# The Potential of Integrating User Experience (UX) and Aesthetic Experience (AX) in Augmented Reality Comic (AR Comic)

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**Abstract:** The purpose of this paper is to explore the potential of synergising of two major theories that sprang from two entirely different disciplines, namely the human-computer interaction (HCI) and the arts. Indeed, there are vast and diverse gaps when two different theories, such as technology and art, are to be combined to develop a new element that complements to both disciplines. In this paper, the proposition is to measure the user experience when dealing with an art object that infuses with digital technology. Augmented reality (AR) derived from the HCI discipline and customarily to UX as a measurement tool. On the other hand, a comic is an aesthetic object that requires an aesthetic-friendly method as its measurement tool. Ultimately, this paper proposes an integration of the UX and AX theories to evaluate an AR comic.

Key words: Augmented reality, comic, user experience, aesthetic experience.

# 1. Introduction

The comic book industry was plunging with a massive challenge when two largest comic producers, DC comic and Marvel announced a 6.5% drop in 2017 from the US \$ 1.015 billion business down to the US \$ 70 million by 2016. This fall occurred on the most prominent factor landscape changes to the growing digital environment around the world. Hence, DC Universe platforms, for instance, are among the highest platforms of streaming content by users.

Since the birth of the new media in 1995, the changes in the way of life, in the way of thinking and the working environment grew gradually [1]. In today's digital era, all conventional content is no longer tied to a particular form. It is more interactive and co-existence with the device that became its platform of reading [2].

The 4.0 industry revolution comes with mixed reality technology (MR), virtual reality (VR) augmented reality (AR), hologram and internet of things (IOT) shift the landscape of the publication to something unexpected when text, sound, visual and animation appear in line not only on screen but beyond that. The AR itself is moving fast in content, visual, animation, media and interactivity. Consequently, the presence of mobile technology makes the AR more relevant to users and is achieving high user targets [3]. This interactive element that co-exists with the device has increasingly become the platform of reading [2].

# 2. User Experience (UX)

The HCI is a broad constructive knowledge, and it overlaps with user-cantered designs, user interface,

and UX [4]. In many ways, the HCI is a forerunner of the UX. Despite the significant differences between the HCI and the UX, the HCI is inveighing to be an academic and empirical of scientific research tool while the UX invariably focuses on the industry and developing products and services for example: phone applications, the web and augmented reality applications, both fields are strictly related to human interaction and technology products [5].

Formally, ISO 20101 defines the UX as involving human perceptions and responses or expectations of responses as a result of using a product, system, or service [6]. It is relevant to the UX that includes emotions, beliefs, preferences, perceptions, physical and psychological responses. Hence, the use of such products also strong reflected in the behaviour and achievements that occur before during and after usage of the products.

Related to this, is the difference between usability of the UX whereas the UX has comprehensive objectives, not only to achieve effectiveness, efficiency, and satisfaction but also to enhance the UX holistically such as anticipation, interaction and reflection of the experience [7].

# 3. Aesthetic Experience (AX)

The AX is the reflection on the idealistic nature of aesthetic objects such as flowers, mountains, beautiful faces, music, theatre, dance, and painting. The uniqueness between the relationship of the aesthetic objects and the preoccupation of experience that is considered as a source of AX [8].



Fig. 1. The triangulation of AX.

AX is often associated between perceptions and feelings; whereas the sensitivity towards both is integrated with the idealistic feelings such as refine pleasure, delight, awe, admiration, and joy. Furthermore, effects and passions considered being of a unique positive value [9]. Scholar postulated that AX is a form of subjective judgment that is different from other humans [10]. Its accurately refers to a sense of taste that mostly about the ability of humans being cultivating perceptions and sensitive to the aesthetic objects around them.

By all means, the AX involves phenomenon (objects, events, sounds or other perceptions) or a set of phenomena (a set of objects, a sequence of events, melodies or complex perception structures) that are ideal. Although it is subjective based on the objective of the object, and it certainly affords excitement, sadness, miracle, and admiration [11].

#### 4. Comic

Scholars define the terms of the sequential art form as a basis for the definition of comics. On the other hand, they define the comic is a picture or a sequential art of juxtaposed images that create the storyline [12].

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the comic is a picture or sequential art form and juxtaposed images that create the storyline [12]. The use of speech balloons, panels, and layouts proponents in understanding the flow of the story [13]. Thus, the comic presentation is an art in which images are used to convey a sequential narrative by using text, symbolism, design, iconography, languages, and media arts elements to build a sub-text meaning [14].

