronized and layered video projectors projecting to a transparent surface on the stage. The hologram projections were also used to trick the position of some of the human artists. There was also a brief second character sequence for this use after the main song. The use of animated characters was calculated, adding the virtual band characters plus the visual effects animated for the human artists together as they both are animated characters on the stage in this case. The time between the first and second character sequence was not taken into account. The second character sequence was only eight seconds long. The main song had 118 seconds with animated characters visible in the broadcast, and outside of the main song, there were 27 seconds animated characters on the stage—making it a total of 145 seconds visible animated characters on the broadcast.

Duration of the characters

The first chart is visualized how much the use of animated characters have evolved between the years 2017-2019. The 2019 'character sequence' and the 'total duration of visible characters' also contains the short sequences for those animated characters that were not animated characters from the virtual band.

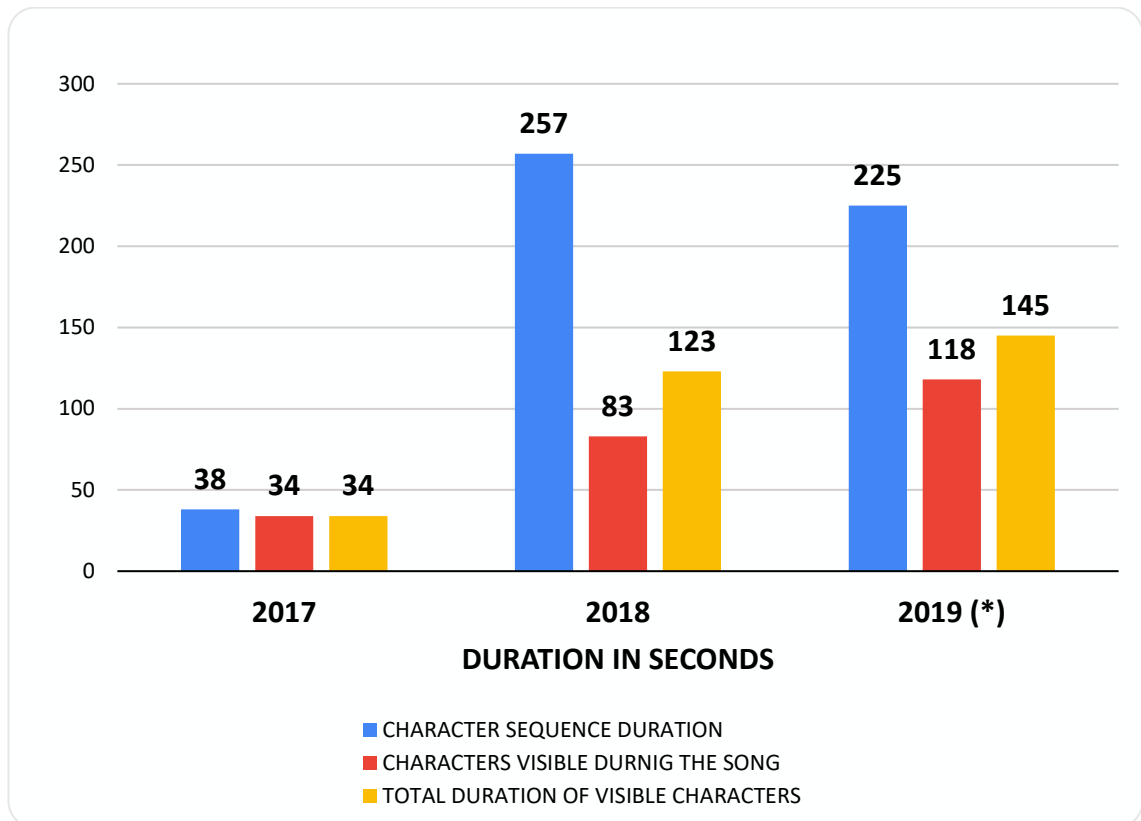


Chart 1: Visible animated characters duration in seconds

Chart 1 shows the usage and visibility of the animated characters have grown significantly from 2017 to 2019. The most relevant change in the content was the invention of the virtual band. After the first virtual band's success, the 2019 virtual band was done with different techniques, and with the hologram projections, it was intended to make an even bigger surprise to the audience. It is not clear if the change in technology affected the duration of animated characters seen on the broadcast. While this research is analyzing the animated characters, the hologram projection technology was used during the whole ceremony to project hologram visuals. As the hologram projections are visible throughout the ceremony, it affects the overall appearance and style of the visuals in the show, contradictory to a single use of AR during the show.

Relationship between the animated characters, the show, and the song

Chart 2 shows the relationship between the animated characters, the whole show, and the main song performance. The 2017 ceremony featured only one animated character, the dragon, and it was brought on stage with AR graphics in the dramatic peak point of the show. The AR dragon's main purpose was to create a strong wow-effect for the audience at the stadium and those watching the broadcast. The 2018 ceremony was the first to feature in-game player characters as performers on the stage. The 2018 ceremony was technically made with a similar AR graphics system than the 2017 ceremony. In the 2019 ceremony, the technology was different, but the concept of a virtual band made from in-game player characters remained the same.

