

# Re-conceptualized Dramatic Interaction

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### Abstract

In this paper, I discuss three design cases of collective interactive communication environments. These include a traditional, high-end modern but very controversial opera production; a collective, interactive art installation; and technology embedded interactive cinema. These cases illustrate how each different type of media transforms its core function due to the changing of technology, culture and trend, and how user behavior and participation changed accordingly. Further, as these cases recognize the absence of emotional engagement in current interaction design, this paper suggests that the design of interactive systems can be re-conceptualized in a way that helps designers address uncertainty, complexity, and ambiguity. Rather than simply looking at interaction in terms of effectiveness and optimization, this paper tries to use opera as an inspiration to create a more engaging, dramatic user experience. This paper argues that the information can be communicated in a complex method, which delivers the meaning accurately on an emotional level, as it creates a playful ambiguous space that allows audiences to have different interpretations, to engage, to control and to play.

### Introduction

“HCI is not fundamentally about the laws of nature. Rather, it manages innovation to ensure that human values and human priorities are advanced, and not diminished through new technology” (Carroll 2014). According to this definition, UX designers bring user-optimized information to increase efficiency and further push user’s daily productivity. Usually, optimized communication tends to present accurate numbers, data and findings, and emphasize simplicity, efficiency and accuracy. It is agreeable that by focusing on productivity, optimization and efficiency, “values” and “priorities” have been very well fulfilled, but the “human” factor is missing because the very essence of life and humans can never be described or judged by efficiency or productivity. We live in a complex world, which have nothing to do with simplicity. As stated by Donald Norman in his book *Living with Complexity*: “I use the word ‘complexity’ to describe a state of the world. The word ‘complicated’ describes a state of mind.” In his book, he points out that simplified things can make things “complicated, arbitrary and unnatural” (Norman 2010). For instance, you have your health information recorded by your ambient smart devices you carry. The information provided is accurate (tracked in the background all day), efficient (you don’t make any effort toward this tracking job.) and optimized (usually categorized by different factors). However, is this information actually helpful? As a matter of fact, most often this optimized information doesn’t help or improve anything, rather it only gives you numbers. The worst part: you don’t know what to do with it.

As humans, we sense, touch, feel and react. It takes time for individuals to learn and to appreciate what they’ve learned. The learning process supposes to bring individual fulfillment and excitement, and it does require some learning curve to achieve the final goal. Nevertheless, the efficiency-oriented HCI process doesn’t give us the time to sense or feel; it eliminates the leaning curves, bringing us to the conclusion part directly, and asks us to accept passively, react

directly. This eventually leads us to a senseless, task-oriented interaction process where there are no natural emotional elements involved. When designer tries to bring character into the interaction, a major concern has been losing on focus and efficiency.

In contrast, in theatrical and operatic presentations, the story line, character, and certain emotions are usually communicated loosely. More often, they are usually heavily repeated and layered. None of the information that appears in opera is optimized or efficient. Most of the communications are indirect, ambiguous and sometimes extremely complicated or even confusing. For instance, in Verdi's *Rigoletto Act 3: "Bella Figlia Dell'Amore (Beautiful Daughter of Love)"*, four characters — Duke, Maddalena, Gilda and Rigoletto join the conversation sequentially. It has been described as a "masterful quartet that is an intricate musical depiction of four personalities and their overlapping agendas" (MetOpera 2014). Duke and Maddalena are filtering with each other, father Rigoletto and daughter Gilda overhear it. Rigoletto finally proves to his daughter Gilda that Duke is nothing but a playboy, and of course, Gilda is expressing her desperate broken heart. Each is expressing his or her own emotion and character, joined together to reach a dramatic emotional peak where the audience can no longer hear any of them individually, but only sense and feel the excessive affection.

Operatic presentation usually put different characters in a very complicated, messy and extreme situation. But all these dramatic situations can be traced back to everyone's real life experience. It provides a platform for audiences to experience the emotions that they can relate to, but not necessarily as extreme as it in opera, that's how opera catches its audiences.

For example, in Mozart's *Marriage of Figaro: Act 2 Final: "Voi Signor, Che Giusto Siete,"* seven singers join together, each has his or own intentions, personality and lyrics, expressing seven types of unique emotional statuses and intentions. All seven voices build to the musical peak when no single lyrics can be heard but only a purely musical splendor. To illustrate how complicated it is, and how Mozart perfectly presented such complexity, we need to look at the plot first.

