Developing Theoretical Framework on Augmented Reality (AR) Comic Using User Experience (UX) Approach

Mohd Ekram Al Hafis Bin Hashim, Muhammad Zaffwan Bin Idris, Ahmad Nizam Bin Othman

Full Terms & Conditions of access and use can be found at
http://hrmars.com/index.php/pages/detail/publication-ethics

Developing Theoretical Framework on Augmented Reality (AR) Comic Using User Experience (UX) Approach

Mohd Ekram Al Hafis Bin Hashim[*1], Muhammad Zaffwan Bin Idris[2], Ahmad Nizam Bin Othman[3]

Sultan Idris Educational University, 35900 Tanjong Malim, Perak Malaysia
Email: mekramalhafis@gmail.com

Abstract
The purpose of this writing is to gather and suggest the construction of the theory and pipeline in the development of augmented reality (AR) comics. the user experience element is used as the main theory and the guide line in producing AR comics. Comic construction elements also play a role as an integration towards conventional methods with AR technology then enhancing the User experience approach. Moreover, by reviewing the AR theory and model, comics construction element and UX approach, it's can suggest a theoretical framework on developing an AR comics.
Keyword: Augmented Reality, Comics, User Experience, Usability, Mix Reality.

Introduction
Since an augmented reality comic by Sutu appear through *modern polaxis* that bring new approaches to enhance the way of reading the comics book, the research on augmented reality drive on creative media develop more faster. It's also bring the innovation on comics itself. Comics have been through some process of evolution in the few years before. From conventional comics to web comics and turned into an interactive comics and motion comics. The style and comic presentation nowadays is heavily dependent on technology that is constantly changing in character. According to Smith (2015) Comics as a digital media brings about new opportunities and challenge for comic book publishers, motion comics can be regarded as one of several attempts to bring comic book narratives to a new consumer. This has been agreed by Hu, Hengeveld & Raunterberg (2014) and introduce the interactive comics call the dreaming wine that explore some principle such as story structure, Experimenting with panels, Panel splitting and experimenting setting. Augmented reality (AR) environments, as well as augmented reality applications seem to be the next big wave in computer graphics application in market (Braun, 2003). Nowadays, with the increase of computational speed and advancement of specific

computer technology, AR applications become feasible in multidisciplinary field such as education, advertising, film, medical, game and many more. Research on VR and AR become growth spread with the development of interactive computer technology collaborate with 2D and 3D animation. According to Noh, Sunar & Pan (2009) researcher in VR and AR have shown considerable growth with computer technology and sophisticated 3D modelling package. On the other hand, AR can approach to enrich user experience in collaborative AR environments in CVE's (Computer virtual environment).

Comics

McCloud (1993) express the terms of Sequential Art as a basis for the definition of comics. McCloud regard to the definition of the comic is a picture or a sequential art and a juxtaposed images that create the storyline. Sequential Art produces an unlimited variety of presentation styles of physical media. In the comics itself that touching various issues such as, contemporary fiction, history, folklore, education, mystery, biography and satire. The form of comics quite similar to storyboard drawing but the aim for output product is different.

On the other hand, Eisner (2000) pointed out that comics are a medium or a way of telling a story that is closely related to the writing and style. Unlike other mediums., the strength of comics is a storytelling style, the style of writing and assisted with the visual power that gives more imaginative. Meanwhile, Arroio (2011) claim that the comic is not just a creator even comics illustration, but they are developing an intellectual combination between images and text preparation to develop a narrative. Furthermore Arroio (2011) explain about the use of dialog balloons, panels and layouts help in understanding the flow of the story. comic is a graphic medium in which images are used to convey a sequential narrative by using text, symbolism, design, iconography, techniques, languages, and mixed media arts elements to build a sub-text meaning.