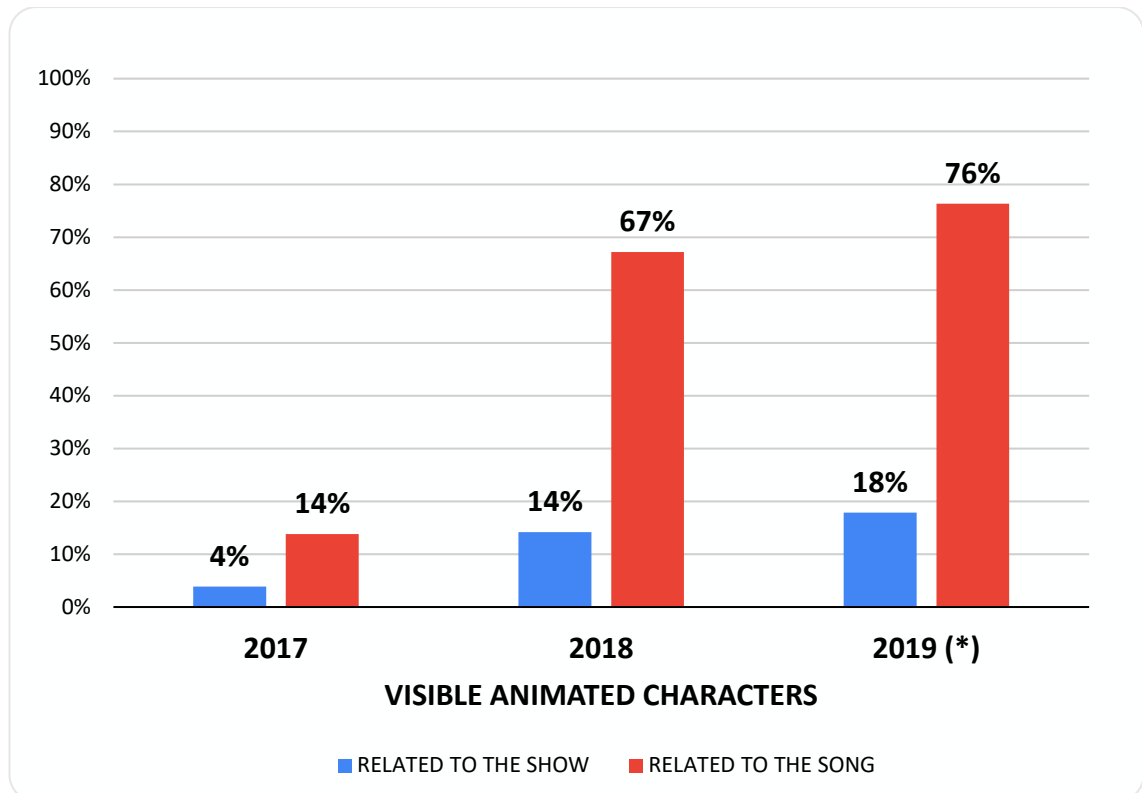


Chart 2: Visible animated characters related to the show and song performance

6 DISCUSSION

My experience is that emerging technologies, such as Virtual Reality, have had more hype in the media than relevant content made with it. I feel that that is unfortunate, and it can lead to a peak of events marketed with this technology-driven wow-effect. A technology can astonish the audience, but that effect cannot be repeated to the same viewers after it has been done once. Aiming for the wow-effect can make a long gap for the technology to become used for a kind of content it is most suitable. As the League of Legends World Championship opening ceremony performances used AR-, Motion Capture, and Virtual Studio technologies in 2017 and 2018, is it surprising that the 2019 event did not have any high tech (as high-level novel technology) solutions. The 2019 show featured a virtual band again, but now it was created to the stage by projected holograms that are essentially video projections to transparent surfaces. The essence of content was still virtual, but projected holograms are not something that is hyped in media, but they can create a powerful experience for the audience when used with skill.

The content analysis of this research can be replicated, and that data is simple to gather from the video footage. There might be small differences in durations if they are counted in frame-level accuracy, but this will not make any significant difference in the results. A part of the technical information was analyzed from the video footage, and several sources (audience videos, social media posts, marketing materials, case studies) were used to ensure the analysis. Large scale broadcasts like the League of Legends World Championship Finals have a significant amount of television technology. All information was not available for the multi-camera production technology used in these events, and those were left out of the analysis to avoid any inconsistency. The animated characters studied in this research can be seen in the broadcast video. This research focuses on the video and the experience achieved with that. The atmosphere for the broadcast would not be the same without the audience at the stadiums, but how the audience experience varies was not possible to study in this research.

Which characters are brought on stage in the ceremonies? What kind of evolution is seen in the use of technology?