Figaro and Susana are about to marry; they are both the servants of Count Almaviva and Countess Rosina Almaviva. Count Almaviva has been persistently trying to seduce Susana, and keeps finding excuses to delay the civil part of the wedding of his two servants. However, deep inside Susana, she somehow loves both Figaro and Count Almaviva, which she's too ashamed to speak. On top of all this, she's also tired of the constant pursuing from her music teacher, Basilio. Figaro, Susanna, and the Countess conspire to embarrass the Count with a carefully planned scheme that Susanna will write to the Count agreeing to a rendezvous, but they will send count's pageboy Cherubino dressed in women's clothes instead. But Countess is also in a very ambiguous relationship with Cherubino. Cherubino, on the other hand, is in another formal relationship with Barbarina, daughter of Antonio, the count's gardener. In the meantime, Dr. Bartolo, a practicing lawyer, is seeking revenge against Figaro for thwarting his plans to marry Marcellina (Dr. Bartolo's housekeeper) himself. Marcellina has a contract stating that Figaro must marry her or repay the money he borrowed; she is a woman old enough to be Figaro's mother, and it turns out that she really is Figaro's mother in the end!

The Act 2 Final happens when the carefully planned scheme by Figaro, Susanna and Countess is just about to succeed. At this crucial moment, Dr. Bartolo, his housekeeper Marcellina and music teacher Basilio enter just in time. Marcellina presents the contract to the Count and insists Figaro honor the contract to marry her. Dr. Bartolo is in his own entanglement, which is that he

does want to break the marriage between Figaro and Susana but definitely doesn't want Marcellina to marry Figaro. The music teacher Basilio is in the mood of gloating since Susana appears to be available again. The Count gets a huge release from the former inducing awkward embarrassing situation, desperately pulling everyone's attention to the contract. Figaro is ferocious about the contract, sneering at the ridiculous fact with defeated heart. In the case of Susana and the Countess, they are both jittery and desperate with a deep hidden shame because their plan has failed completely.

It is such an intense scene with so many characters, emotions and intentions. Catching the lyrics is absolutely impossible: They are all different but singing at the same time. Nevertheless, it is a musical splendor with precisely preserved personalities. "It begins as a duet and grows naturally into a trio, a quartet, a quintet and finally a septet...although the music falls into clear sections, it's also unquestionably a single, organic whole" (Hurwitz 2005). Every personality and intention is crystal clear; the audience would not be able to "hear" it, but sense it. None of this information is optimized; the way Mozart presents it is not efficient at all if we judge it from an efficient point of view. But the communicated result is totally accurate and efficient, "...you find yourself amazed that the time has passed so quickly. It's music that really does cheat the clock" (Hurwitz 2005).

It is very common in opera that massive amounts of information are presented all together at the same time. Even the same piece of information is usually duplicated, doubled up, overlapped and repeated for so many times. Although the audiences won't be able to hear any singular lyrics, every piece of information has been thoroughly and accurately addressed. The information communicated through opera largely relies on emotional response.

It is unquantifiable, complex and ambiguous. Such complexity doesn't make opera annoying. Such indirect vague communication doesn't make the opera difficult to understand. Rather it is quite delightful to ponder, to sense and to taste. In this tasting process, we see underlying principles, we see order and reason in such complexity, and we love it, embrace it.

In this case, the singers are singing their very own statements, their moods and intentions. All these statements are quite different from each other. But together they are making a more sophisticated, clear statement of the entire story, and also reflecting THE author's intention. This fits in the fourth type of ambiguity defined by William Empson "...two or more meanings of a statement do not agree among themselves, but combine to make clear a more complicated state of mind in the author" (Empson, 1966).

Ambiguity has been addressed and applied massively in literature, fine arts and music since the late 19<sup>TH</sup> century. "...viewer is called upon to collaborate in the development of a work in progress...placing the artist in the partly passive role of an 'operator' rather than that of an all-powerful demiurge" (Gamboni, 2001). The ambiguity as a core factor in art works has been developed thoroughly in the history of modernism. But due to the nature of productivity and efficiency, ambiguity has rarely been address in HCI design.