McCloud (1993) and Eisner (2000) had outlined the elemen of comics construction and the similarity of that elemen have shown in figure 1 below :
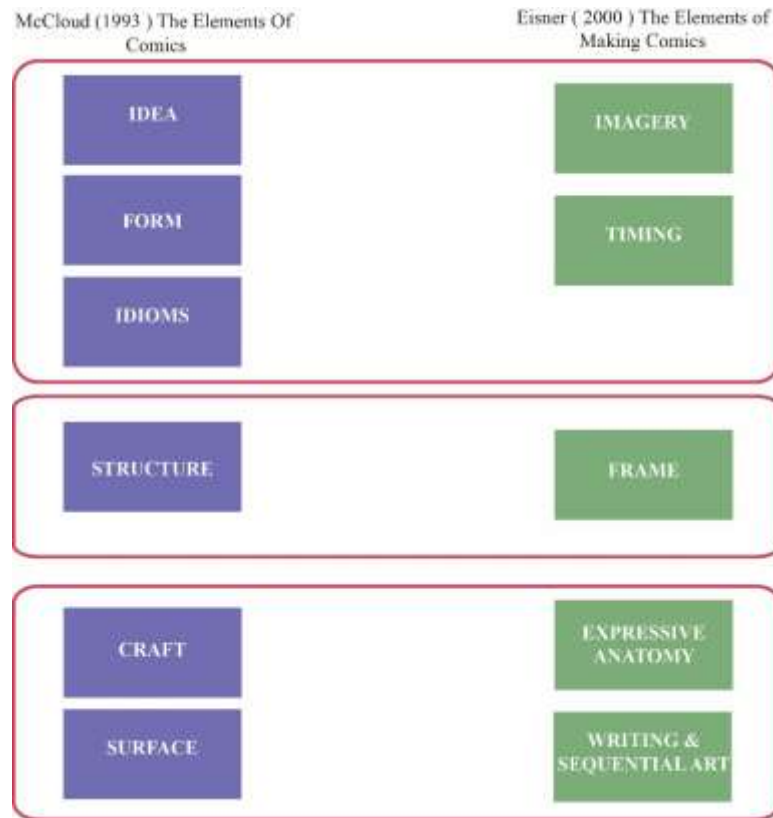
Figure 1 link between McCloud (1993) comics element and Eisner (2000)

Augmented Reality (AR)

As we know, augmented reality (AR) is a reality based interface design and create a future generation of virtual reality industry (Wang et.al 2014). With the rapid development of technology, mobile technology is also growing enabling the mobile and AR to enhance their potential in terms of content and research. for instance the research on mobile augmented reality (MAR) identified few elements that contributing the framework on producing mobile AR content.

Irshad and Rambli (2016) introduce a multi-layered conceptual framework for enhancing UX of MAR product to aims the encapsulate the important dimensions such as time and context to show the complete experience. In addition, they are six aspect of MAR which is ; [1] presentation, the physical aspect of the product that give impact to user, [2] information content, this is about the visual and the design for effective UX, directing user to move on this application, [3] service functionality, this is about the type of MAR application like education, creative driven or medical purpose, [4] interaction, the context of use and functionality is the main difference of MAR application from the conventional interaction, [5] augmentation, this is the most important thing on MAR application, enabling ability to augment the visual information, text, video or animation in real surroundings and [6] mobility, its refer to the technology usable in mobile context and activities. Easy access anytime and anywhere using various mobile device.
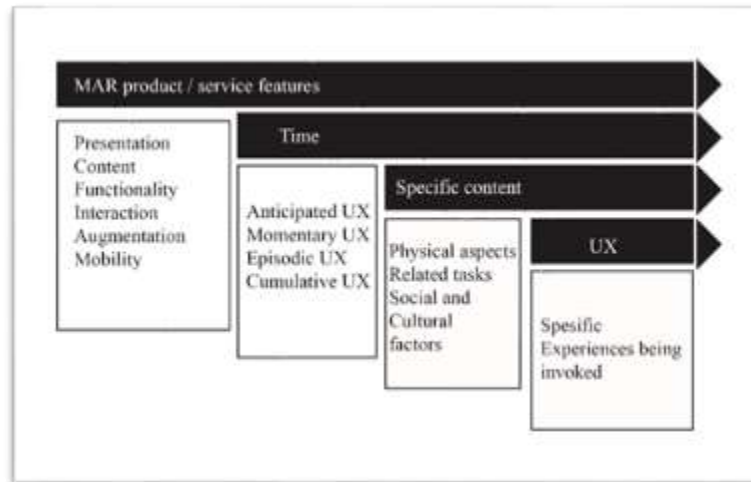
Figure 2 Multilayered Conceptual Framework for enhancing the UX of MAR products. Irshad & Rambli (2016)