The Elder Dragon in the 2017 ceremony was a massive technical effort at the time it was made. It resulted in a tremendous amount of attention towards the League of Legends World Championship opening ceremonies. At first look, the AR K-pop band in 2018 was not that impressive, but when I looked more into the characters, I rapidly changed my opinion about it. The AR dragon was indeed an in-game character on the stage, but the AR K-pop band had so many more levels of connection to the game and its essence. Using technology just for creating a wow-effect did just what it was supposed to do in the AR dragon case. The AR K-pop band had exclusive character skins that players could buy as in-game purchases. The band had a real music video that was not connected to the game, and its visuals were more like pop-culture visuals. The song composed for the band was a huge success all over the world.

In 2019 Riot Games continued with the band theme presenting a virtual hip-hop group. This time there was one character from last year's K-pop band and four new characters, again with special skins for the players to buy. Now Riot Games teamed up with Louis Vuitton, who designed two exclusive character skins (which are available only by playing specific campaigns), the travel case covering the world championship trophy, and a League of Legends clothes collection. The visual appearance of the band was similar in the opening ceremony as it was in the music video. There was a more artistic approach to the look and feel of the band than it was with the AR graphics in 2018.

What is considered to give the best experience to the viewers during the ceremony?

I watched some of the so-called reaction videos to the 2019 opening ceremony from Youtube. Daniel Reynolds told me that he was surprised by the first thing people reacted more strongly to when seeing these reaction videos. I randomly selected ten reaction videos, and in all of them, the audience was astonished at the point where there is a kind of slow-motion explosion on the stage. The explosion is made with the same hologram projection technology that is used from the first seconds in the ceremony. People seem to react to this particular visual effect

so strongly because something is happening to the artists on the stage. Even it is technically just a hologram graphics projection. The visual effect itself is nothing special since there have already been great looking hologram visuals in the show before this. The experience comes from the whole concept, and the use of modern technology is not the only driver here. Riot Games had been hoping to bring their League of Legends in-game characters to the stage for years before the 2017 ceremony. It was just that time when the AR technology was good enough for creating a believable and enjoyable experience for the audience. The AR dragon had the element of surprise also because there were no AR graphics used before it, and the audience did not expect a dragon to fly onto the stage. The best experience comes from the element of surprise, the characters that the audience loves, courageous use of technology, and expanding the world of in-game characters: the music videos, exclusive skins, merchandise, and commercial collaborations, all together.

How the use of technology and characters relate to the commercial value they create? How does technology relate to visuality and artistic possibilities?

The atmosphere in the 2019 opening ceremony is different from the 2017 and 2018 ceremonies. It is an indoor stadium, and the darkness enables visuals that are made with light much more effectively compared to daylight events. Which is better then? The audience was amused back in 2017, and even more amused in 2018. However, the 2019 ceremony was visually the best ceremony of all of these by far. The 2018 virtual band, K/DA, was a great example of doing something similar but still very different than the AR dragon. Now the characters on stage were the player characters from the game. When watching the stage choreography for the Pop/Stars performance, it felt a bit awkward. Both the digital and human artists did the same choreography, and the animated characters got their movements from their human counterparts (by motion capture animation process). There are specific dance moves in the Pop/Stars choreography that can give *the uncanny valley* -feeling, while the same choreography presented by the professional dancers feels just right.

The 2019 ceremony had a completely different approach in the stage performance as the characters' choreography did not try to replicate the movements of their human counterparts. The 2018 K/DA dance was excellent for that time, but if done again, would it have been better with similar technology in 2019? Now in 2019, Riot Games chose something that did not risk the awkwardness of human-like animated characters. Would Louis Vuitton have collaborated with Riot Games if the band would have been presented with motion capture animated AR characters? For me, it looks like the 2019 projected holograms did not suffer from the uncanny valley phenomenon, like the K/DA performance suffered in the 2018 ceremony, possibly because they were done with more traditional looking animations. Technology did not restrict the style nor the function of the animated characters, and the 2019 show felt intact visually and emotionally.

Riot Games have been changing something after each opening ceremony from 2017 to 2019. The element of surprise has been the critical point for their ceremonies' success. To create the wow-effect with the AR dragon worked well. The following year they brought much broader content, and commercialization, with the same technology. In 2019 they continued with the virtual band theme. They used another technology that allowed Riot Games to upgrade the overall visuals for their main event for the year and make a high-level commercial collaboration to influence an even broader audience.

How technology and content are related to creating the experience? Which technologies are used to impress the audience, and how does the use of technology evolve between 2017 to 2019?

Technology will not make a weak story strong. Riot Games have a continuum in their League of Legends ceremonies, and that comes from the story from the game. They do not have a continuum in using certain virtual reality technologies, because they choose what they feel would be the best for their content and the event, whichever venue it is arranged. Riot Games has succeeded in creating memorable experiences for their audience. They need to do slightly better each time, and for that, they need to come up with something new every year. Virtual production technologies are now taking off; at least their developers are expecting it to happen. Unreal Engine is getting more and more virtual production features, and everyone who can create game content can create virtual worlds for

broadcasting. There will be photorealistic virtual content in weekly programming, and those content creators who can combine new technologies with relevant content will break the news. Like the League of Legends World Championship Finals opening ceremonies have done during the past few years.