In William Gaver's paper *Ambiguity as a Resource for Design*, he used ambiguity to encourage close personal engagement with systems (Gaver, Beaver, and Benford 2003). It is agreeable that we can never eliminate the ambiguity and complexity in our nature as humans. Thus ambiguity should not only be considered as a primary source, it should be considered as a design element. The uncertainty, complexity and the ambiguity of human beings should be addressed in interaction processes and used to engage the audience emotionally so that the audience can

sense, feel and react. The Designer should try to address ambiguity factors in interaction design rather than avoid them in order to create a much richer interaction. The following three case studies will illustrate how ambiguity works in different scenarios and how they can be adapted and applied in interaction design.

### **Case Study I – The modern production of opera Mozart’s *Die Entführung aus dem Serail***

In today’s opera production, the stage director is one of the most important roles. And it’s becoming more and more important than ever before since it is constantly bringing the audience a completely new experience out of the old.

The elevation of the stage director’s role is extremely similar to the role of a UX designer. Audiences are seeking a more engaging, vivid opera experience than ever before; similarly, users are looking for a more engaging user experience. The director needs to have a deep understanding of the music score itself, knowing the nature of the opera singer’s performance, while also having knowledgeable understanding of costumes, lighting, and stage design. Likewise, in a similar manner, a UX designer needs to have interdisciplinary knowledge of science, psychology, computer science, graphic design, information architecture, etc. A stage director is designing an experience out of the original old plot, bringing an experience audiences never had before with familiarized music pieces. However, unlike a UX designer, most of Regietheater directors never simplify or optimize the stage; rather, on top of the already complicated opera scores, they try to invent their own story, creating confusions and vague spaces for the audience to experience, offering room for alternative reactions to the same piece of performance.

The very first “opera” was performed in Florence in 1589 (Somerset-Ward, 2006). New works were continuously created until the 20<sup>th</sup> century, when restaging existing successful past works became more popular. From the birth of opera “drama per musica” (drama expressed through music), until World War II, the stage director was missing for 300 years. As Richard Somerset-Ward states “(the) role was variously played by the librettist or composer (if they were still alive and on hand), by the conductor (if he cared), by the theater’s in-house librettist...or by the stage manager...” (Somerset-Ward, 2006). For 300 years, the musical side of opera was much more important than the dramatic side of an opera, but the very essence — charisma — of the opera does come from its dramatic side.

It took more than 300 years for us to have the term “Regietheater”, meaning “director’s theater” in Germany. And finally, the dramatic side of the opera receives equal attention to the music. The stage director revitalizes the old opera, bringing new interpretation and insightful connotation to the audience. Regietheater gives the director total freedom to strip away opera’s original geographical location, chronological situation, casting and plot, with only the composer’s music left. This eventually revitalized the entire opera industry and stands as the major trend today.

For instance, for a new production in the 2006 Salzburg Festival, Stefan Herheim directed the most controversial Mozart’s *Die Entführung aus dem Serail* K.384 (*The Abduction from the Seraglio*; also known as *Il Seraglio*). The original plot was extremely simple: the Spanish nobleman Belmonte embarks on a rescue journey to free his fiancée Konstanze, her maid

Blonde and Belmonte's servant Pedrillo from the clutches of the Turkish Pasha Selim. Belmonte sneaks into the pasha's seraglio, eluding and outsmarting the overseer of the harem Osmin. Belmonte disguises himself as the decorator applying for a job in the seraglio; meanwhile inside the seraglio, Pasha Selim pursued Konstanze in every possible way, trying to win over Konstanze with true love rather than forcing her to do so. However, he failed eventually. In the end, Pasha Selim discovered Belmonte's true identity and freed all of them. The entire opera ends in a magnificent chorus praising Pasha Selim.