With the rapid advancement and development of ICT and digital technology, many things that have been done manually now advanced into digital form. Conventional comics are usually painted on paper using ink, pen, and color will be printed through newspapers or magazines, but now it has holistically changed through ICT and digital technology. The arrival of digital technology has particularly resolved hassles to maintain the product quality of the comic. On another occasion, popular statement in 'Re-inventing Comic' explains that the potential of multimedia in comic may offer more visual effects with enhancements in terms of sound effects, mobility, and interactivity. Incorporating of comic and multimedia promise a new digital environment using particular devices such as computers, tablet, and mobile phone [15].

In addition, it defines as "Infinite Canvas" where the concepts, storylines, styles, and comic elements are still present in digital environments with multi-dimensional panel structure, sound, sound, special effects and minimal limitation on animation or movement. In infinite Canvas, it provides solutions to the issue of prints and storage of comic materials.

Furthermore, by combining comic features such as style, genres, dialogue balloons and panel structures with interactive media, character and background sounds as if reading balloon dialogue, a little element of animated motion and readers can choose a favorite plot to make comics lives in a virtual environment [16].

Under the circumstances, there is another medium of the comic, which calls interactive comic. The interactive comic is a two-way interaction with an audience in order to get information by reading, seeing, or listening. The comic is only a medium (aesthetic object), and the technology itself makes the comic different between the ages. The interactive comic allows the reader to choose from which chapters and frames of the comic that they want to read. Furthermore, the set of interactivity shall stimulate the audience to play with the comic [17].

Scholars suggest several factors may influence readers in reading interactive comics, which are panel arrangement, narrative story structure, and interactivity [18]. In 2008, Warner Bros. launched the 12 Watchmen episodes in a format called motion comic. The motion comic features changes such as comic panel that has been animated with the addition of panning and zoom techniques and is given a sound effect, background sound and character, music, and special effects. Warner Bros has also published this series online and in DVD format.

Motion comic can be described as a moving comic on paper (screen) and like a movie show. The compilation of pictures, sounds, texts, and movie concepts are like moving comics. Hence, motion comic production has several approaches such as a) Cinematic; a production approach that subsumes the various properties of the comic book language within a full-screen mise-en scene, b) Reconstructed; more elements of the original comic book such as multi-panels, sound effects, speech effect and more are present in the motion comic mise-en-scene and c) 3D; combination of comic book artwork alongside and in combination with CGI objects, characters and backdrops. This typically follows the conventional approach to mise-en-scene [19].

#### 5. Augmented Reality (AR)

Development in the fields of augmented reality (AR) and virtual reality (VR) remarkably promise significant changes in intellectual, method, and thinking about how we interact with technology. While, mixed-reality (MR) which increasingly gaining in popularity and relevance in various fields such as education, factories, manufacturing, military, simulation, and healthcare, it is still considered limited and

requires a genuinely qualified expert in order to implement the content and the technology [20]. There are some aspects of reality that are particularly, beyond the purely visual considers MR, namely; a) audio, b) motion, c) haptic, c) taste, and d) smell elements [21].

There is no single definition of MR, and it is highly unrealistic to expect one to appear in the future. The MR is the blending of physical and digital reality where the physical reality state of things as they actually exist through our human senses without technology and the digital reality is artificially created sensory experiences of people, environments, and objects [22].

In other words, the MR represents the control collision of the VR and the AR. In a practical sense`, the virtual and real worlds come together to create new worlds in which both digital and physical objects can coexist and interact with each other. It also deciphers the main goal to replace keyboards and flat displays with entirely new paradigms for communication and collaboration [23].

There are notions of the MR in order to synthesise the thematic coding and all definitions of it, such as; a) continuum that is a mix of real and virtual objects within a single display on a spectrum between a sufficiently real and entirely virtual reality b) Synonym means the terms are interchangeable for a system or experience that was clearly the AR or define the AR to explain their understanding of the MR. c) Collaboration; in this scenario, the MR describes the interaction between an AR and VR user that potentially physically separation. d) Combination; the MR as a combination of AR and VR, e) Alignment; the MR as an alignment of environment a synchronization between the physical and virtual environment, in other words, the alignment of virtual representation with the real world, respectively, and e) Strong AR, that MR are as a stable versions of AR.

In a practical sense, it is mainly characterized by an advanced environmental understanding as well as interactions of both of the user with the virtual objects and the environments.