Has the use of technology evolved or not? The use of technology has been pioneering and creative in these ceremonies, and is it bad that the 2019 ceremony did not use any virtual reality related systems? The change from 2017 to 2019 is showing that the content should be the driver when using technology to impress the audience. How did the technology and content relate to the experience in these ceremonies? The most significant difference is that the AR graphics cannot be seen by the audience at the venues as they are meant to be seen. The AR graphics give the best experience to the broadcast viewers. Projected holograms have weaknesses in their resolution when zoomed in with cameras. The venue audience will not see this flaw as the broadcast viewers do. If the 2019 ceremony had used hologram projections only for the animated characters, the experience would not have been as good as it was the year before with AR graphics. Now that the hologram projections were used throughout the whole ceremony, the animated characters blended in the experience in a beautiful manner. It is the overall visual creativity that makes the 2019 ceremony an excellent experience.

As the XR technologies make their way on weekly broadcasting, it would be worth a study to research their significance from the perspective of the average viewers. Esports broadcasting is technically challenging even for the traditional sports broadcasting professionals, and it should be studied as there is a growing need for talent to do these productions. A natural connection for digital in-game characters is seen on stage in League of Legends ceremonies. It could be studied do they make the players' and fans' emotional connections stronger now that they appear on the stage virtually? This year will be the 10th anniversary for the League of Legends World Championship games, and there were public promises for a grand celebration at the 2020 finals right after the 2019 ceremony. It remains to be seen how Riot Games is going to make it *bigger* at the 2020 ceremony. After all this, I will be watching it live.

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APPENDICES

Appendix 1. Shot-by-shot analysis - 2017

CAMERA SHOT ANALYSIS - LoL Worlds Opening Ceremony 2017

Source: <https://www.youtube.com/watch?v=fn5kSCj-VNM>

CUE	TC	CAMERA	SHOT SIZE	NOTES	ANI-MATED CHAR-AC-TERS	CHAR-AC-TERS DURA-TION
1	00:00					
	00:21	VIDEO		COUNT DOWN ZERO - RIOT LOGO		
2	01:54	Steadicam	MCU	Artist - Jay Chou, behind the stage		
	02:01	Steadicam MCU to MFS	cont'd - MCU to MFS	Doors open to the stadium stage. Steadicam shot around the stage.		
3	02:45	Spidercam	WS	Band comes to the stage		
4	03:14	Handheld 1	FS	Dancers		
5	03:15	Handheld 2	MS to FS	Dancers		
6	03:17	Steadicam	FS follow shot	More dancers to the stage		
7	03:24	Spidercam	WS from above	Stage from above		
8	03:30	Steadicam 1	FS	Drummers		
9	03:35	Steadicam 2	FS	Band walks to the stage, dancers		
10	03:40	Spidercam	FS	Stage from above		
11	03:49	Steadicam 2	FS	Song 1 starts, band		
12	04:05	Crane 1	FS	Dancers and stage		
13	04:09	Steadicam 2	FS	Stage		
14	04:13	Crane 2	FS	Stage		
15	04:17	Steadicam 2	FS to MCU	Band		
16	04:21	Spidercam	WS	Back of the stage		
17	04:29	Robo / Handheld	MCU	Strings		
18	04:30	Handheld	CU	Conductor		
19	04:31	Steadicam 2	WS	Band		
20	04:32	Handheld	CU	Dancers		
21	04:33	Handheld	FS	Dancers		
22	04:36	Crane 1	WS	Dancers		
23	04:39	Spidercam	WS	Stage		
24	04:45	Crane 1	WS	Dancers		
25	04:48	Spidercam	WD	Stage		
26	04:53	Steadicam 2	FS	Band		
27	05:00	Handheld	MCU	Drummer		
28	05:04	Steadicam 2	MFS	Band		
29	05:09	Crane 1	WS	Dancers		
30	05:13	Steadicam 2	MFS	Band		
31	05:17	Crane 2	WS	Stage		
32	05:22	Steadicam 2	FS	Band		
33	05:27	Spidercam	WS	Back of the stage		
34	05:35	Handheld	FS	Dancers		
35	05:37	Steadicam	CU	Drummers		