However, in the new production, the original story plot is completely gone. Even Pasha Selim as a character is gone. Director Stefan Herheim wrote the whole new dialogue for the overseer Osmin, turning this character into a multiple perspective spiritual guidance for the leading role: an angel, a devil, and a priest. Herheim also turned the seraglio into a psychological inner world questioning the essence of marriage. He switched the scene from pre-wedding, wedding and married daily life purely based on stage projection. The struggle, violence, desire, sexual urges and impulses in the nature of two sexes' apostrophe relationship are illustrated by every single detail: full frontal nudity kitchen apron, waving kitchen knives and projection on the back of the stage providing both live consistent and pre-recorded inconsistent silhouettes, video motion graphics of the characters and a quasi-rape scene. "It is a genesis, the beginning of all beginnings, when man is separated into two sexes, is disoriented, and from then on seeks to return to his original form in ever new constellations," explains Herheim. ('Die Entführung Aus Dem Serail (Mozart 22)' 2014)

The performance is extremely complex, not only adding a whole new story on top of Mozart's original music, but also playing with many fragments of metaphor and connotation. That's not even to mention the surrealistic neurotic stage projection taking audiences from reality to imagination and soliloquizing madness. Massive new ideas and madness information is overloaded on stage.

"Psychologists have demonstrated that people prefer a middle level of complexity: too simple and we are bored, too complex and we are confused" (Norman, 2011). In this case, the original story is way too simple, and arguably boring to both new listeners and opera fans. (Opera fans may pay more attention to music, but that's a whole different topic.) The complexity does create confusion, but on a level which most people can understand. Most importantly, the ambiguous information provided on stage triggers audiences to deeply engage with the argument on the concept of marriage, its successes and its failures, rather than passively accepting a dull, over-costumed and repetitive traditional productions.

In opera, the music itself is usually much more complicated than the drama. That's also the major reason people love it. In this case, the stage director makes things even more complicated, but eventually makes the opera much more engaging than ever before. We can clearly see how much we are craving for inconsistent information in order to create a space for rich interpretation. The information presented here is not optimized at all. It is messy at a certain level. It is also indirect. It requires audiences to rethink and critique, but it is rich and informative. A rich but ambiguous space for interpretation is a common method applied in almost every art discipline. Abstracted paintings inspire viewers to explore what exactly it is. The poet uses a limited amount of words but create an unlimited space for imagination; its artistic conception can be larger than a million-words novel. In classical music, which is like singing a song without words, the same piece of classical music has been played again and again, generations after generations, and each time you can find something new.

Opera itself can be regarded as the earliest format of multimedia performance. It brings together sound, light, visual and performance together as a whole experience. The modern stage director tries to infuse more elements into opera to create an even more engaging experience to attract a wider range of audience groups. Many opera productions try to catch younger audiences' attention by borrowing inspiration from popular culture and movies. And The Metropolitan Opera of New York streams live opera in HD in cinemas to make opera more approachable to broad audiences. UX designers are always dealing with different elements, and both the stage director and UX designers are trying to create the experience that attracts a wider range of audience groups. What's different is that UX designers usually focus on how to optimize the multiple facets and provide an efficient solution; whereas stage directors usually infuse classical opera with modern interpretations and technologies.

It is commonly accepted that efficiency and simplicity are the core criteria for many user experience designs. And in many user scenarios, it is absolutely necessary. However, in order to achieve such efficiency, the entire interaction process is usually predominated by the designer: limited amount of options, task-oriented and goal-focused. The users don't have enough freedom to explore the interaction process by themselves, and it results as a less engaging but more repetitive user experience. On the other hand, the modern opera production creates so many "uncontrollable" elements, ask audiences to invent their very own review. This fits to the 6th type of ambiguity defined by William Empson "...what is said is contradictory or irrelevant and the reader is forced to invent interpretations" (Empson, 1966).

If we judge from a current UX design point of view, the entire opera production may seem like a mess. However, what's undeniable is that it's a totally new experience built out of an old script. It does make the story confusing, but the overall philosophical intention of the director has been communicated astonishingly accurately. It is a complex production, but a totally understandable one. There are logic, concept and principles underlying the seemingly confusing stage performance. It creates intensive debate among audiences. It's a complicated journey of discover for every audience. It is indeed an engaging "user experience."