User Experience
According to International Standard on Ergonomics of Human System Interaction (ISO 9241-210) user experience (UX) is a person perception and responses resulting from the use or anticipated use of a product, system or service. UX basically reflect subjectively in user mind. Meanwhile, Forlizzi and Battarbee (2004) define UX as an interaction and the effect of UX between user, product, social and cultural context. That's mean, for overall definition UX is considered a subjective intellectual in universal concept that strongly touch the usability aspects to the user, the value sensitive design, social and cultural communication and emotional including experience such as fascination, joy, excitement and aesthetics (Klingbeil et.al, 2017).

Meanwhile Preece (2002) claimed that UX is more than just usability, its beyond the usability goal and integrate the product perspective moreover the UX goal from Preece element such as ; satisfying, fun, enjoyable, helpful, entertaining, motivating, aesthetically pleasing, supportive of creativity, rewarding and emotionally fulfilling. This statement support by Adikari et. al (2015) mentioned the element of desire is the important of UX product assessment.
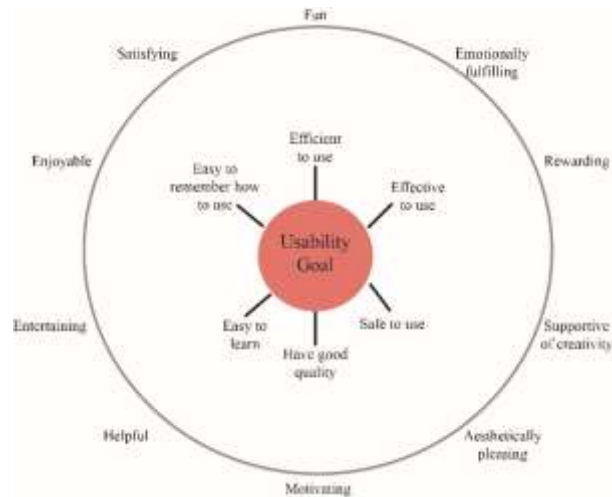
Figure 3 Usability and UX goals , Preece et al 2002)
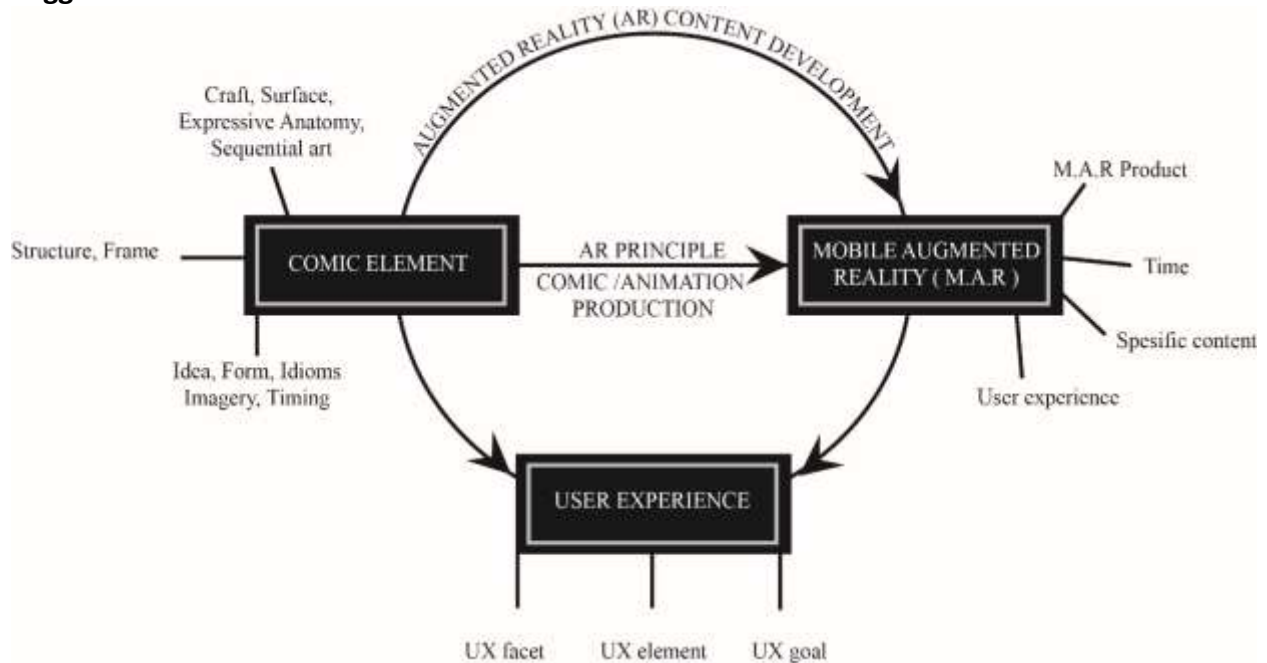
Suggested Theoretical Framework