36	05:38	Handheld	CU	Strings		
37	05:40	Tripod (FOH 1)	MCU	Band		
38	05:42	Spidercam	WS	Stage		
39	05:58	Handheld	CU	Strings		
40	06:00	Handheld	FS	Dancers		
41	06:02	Spidercam	WS	Stage		
42	06:07	Handheld	MCU	Conductor		
43	06:08	Handheld	MCU	Dancers		
44	06:09	Tripod	FS	Dancers		
45	06:12	Tripod (FOH 1)	WS	Stage		
46	06:20	Crane 2	WS	Audience		
47	06:23	Crane 3	WS	Audience		
48	06:26	Spidercam	WS	Grand piano		
49	06:30	Steadicam	FS to CU	Grand piano - 06:55 CU of vocalist, SONG 2 start		
50	07:11	Handheld	MFS	Vocalist		
51	07:24	Spidercam	WS	Vocalist		
52	07:45	Tripod (FOH 1)	MFS to CU	Singer - Rapid shot size change zoom. Dramatic impact.		
53	07:47	Crane 1	WS	Stage dancers		
54	07:49	Steadicam	FS	Dancers & band		
55	08:03	Handheld	MS	Strings		
56	08:06	Spidercam	WS	Stage from above		
57	08:13	Tripod (FOH 1)	CU	Vocalist		
58	08:17	Tripod (FOH 2)	WS	Vocalist & band		
59	08:26	Crane 1	WS	Dancers & band		
60	08:34	Tripod (FOH 1)	MS	Vocalist		
61	08:46	Tripod (FOH 2)	WS	Stage		
62	08:48	Spidercam	WS	Stage - 360 around the stage		
63	09:00	Tripod (FOH 1)	MS to CU	Vocalist - Rapid shot size change zoom		
64	09:08	Crane 2	WS	Stage		
65	09:12	Handheld	FS to WS	Vocalist		
66	09:18	Tripod (FOH 1)	MS	Vocalist (walking towards the front of the stage, MS to CU), calm moment in the song.		
AR START	09:28	cont'd	cont'd - CU to WS	As the song picks up pace the camera makes quick follow movements. Right after those movements there is a loud roar in the PA speakers. Camera makes "imperfect" zoom and tilt up to look for the dragon. This creates really dramatic impact to the mood as it would not be planned. On location audience can see and hear the dragon through stadium PA and led screens. Audience reacts to the AR element and this can be heard through microphones.	AR starts with audio	4
67	09:32	Crane 1	FS to WS to FS	Full shot of an huge world cup trophy prop on the back of the stage then tilt up to the dragon. Also seemingly imperfect camera movement. Follow shot of the dragon as it flies over the stage.	AR + audio	18

68	09:50	Crane 2	FS to CU	Follow shot of the dragon and audience. Dragon flies inside the stadium over the audience. AR dragon creates a realistic looking shadow to the audience as if flies.	AR + audio	3
69	09:53	Crane 1	WS to CU to WS	Dragon lands to the center of the stage. Dramatic camera movements follow dragons head. Image opens up to wide shot showing the whole stage and the size of the dragon. At 10:06 the dragon flies away.	AR + audio	13
70	10:10	Tripod (FOH 1)	WS to CU	Vocalist		
71	10:16	Tripod (FOH 2)	WS	Stage		
72	10:20	Tripod (FOH 1)	CU	Vocalist		
73	10:24	Steadicam	MS	Teams walking to the stage		
74	10:28	Handheld	FS	Teams walking to the stage		
75	10:31	Tripod (FOH 1)	MFS	Vocalist		
76	10:38	Spidercam	WS	Trophy and teams		
77	10:45	Tripod (FOH)	CU	Vocalist, end of the song		
78	10:47	Handheld	FS	Blue team		
79	10:49	Handheld	FS	Red team		
80	10:54	Steadicam	FS	Host		
81	11:06	Spidercam	WS	Teams walking to the stage		
82	11:15	Handheld	FS	Red team		
83	11:19	Handheld	FS	Blue team		
84	11:24	Handheld	MFS	Red team		
85	11:29	Steadicam	FS	Teams line up		
86	11:37	Tripod (FOH 1)	MCU	Host		
87	11:46	Tripod (FOH 2)	WS	Blue team		
88	11:50	Crane 1	WS	Stage		
89	11:55	Tripod (FOH)	MCU	Blue player 1		
90	12:00	Crane 1	WS	Stage		
91	12:07	Tripod (FOH)	MCU	Blue player 2		
92	12:12	Spidercam	WS	Stage		
93	12:18	Tripod (FOH)	MCU	Blue player 3		
94	12:23	Crane 1	WS	Stage		
95	12:29	Tripod (FOH)	MCU	Blue player 4		
96	12:34	Crane 2	WS	Audience + stage		
97	12:41	Tripod (FOH)	MCU	Blue player 5		
98	12:44	Crane 1	WS	Stage		
99	12:50	Tripod (FOH)	TS	Blue player 6 and manager		
100	12:55	Crane 1	WS	Stage		
101	13:04	Crane 3	WS	Audience		
102	13:06	Tripod (FOH)	MCU	Host		
103	13:19	Crane 1	WS	Stage		
104	13:22	Crane 3	WS	Audience		
105	13:23	Crane 1	WS	Stage		
106	13:30	Tripod (FOH)	MCU	Red player 1		
107	13:34	Crane 1	WS	Stage		
108	13:39	Tripod (FOH)	MCU	Red player 2		
109	13:31	Crane 3	WS	Audience		
110	13:34	Crane 1	WS	Stage		
111	13:46	Tripod (FOH)	MCU	Red player 3		
112	13:52	Crane 3	WS	Audience		