In case study I, I illustrated how the stage director's role is similar to that of a UX designer, and the way of creating an engaging experience. Moreover, I illustrated how modern opera attracts boarder audiences by introducing modern elements and technologies, and how these elements create a playful ambiguous space. It illustrates that such ambiguous space doesn't necessarily provide misleading information. Rather, it allured audiences to have their inventive interpretation. This ultimately attracts a broader range of audiences to get involved with the opera experience. Furthermore, the rise of the stage director proved that such complexity is deeply desired. UX designers should learn form from this and release their predominate control of the interaction process, bringing more options and possibilities, and encouraging users to have imaginative interpretations and self-exploration space. Such ambiguity has been successfully applied in different art disciplines and it should be also considered as a crucial part of design for UX designers.

An optimized user experience usually puts the user in a perfect user scenario that doesn't exist in real life i.e. everything works smoothly. Nevertheless, there is always malfunction of the machine, and when it's malfunctioning, it only creates frustration and anger, no matter how efficient the machine is designed to be. This paper suggests that we could focus less on efficiency as the ultimate goal of user experience. UX designers can introduce this type of ambiguity to our user

scenario, and further create these ambiguous and vague interactive spaces intentionally as an alternative to malfunction frustration. It calls for giving up more of the authorship of designer to create a more engaging experience. For the next case study, I will discuss how authorship and its evolution are seen in fine arts, game design and HCI, and how less authorship creates new user scenarios.

### **Case Study II - Interactive performative installation “Off the Wall” by Margert Wibmer. - Famous Chicken in Counter Strike game**

In “Off the Wall” project, Wibmer collaborated with composer Gunther Zechberger to create a “virtual-reality opera”, as described by Wibmer. In an immersive black room space, a virtual sculpture of the artist dressed in an industrial yellow rubber suit has been projected on different walls. Pre-recorded motion movement videos and sounds are blended with real-time controlling. Audiences were able to control the rotations and movements of the sculpture by posing in different gestures. The sensors and cameras are hidden from the audience to create a certain uncertainty and ambiguity. It is unclear to the audience if the movement is triggered by themselves or by a system.

There are two scenarios created for the interaction. In a one-person scenario, the smaller movements of the audience member create a bigger impact on the sound and virtual sculpture. It turns the audience into a single instrument, which creates unique compositions on both virtual sculpture and sound, together with the audience member’s own choreography. In a multiple person scenario, the shape of reactions on the virtual sculpture and sound is co-created by all THE audience members together, and the entire virtual opera only stops when everybody stands still.

As stated by Wibmer, “The public plays the supporting roles but also can take the function of the director, the stage designer, the conductor and the choreographer.” In a similar manner, in Brenda Laurel’s book *Computer as Theater*, she considered HCI as a mediated collaboration between designer and interactor (Laurel, 2013). Although “Off the Wall” is more of an artistic installation, it perfectly questioned and illustrated the balance of authorship in the interaction process. The sharing of co-authorship has been very well-developed in the fine art discipline, but less seen in the HCI community. In game design, Mary Flanagan is seeing two kinds of reaction on the authorship of the game: desired play and subversive play. In short, some players tend to aim for the goal set by the game designer, desiring the goal and playing to reach it; meanwhile some other players deny the settled rules and subvert the game (Flanagan, 2009).

In the early version of the game Counter Strike, there was a chicken in an Italian market scene, countless video recordings of games on YouTube show that players — no matter whether they are playing the role of a sniper or terrorist — were all shooting the chicken for fun. With a scream from the poor chicken, he died. The game designer did not design this innocent chicken as a target for people to shoot. But pretty much all the players enjoyed doing so. What’s more interesting is that in the early version, the chicken didn’t move; he was just there to be easily killed. However, after about 10 years, in the newer version of Counter Strike OL2, THE chicken is still there but now he moves! He’s running around all over the place to avoid the bullet. Now, online gamers are turning a serious counter sniper game into a funny party of shooting the chicken without tactical lenses. Since using a sniper tactical is not allowed, there is a high

chance that gamers will shoot a hostage, teammates or each other accidentally. So a full set of game rules is developed as follows:

1. One bullet at once with no sniper tactical.
2. Line up at certain distance in order to avoid an accidental shot.
3. If you missed, line up again from the end of the line.
4. If a hostage is shot by accident, the shooter's qualifications for shooting the chicken will be cancelled and the player no longer be allowed in the game until the chicken is finally killed.
5. If one hostage is shot by accident, all players who missed shooting the chicken will be lined up next to the chicken to protect the rest of the hostages.