The AR is a mobile or incorporated technology that embedded senses, processes, and out-put data in real-time, recognize, and tracking the real-world objects and provides contextual information by registering the human senses [24]. To illustrate the features of AR, scholar has outlined several features in the AR system, namely:

- It senses properties in the real world. The system will collect various forms of data about the world as the user experience. Sensors may include video, audio, haptic, location, motion or wireless signals.
- Process in real-time. Inputs from sensors will be analyzed and use by the system in real-time. Some information may be store for later analysis or sharing, but at least some of the data is used in real-time.
- Output (overlay) information to the user. Information gathered and processed by the system will generally be overlaid on the user's usual perception of the world.
- Provide contextual information. The information provides by the system to the user is contextual and timely, meaning it will relate to what the user is currently experiencing.
- Recognize and track real-world objects. The feedback will tend to track or process real-world objects or people in the user's view. For example, a facial recognition application may recognize faces and label them with names as the identified person moves through the user's field of view.
- Mobile or wearable. In the long term, we aspect that many AR systems will be wearable.

In a practical sense, there are several essential components in the AR application such as, displays, input devices, tracking and computers [25]. However, the successful AR mobile system depends on having an application that enables for a user to focus on the system or application rather than on the computer devices. It is enabling user interacts naturally and socially in an acceptable way in order to provide the user with private information [26].

Visualization in the real-world environment inextricably links from the visual interaction between real and virtual images. This type of visualization is a tool for exploring real-world structures with enhancing contextual information by augmenting textual or images annotation. Scholars has identified five visualization techniques in the AR system are [27]: a) Situated visualization, b) Objects as context, c) Sensor data as context, d) Scene as context, and e) Uncertainty as context.

#### 6. Integrating the UX and the AX in the AR Comic

Theoretically, the AR product relates to the science of human-computer interaction (HCI) and uses the UX approach as a method of measuring and the AR product [28]. In previous studies, there are two primary components of the UX, that are pragmatic and hedonic, which both components support each other to achieve a positive the UX [29].

Positive emotion attributes of the UX are essential for a technology-driven product to determine the effectiveness of a product in the marketplace. This means that any negative emotion attributes of the UX are to be avoided for technology-driven products [30]. Recent studies confirm that emotional elements constitute a significant component of UX, and it mainly designs to promote the positive emotion [31&32]. There are several UX elements commonly found in AR, namely; a) efficiency, b) inspiration, c) motivation, d) liveliness and e) captivation.

Conversely, since comics can be classified as an art form or an aesthetic object, thus the measurement method should be viewed from an aesthetic point [33]. Furthermore, the AX theory is now widely used and in line with the development of knowledge in the aesthetic field.

The characteristics of the AX based on elements such as; formalities, the content of art form, cognitive, perceptions, and emotions are vital components and essential in assessing and measuring aesthetic objects [34]. The AX elements that related to comics are; a) amusement, b) paradox of tragedy, c) mental jolt and d) storytelling clarity.

The AX is essentially important to understand how an aesthetic object stimulates the emotion by taking into account both the negative and positive emotions [35], which the negative emotion is often neglected by the UX theory. For example, the negative emotion such as despair and sad triggered from the tragic romances in the death of Romeo and Juliet play written by William Shakespeare can still be appreciated by the audiences and valuable in the context of AX.

Therefore, this study purposes an experimental model using factor analysis that can validate the integration of the two theories (i.e., the AX and the UX). This highlights the importance of integrating both the UX and the AX in the AR comic because the AR is an HCI-based product and highly relevant to UX as a means of measurement. Conversely, we found there are no element of the AX in the AR comic or any art-based product although arts is used as its subjects.



Fig. 2. Suggested framework of UX and AX in AR comic.

# 7. Suggested Framework

This paper proposes the integration of UX and AX in AR comic based on theory and empirical data from past studies. Indeed, the integration of both the UX and the AX elements in terms of discipline and objective will postulate the new inventions in a combination of art and technology.

This framework illustrates the combination of HCI via the AR technology as its product and the UX as its measurement tool, while the esthetic object represents the comic as its product and the AX as its measuring tool. Certainly, there are some exciting elements when the combination of these two theories is studied and tested in the AR comic.

The combination of AR and comics will also gain a new genre in comics other than existing genres such as conventional comics, interactive comics, and motion comic. This combination also presents an insight into variation of a new method in the AR application that embraces the aesthetic objects.

# 8. Conclusion

In conclusion, the development of AR technology enables knowledge about HCI and UX to explore new possibilities in the field of reality technology. Integration of AR technology not only involves UX's potential but also celebrates other elements like AX if it involves an aesthetic objects, especially comics. With massive development of AR technology aesthetic object can flourish further by using AR technology incorporating with aesthetic objects. This paper unveils the idea integration of UX and AX in order to contemplate new possibilities and discoveries in both fields and become catalysts for future research.

# **Conflict of Interest**

The authors declare no conflict of interest

# **Author Contributions**

Mohd Ekram Al Hafis is the main researcher in this research. Muhammad Zaffwan Idris acts as a supervisor. Also Che Soh Said will advise in analysis data and computing side.

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