113	13:54	Spidercam	WS	Stage		
114	13:59	Tripod (FOH)	MCU	Red player 4		
115	14:03	Crane 1	WS	Stage		
116	14:09	Tripod (FOH)	MCU	Red player 5		
117	14:13	Crane 3	WS	Audience		
118	14:18	Tripod (FOH)	TS	Red player 6 and manager		
119	14:24	Crane 3	WS	Audience		
120	14:26	Crane 1	WS	Stage		
121	14:39	Tripod (FOH)	MS	Host and trophy		
122	14:47	Crane 3	WS	Audience		
123	14:49	Spidercam	WS	Stage - end of stage ceremony		
124	14:53		Video			

TOTAL VISIBLE ANI- MATED CHAR- AC- TERS	38
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Appendix 2. Shot-by-shot analysis - 2018

CAMERA SHOT ANALYSIS - LoL Worlds Opening Ceremony 2018

Source: <https://www.youtube.com/watch?v=WYSJloehGq0>

CUE	TC	CAMERA	SHOT SIZE	NOTES	ANIMATED CHARACTERS	CHARACTERS DURATION
0	00:00	-	-	Countdown clock		
1	00:49	-	-	Countdown insert from 10 to 0. Animated player characters appear with countdown numbers from 8 to 1.		
2	01:21	Steadicam 1	FS	Shot starts from the led screen and opens up to show the stage		
	01:27			Song start		
	01:27	con't	con't	AR characters walk on stage towards camera. Camera backs up.	AR start. Four AR characters are introduced (the K/DA virtual pop group)	8
3	01:35	Steadicam 2	MCU	Artist A		
4	01:40	Crane 1	MS	Artist A		
5	01:46	Steadicam 1	FS	Artist B and C	AR character A walks on stage on front of the pop group.	7
	01:53	con't	FS	Artist B and C	AR character is left out of the frame	
6	01:58	Crane 1	FS	Artist D		
7	02:02	Crane 2	MFS	Artist D		
8	02:09	Spidercam	WS	Artists, dancers and opens up the show the led screen and the whole stage		
9	02:19	Tripod 1 (FOH)	FS	Artists		
10	02:25	Crane 1	TS to WS	Artists		
11	02:29	Steadicam 1	TS to FS	Artists		
12	02:40	Crane 1	WS	Artists + AR character vocal performance	AR Akali	4
13	02:44	Steadicam 1	FS	AR Akali on the foreground. Artists on the background.	AR Akali	2
	02:46	con't	FS to CU	Artist A	AR Akali is left out of the frame	
	02:51	con't	CU to FS	Artist A and AR Akali	AR Akali back to the frame interacting with the Artist A	4
	02:55	con't	FS to CU (zooming in and out)	AR Akali vocals	AR character singing in CU. Finishes this performance by throwing mic on the stage and blowing away with VFX.	8
14	03:03	Crane 2	CU	Artist B		

15	03:09	Steadicam 1	WS to MCU	AR Ahri flying then descending to the stage. Image opens up to show whole K/DA AR pop group. Artist are 2 and 2 on the sides of the stage. Steadicam is going from front of the AR characters to behind them.	AR Ahri flying then descending to the stage. 3D heart flies around the character. All AR K/DA characters dancing on the stage.	18
16	03:27	Crane 1	TS	Artist A and Artist C		
17	03:30	Tripod 1 (FOH)	TS	Artist B and Artist D		
18	03:34	Steadicam 1	FS	AR characters on the foreground		3
19	03:37	Crane 1	FS	AR characters on the foreground		9
20	03:48	Tripod 1 (FOH)	FS	AR character Kai'Sa dancing		5
21	03:53	Crane 2	MCU to TS	Artist B and Artist D		
22	03:59	Crane 1	FS to WS	AR character Kai'Sa dancing	AR characters shoots bright light balls which fly around and shine. AR SFX	6
23	04:05	Tripod 1 (FOH)	WS to FS	Artist B and Artist D		
24	04:10	Crane 1	MFS	Artist C		
25	04:14	Steadicam 1	WS	AR characters dancing	AR character Evelynn teleports to the stage	9
26	04:25	Crane 1	TS	Artist A and Artist C		
	04:30			SONG END		
27	04:30	Steadicam 1	FS to WS to CU	AR characters and artists. Song end. Camera zooms in and takes AR Ahri into CU and she steps into the portal that opened on the stage.	AR characters and portal that opens a passage to game world. (Camera tracking glitches and virtual world starts to drift when steadicam is going towards it.)	40
28	05:10	Insert				
29	07:15	-	-	Back to the stage live for song performance by RISE. Player teams are standing on the sides of the stage which are now separated from the main performance stage.		
30	10:45	-	-	Song ends and host comes on the stage		
31	15:49	-	-	Opening ceremony ends		
TOTAL VISIBLE ANIMATED CHARACTERS						123

Appendix 3. Shot-by-shot analysis - 2019

CAMERA SHOT ANALYSIS - LoL Worlds Opening Ceremony 2019

Source: <https://youtu.be/6QDWbKnrRcc>

Cameras used in production: Robycam 2D, Moviebird 52, Crane/jib, 3x railcam, tripod cameras, steadicams