What you will see in the game is pretty funny when the sniper and terrorist all line up, focus on a running chicken, miss the shot, and accidental shots are happening all over the place. Such a scenario has never been designed intentionally, but the crucial element — the chicken — is provided. It is such a funny and whimsical moment in the game when you can see hostage, sniper and terrorist all gathered to shoot a chicken. And it seems much funnier than the original game settings.

It's human nature to break the rules and seek new possibilities. "Off the Wall" was created during 1998-2000, 13 years ago. The famous chicken appeared in Counter Sniper almost 10 years ago too, and now it comes back with advanced features. In both cases, the designer provides essential elements for the user to interact with, but also provides somewhat irrelevant information, elements and objects — puts them out there and let user explore with them freely. The interaction behavior is co-authored by the user, and from the development of the chicken we can see now that the force of participatory interaction is stronger than before. Audiences enjoy being part of what they are watching and playing. Audiences want more control of the contexts, process and result rather than just accepting passively. The population of social media is turning media itself into an interactive experience. This interaction is not entirely authored or controlled by the host, or the journalist or the designer, it is a co-authored experience, in which the participatory action of the audience plays a crucial role. The next case study will illustrate the blurred boundaries between authorship, co-creating and self-generated contents and how they interact with each other.

### **Case Study III – The bullet screen setting in cinemas.**

The "bullet screen" is an alternative model of movie-watching that has recently been introduced in select theaters in China. It allows audience members to send text messages via mobile phones while watching the film. The messages are then projected onto the screen, *directly on top of the movie itself*, scrolling across the screen and then disappearing.

This idea was first created by Hiroyuki Nishimura and applied on Nicodou, an ACG (animation, comics, games) video portal in Japan. Multiple internet users can comment anonymously. "Even when the videos are boring, the viewers are getting together and entertaining each other", stated Hiroyuki Nishimura ('Meet Hiroyuki Nishimura, the Bad Boy of the Japanese Internet', 2014). It

creates a virtual social platform where people can comment exactly what they feel without concern for any social conventions, politeness or propriety.

By moving this interaction idea from virtual platform to a physical world cinematic setting, it creates a perfect combination of “tangible computing” as well as “social computing.” Paul Dourish identifies these two areas in his book *Where the Action Is: the Foundations of Embodied Interaction* (Dourish, 2001). Tangible computing allows the user to use our natural human ability to touch, sense, and understand objects in a real world context, and learn from these objects. Social computing refers to “the attempt to incorporate sociological understandings...[that] the systems we use are embedded in systems of social meaning, fluid and negotiated between us and the other people around us” (Dourish, 2001). The combination of these two makes this cinema bullet screen interaction distinguished from the others.

First and foremost, with the physical presence of audiences, the bullet screen creates an interaction which has meaning that is generated in the process of interaction, and the meaning is communicated through the audiences’ interaction with the system. Also, the meaning itself is constantly, rapidly changing, evolving and growing.

The essences of different media forms are changing rapidly due to the evolving of new technologies and the state of society. Back in history, opera and drama functioned as the major entertainment, similar to today’s movies and TV. Nevertheless, today’s opera or drama functions more as a social event rather than major entertainment itself. People go to a play not entirely for the sake of enjoying the play; rather it’s a social opportunity to go on a date, to catch up with friends, to thank a colleague or to spend some time with family. The participatory culture has become the major trend in entertainment, and such participation is generating very interesting drama patterns.

The pattern generated through the interactive social activity of the bullet-screen cinema is very similar to the roughly 7 stages of a drama play in traditional drama study, namely exposition, inciting incident, rising action, crisis, climax, falling action and denouement.

***Exposition*** – regular relaxed comments

***Inciting incident*** – some audiences give harsh comments

***Rising action*** – arguments and disarmaments

***Crisis*** – More and more members join the conversation

***Climax*** – At the point where massive amounts of text messages are layered on top of each other, no one can read anything.

***Falling action*** – audiences’ attention again goes back to the movie

***Denouement*** – open-ended or no denouement.

The bullets message scrolls through the screen on various speeds based on the frequencies of the comments; no one’s comments last forever, which adds certain tensions to the audience members who participate. Audiences will also be able to choose the color and the font size if he or she really wants to shout out. All these options help the audience members to better express themselves. With the desire for expression and a group-entertaining environment, bullet screen interaction can literally generate a new unscripted drama play on top of the movie, solely based on the content generated by the audience.