Figure 4 Suggested theoritical framework AR comic using UX approach

Conclusion

In conclusion, the rapid development of AR technology has developed studies in various fields. The creative field is especially exemplary from exploring AR technologies to be applied in the production of creative based products. The functionality of each product should be seen in terms of interface elements it also needs to refer to the user experience (UX) itself, how their reflection on the creative product is the main point to discourse. In this study, the first phase of the research is integrates the theories to generate the framework of the AR comic theory by looking at some

of the main components through the UX approach. In the future, for the second phase the researcher will list the workflow or pipeline of the AR comic development process for the instrument of study. This theoretical framework will be an important basis for the creation of the AR comics.

Corresponding Author
Mohd Ekram Al Hafis Bin Hashim
Multimedia Creative Dept.
Sultan Idris Education University
Tanjong Malim , Perak
Malaysia.
Email: mekramalhafis@gmail.com

References
Adikari, S., Mc Donald, C., & Cambell, J. (2015). *Quantitative analysis of desirability in user experience.* Australian confrence on information system, 2015. Adelaide.pp1-11.

Arroio, A. (2011). *Comic as a narrative in natural science education.* Western anatolia journal of education science special issue. Dokuz eylul in stitute, Izmir, Turkey.

Braun, N. (2003). *Storytelling in collaborative augmented reality environments.* WSCG 2003 short papers proceeding February 3-7.

Clark, A., & Dunser, A. (2012). *An interactive augmented reality colouring book*, IEEE symposium on 3D user interface 2012 USA.

Van Krevelan, D.W.F & Poelman, R. (2010). The international journal of virtual reality*, 2010, 9(2), 1- 20.*

Eisner, W. (2000). *Comics and sequential art*. Poorhouse press, Tamarac Florida, Nineteenth printing.

Forlizzi, J., & Battarbee, K. (2004). *Understanding experience in interactive systems*. Proceeding paper. Human- computer interaction institute.

Hengeveld, H., & Rauterbeg, M. (2014). *Can time perception be affected interactive comic*, Conference paper Jan 2014. ISO FDIS 9241-210:2009, *Ergonomics of human system interaction-part 210 : Human centered design for interactive systems*. International organization for standarisation, 2009.

Irshad, S., & Rambli, D. (2016). *Multi-layered mobile augmented reality framework for positive user experience.* Conference paper January 2016.

Klingbeil, M., Pasewaldt, S., Semmo, A., & Dollner, J. (2017). *Challenge in user experience design of image filtering apps*, Symposium on mobile graphics and interaction applications 2017, Bangkok , Thailand.

McCloud, S. (2000). *Reinventing Comics: How imagination and technology are revolutinizing an art form.*New York: Harpercollins books.

Noh, Z., Sunar, S., & Pan, Z. (2009). *Edutaiment 2009, LNCS 5670, pp 50-61*, 2009 Springer-verlag Berlin Heindelberg 2009.

Preece, J., Rogers, Y., Sharp, H. (2002). Interaction design*:* Beyond human-computer interaction. John Wiley & sons.

Smith, C. (2015). Writing Visual Culture(5), University of Hertfordshire 2015, retrive from http://researchprofiles.herts.ac.uk/portal/en/publications/search