CU E	TC	CAM- ERA	CAM MOVE- MENT	SHOT SIZE	NOTES	ANIMATED CHARAC- TERS	CHAR ACTE RS DU- RA- TION	CHAR ACTE R SEQ
0	00:00 00:28				Countdown RIOT LOGO			
1	00:29		x					
2	00:33		x					
3	00:39		x					
4	00:41		x					
5	00:45		x					
6	00:48		x					
7	00:51							
8	00:58		x	MS	Vocalist - Valerie Broussard.			
9	01:07		x	MCU	Vocalist			
10	01:09		x	MS	Vocalist			
11	01:14		x	FS	Vocalist, from side. Dancers			
12	01:18			CU	Vocalist			
13	01:22		x	WS	Vocalist, dancers, from above			
14	01:24		x	CU	Vocalist			
15	01:29		x	MFS	Vocalist and dancers			
16	01:35		x	FS	Vocalist and dancers			
17	01:39			WS	The whole stage and screens			
18	01:45		x	MS	Vocalist			
19	01:47			WS	The whole stage and screens			
20	01:49		x	FS	Dancers			
21	01:53		x	WS	Vocalist and dancers			
22	01:56		x	WS	Vocalist and dancers			
23	01:59		x	MS	Vocalist			
24	02:02			WS	Stage, vocalist and dancers	Slowmotion explosion, blastwave, vocalist and dancers are blown away in slow motion. Projected to Holonet. LoL characters appear on the blast-wave surface.		7
	02:09				EKKO on stage	EKKO appears on stage. Multiple projections, fast changes and different sizes and rapid change of positions.	9	
25	02:18		x	WS	Led screens and empty stage			
26	02:21		x	WS	Audience			

	02:24				SONG START			
27	02:24		x	WS (slow dolly sideways)	Stage and trophy box. EKKO appearing again	EKKO	3	
28	02:27		x	WS (slow zoom in)	EKKO, real artist coming to stage	EKKO	6	
29	02:33		x	MS	Thutmose (EKKO) vocals			
30	02:36		x	WS	Thutmose (EKKO) vocals	EKKO	2	
31	02:38		x	WS	Thutmose (EKKO) vocals, screens	EKKO	5	
32	02:43		x	FS	Thutmose (EKKO)			
33	02:46			FS	Thutmose and EKKO, choreography where both walk and dance on stairs. Camera location must be fixed to localize characters.	EKKO	12	
34	02:58		x	WS (zoom in)	Becky G (QIYANA) vocals			
35	03:05		x	FS (zoom in)	Becky G (QIYANA) vocals			
36	03:09		x	WS	Stage			
37	03:11		x	FS	Keke Palmer (SENNNA) vocals			
38	03:14			MCU	Keke Palmer (SENNNA) vocals			
39	03:17		x	WS (slow zoom, tilt up)	Keke Palmer (SENNNA) vocals, SENNA	SENNNA, stands up from kneeling position	6	
40	03:23			EWS	Becky G (QIYANA) vocals, QIYANA dancing, screens	QIYANA	9	
41	03:32		x	FS (slow pan)	Becky G (QIYANA) vocals, QIYANA dancing	QIYANA	3	
42	03:35			EWS	Becky G (QIYANA) vocals, QIYANA dancing, screens	QIYANA, AKALI appears	6	
43	03:41		x	MS	Soyeon (AKALI) vocals			
44	03:44		x	WS	Soyeon (AKALI) vocals, AKALI, dancers on foreground	AKALI	4	
45	03:48		x	WS	Soyeon (AKALI) vocals, AKALI, dancers on foreground	AKALI	2	
46	03:50		x	EWS	Soyeon (AKALI) vocals, AKALI, dancers on foreground	AKALI	2	
47	03:52			MS	Soyeon (AKALI) vocals			
48	03:54			EWS	Stage, artists			
49	03:56		x	MFS	Becky G (QIYANA)			
50	03:57		x	WS	Artists			
51	04:00		x	EWS	Artists, led screens			
52	04:06			WS	Artists on foreground, characters on background	AKALI, QIYANA, SENNA, EKKO, YASUO	3	
53	04:09		x	FS	Dancers (you can see SENNA partly in the background)	SENNNA	1	
54	04:10		x	WS	Artists on foreground, characters on background	AKALI, QIYANA, SENNA, EKKO, YASUO	3	
55	04:13		x	MS	Keke Palmer (SENNNA)			
56	04:16			CU	Soyeon (AKALI)			
57	04:18		x	WS	Artists on foreground, characters on background	AKALI, QIYANA, SENNA, EKKO, YASUO	7	
58	04:25		x	FS	Keke Palmer (SENNNA)			