Second, bullet screen interaction is an instant interaction. Every comment is stuffed on top of the movie itself, at any given time the scene may be overlaid with multiple “bullets,” or comments. But they disappear after scrolling through the screen.

The quarrel that happens on a bullet screen doesn't last forever like as it on YouTube comments threads where you can get access anytime, and read piece by piece. The temporariness makes every comment as a piece of surprise to the audiences. Such a temporary, instant communication fashion creates a massive meaningful information overload effect in a limited amount of time, and audiences are only able to sense the overall mood rather than read the messages accurately. But through the group emotional contagion, the meaning is still delivered accurately.

Third, it is crucial to point out that this interaction process is completely spontaneous and ambiguous, and it usually implicates incompatible contexts to disrupt preconception. The ambiguity has successfully created an interaction storytelling space for the user. By embracing ambiguity and embodied interaction, the bullet screen generates a new perspective of the cinematic medium.

What's happening on the bullet screen is actually a much more engaging version of various kinds of online social communities, such as YouTube. As stated by Burgess and Green: “The central mode of engagement of these platforms is direct response. It invites critique, debate and discussion”(Burgess and Green, 2008). To share, comment and interact has become a major social activity. And usually the audiences are engaged more with the social dimension (critique, debate and discussion) of such activities instead of the content itself. And due to the rapidly changing realm of the media environment, audiences are seeking more options, sharing and controls rather than passively acceptance.

In this case, the boundary between creator and audience is blurred. It is undeniable that our current social realm is more of a participatory culture since “...traditional media content doesn't appear to attract high levels of conversational and intercreative participation, as measured by the numbers of comments and video responses” (Burgess and Green, 2008). Bullet screen cinema, YouTube and many other broadcasting sites are significant challengers to traditional dominant TV service. Burgess (2008) defined YouTube as “an example of ‘co-creative’ culture – whatever YouTube is, it is produced dynamically...as a result of many interconnected instances of participation, by many different people” (Burgess and Green, 2008). Audiences are also the content generator. Contents are massively self-generating without any restriction from traditional media. It broke down the barrier between amateur and institutionalized professionalism, and redefined creativity as a “social process, rather than a static individual attribute, embedded within and co-evolving with YouTube as a dynamic cultural environment, not an inert publishing mechanism” (Burgess and Green, 2008).

## **Conclusion**

From the examples of opera and drama presentation, we can see how ambiguity is introduced and applied in libretto, music and stage production. It is clear from the Case study I that such ambiguity is actually quite desirable. It does create confusion at some point, but overall it creates a logical interaction process and brings meaningful engaging experience. Audiences appreciate

such space created by ambiguity because it allows them to participate, to have their very own, personalized interpretation. They can be a part of what's happening on stage rather than just watching. Case Study II proves that it's human nature to break the rules and seek new possibilities in the interaction process. It has been observed in game design a long time ago and further guided the game design process, and it's becoming more and more popular. In Case study III, two previous case studies joined together as a whole, illustrating how fascinating a dramatic interaction can be, and how engaging an experience is achieved by less constraints from the designer but by providing an ambiguous space intentionally. Furthermore, by looking at the current media environment, it shows that blurred boundaries between authorship, co-creating and self-generated contents have already become the major trend of experience.

To design a more engaging system, designers should consider adapting an approach similar to opera production. Designers could focus less on efficiency as the ultimate goal of user experience. UX designers can introduce ambiguity into our user scenarios, and further create these ambiguous and vague interactive spaces intentionally for the user to interact with; they can co-author the interaction together with the user. Such spaces should be carefully created and curated, rather than just simply giving a user more freedom or a few more options. As humans, we are quite complex creatures. We cannot even define or explain so many emotions and activities by ourselves, but that makes us human. It is ambiguous, it is not very well-defined; such vague ambiguity creates rich culture and our great humanity. Ambiguity has been applied in many art fields already successfully; it would be great to see interaction designers injecting a certain type of ambiguity into interaction design. Adapt a similar method from opera, apply it to the HCI industry, and create interactions that allows audiences to have different interpretations, to engage, to control and to play.

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