59	04:28			EWS	Artists on foreground, characters on background	AKALI, QIYANA, SENNA, EKKO, YASUO	2
	04:30			con't	Stage goes dark. YASUO is introduced left side of the stage and makes a gesture to rise a tornado to the stage. Tornado throws digital dancer characters away.	YASUO, Dancers	3
60	04:33		x	CU	Tornado	Dancers	2
61	04:35		x	WS	Duckwrth (YASUO) vocals, left side of the stage		
	04:39		con't	con't	Lights go out, teleport effect Duckwrth to right side	Hologram Duckwrth appears on the right side of the stage	3
62	04:42			WS	Duckwrth (YASUO) vocals, YASUO on the background	YASUO	2
	04:44				Lights go out, teleport effect Duckwrth to right side	Hologram Duckwrth	2
63	04:46		x	FS	Hologram Duckwrth	Hologram Duckwrth	1
64	04:47			WS	Hologram Duckwrth rapidly changes locations on the stage	Hologram Duckwrth	6
65	04:53			EWS	Led screens and Duckwrth (YASUO)		
66	04:54		x	MFS	Duckwrth (YASUO)		
67	04:55			WS	Duckwrth (YASUO)	A large crowd of characters around Duckwrth. YASUO. Hologram Duckwrth.	10
68	05:05		x	FS	Duckwrth (YASUO)		
69	05:07		x	FS	Soyeon (AKALI) and Thutmose (EKKO) to the stage		
70	05:08			WS	All the artists on the stage. Holograms dancing on the sides.	AKALI, QIYANA, SENNA, EKKO, YASUO	3
71	05:11			MFS	Duckwrth, Becky G		
72	05:13			MFS	Keke Palmer, Thutmose, Soyeon		
73	05:18		x	WS	Artists and dancers		
74	05:23			CU	Keke Palmer		
75	05:26			FS	Artists on foreground, characters on background	AKALI, QIYANA, SENNA, EKKO, YASUO	3
76	05:29		x	WS	Artists on foreground, characters on background, dancers	AKALI, QIYANA, SENNA, EKKO, YASUO	7
	05:34				SONG END		
77	05:36			EWS	Artists on foreground, characters on background, dancers, led screens. Song end.	AKALI, QIYANA, SENNA, EKKO, YASUO	2
78	05:38		x	EWS	Stage lights go out. Hologram characters posing on the stage.	AKALI, QIYANA, SENNA, EKKO, YASUO	1
79	05:39			MS	Audience		
80	05:44		x	WS	From audience to the stage		
81	05:51		x	WS	Stage, music starts, ice block graphics		
82	05:59		x	MCU	Cailin Russo vocals		
83	06:02		x	FS	Cailin Russo		

84	06:10		x	MFS	Cailin Russo			
85	06:11		x	WS	Cailin Russo			
86	06:16		x	EWS	Cailin Russo, led screens			
87	06:23			WS	Cailin Russo fade away with light and traveling as a ice block to the other side of the stage.			
88	06:26		x	FS		Hologram Cailin Russo		4
89	06:30		x	EWS	Chrissy Constanza appears on the center of the stage and Cailin Russo to the right.	Hologram Cailin Russo goes away at 06:34		4
90	06:44		x	MS to FS	Chrissy Constanza, Cailin Russo			
91	06:49			WS	Chrissy Constanza, Cailin Russo, dancers to the stage			
92	06:58		x	WS	Audience			
93	07:00			WS	Chrissy Constanza, Cailin Russo, dancers (hologram sword choreography)			
94	07:34			FS	Chrissy Constanza			
95	07:37		x	EWS	Chrissy Constanza, Cailin Russo, dancers, screens			
96	07:41			CU	Audience reaction			
97	07:43		x	EWS	Chrissy Constanza, Cailin Russo, screens			
98	07:51		x	EWS	Chrissy Constanza, Cailin Russo, screens			
99	07:56		x	EWS	Chrissy Constanza, Cailin Russo, screens, lights of from the stage			
100	08:02		x	WS to CU	Trophy			
101	08:12		x	WS	Trophy revealing and sponsor graphics			
102	08:32		x	EWS	Trophy fully visible, artist appear on the stage			
103	08:40		x	FS	Team 1			
104	08:42		x	FS	Team 2			
105	08:43			MCU	Audience reaction			
106	08:44		x	TS	Team 1			
107	08:46			TS	Team 2			
108	08:48			FS	Chrissy Constanza, Cailin Russo			
109	08:51		x	FS	Team 2 walking			
110	08:56			CU	Audience reaction			
111	08:59		x	FS	Team 1 walking			
112	09:04		x	EWS	Stage, artists, teams, screen			
113	09:08		x	WS	Stage, behind the teams and trophy			
114	09:12		x	WS	Stage, artists, teams			
115	09:14			FS	Team 1			
116	09:16			FS	Team 2			
117	09:19		x	WS to EWS	Stage, artists, teams, screen. Song end			
118	09:27			CU	Audience reaction			
119	09:30				Host comes to the stage and artists leave the stage. No more animated holograms seen on stage.			
120	13:59				End of ceremony			
						TOTAL VISIBLE ANIMATED CHARACTERS	130	15