A New Interaction Design Model for Digital Chronological Infographic Development

Khairul Azhar Mat Daud

Faculty of Creative Technology and Heritage Universiti Malaysia Kelantan.

ABSTRACT

This paper will explain briefly about a selected model of instructional and interaction design. The intensive review from a several literature has done and every fact against each selected model has analyzed to identify their advantages and disadvantages. Based on their advantages listed, in intend to overcome their weakness and enhance the instructional model in order to make the instructional and interaction model more relevant in this age, this paper will proposed a new interaction design model for chronological infographic development. Apps Mobile is a latest technology as a platform to disseminate information and educate people by use infographic approach. To convey the information, which is relate with time line and historical information in 21st century, digital chronological infographic is a appropriates matter to apply.

Introduction

The method of face-to-face learning currently implemented in schools needs to review in order to enhance the effectiveness of instructional regarding to the growing up of tremendous information and communication technology in this age. Learning in 21st century is about implementing of digital technologies. Significant changes in terms of technology, has led to a community or individuals in the community manipulate an authentic facts and have a potential to lead the crisis in the community. The previous studied was finding that by use more illustrations help students to ease understand with an information to convey to them compared with the use of reading material. Students usually preferred and motivated to learn through visual and graphic illustration rather than reading text illustration. Thus, the concept is an infographic to convey information is more effectively compare than text form. The digital chronological infographic can be more attractive because it is able to integrate with the audio system such as music and sound. A simple animated also be able to integrate with a new concept of digital chronological infographic. This new concept has known as Digital Infographic model. Through an intensive literature review, learning concept by using digital infographics through mobile apps platform especially to deploy chronological information is still new and it isn't many research were be done and unexplored currently. This paper was been wrote in order to discuss with a several existing instructional model regarding to designing of infographic in digital form which is intent to convey a chronological information with an effectives means. It does will discuss about the advantages and weakness of certain instructional model. Based on the analysis did for every selected model, the suggestion to establish a new interaction model digital infographic to show the chronological information for Mobile Apps is propose.

The Important Of Infographic In Education

Several studies about infographic have done in order to looking the teacher's needs and their relationships between the various visual formats were delivered in addition to complying with quality criteria such as clarity, aesthetic and linguistic use (Lallana, 1999). Meanwhile, Sancho Valero (2001) also pointed out that the infographic allows a newspaper or magazine optimize the reader's understanding of the information to be delivered through the display of images and text that is processed in attractive graphic design and meets the information needs to be delivered without a lot of reading (Minervini, 2005).

Huang and Tuan (2007) asserted that there are several studies to look at the needs of infographic to the community and how far they accepted an infographic as medium to convey some useful information to them. Huang and Tuan (2007) also stated that the infographic is only used by those who only see information at a glance without making any judgments and rational thinking on it (Diakopoulos, Kivran-Swaine, & Naaman, 2011). In fact, Schroeder (2004) also pointed out that the use of infographics through newspaper or magazine is a different approach to show the uniqueness of newspaper or magazine and showed a little variation compared with others newspaper or magazines.

In a study of interactive infographics as an added value to the mass media online in Europe, Schroeder (2004: 563) states that after more than a decade, the existence of online media in Europe still faces with a serious economic challenges, together with paradox "on the one hand, more and more Internet users prefer online media as their first source for information." Industry and researchers around the world are constantly looking for effective information delivery model and efficient. One key issue seems to be that online media is still not enough to offer content based on the current changes. Information delivery service is still working in conventional means. Therefore, the need to add value to its methods and effective way to present information is very important. Therefore, based on the statement above, Valero (2000) was asserted that interactive infographic can be classified as value added to the visual display of information to the public or consumers. Valero (2000) have defined digital infographic as follows:

Tele: +6013-933 3919
E-mail addresses: azhar.md@umk.edu.my

"…an informational contribution, developed in written newspapers, done with iconic and typographical elements that allows or facilitates the understanding of current events, actions or things, or some of its significant aspects, and accompanies or replaces informational text..."
 (Valero, 2000)

The use of infographics in modern journalism has also become the basis of robust pedagogical approach with the main objective to facilitate understanding through visual displays and illustrations (Álvarez Franco, 2005; Sturken & Cartwright, 2001). Steve Duenes (2008), director of the New York Times daily, has stated "the infographic is proper integration between art, science and information delivery methods." Valero (2010) has stated that the delivery of information through infographic allows the reader to classify certain information to be highlighted.

Although methods for visual presentation is considered to be static in that it is designed with various diagrams and charts, as well as combined with various types of texts and color, but since the emergence and development of information technology has made rapid infographic is no longer a static medium but has added value to the facility interesting interactive. There are various interactive features such as sound, music, color change, action, suspense and so on can be inserted and it makes this infographic more attractive and has a high ability to grab attention from the audience to watching and reading information in particular infographic. News organizations including the New York Times, Washington Post and The Guardian often combine interactive graphics into their news reports (Seals & Heer, 2010)
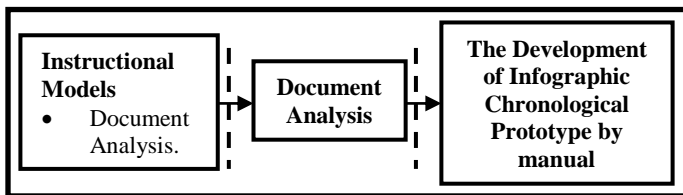
The Conceptual Framework of the Study

Figure 1. Research Conceptual Framework

A selected of instructional models have been analyze in order to review their implementation to design any kind of interaction in educational process. The existing of instructional and interaction model need to review, to make its relevant and concurrent with a tremendous change of current technologies in education. To design and develop an infographic to deliver chronological information, designer need to refer with appropriates model, which is including with three important elements that is [1] instructional, [2] chronological concepts and [3] type of medium use to convey information.

This paper reviewed a several selected familiar interaction and instructional model. The interaction and instructional design model have analyze regarding to their advantages and limitations. Then, the features of chronological concepts and type of medium use to convey information have identified. Referred to every selected model the disadvantages aspect was analyze and recovered. In analyses, process was concern in aspect of how to reduce the list of disadvantages factors in each model. Finally, a new model to design and develop digital chronological infographic has proposed based on integration with three important factors that is [1] instructional, [2] chronological concepts and [3] type of medium use to convey information.

Chronological Concepts

Chronological is a specific information which is present with a different time or ordering time without changing their magnitude, time line and all events was occurs at previous time. In other words, it is educate how to measure, distinguish every parts of storyline regarding to the frame of time line (Smith et. al., 1993). A timeline is divided into equal time segments (month, year, or century, for example), with one end representing the oldest events and the other end the most recent events (Smith et. al., 1993).
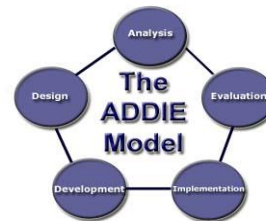
Apps mobile as a medium to disseminate Chronological infographic

Currently, in digital ages, the most popular medium that use to disseminate information must be with digital application. In 21st century, many option of digital medium was use by teenagers and youths. The latest digital media were use is smart phone and I-Pad. The most popular of digital media in time being is Apps Mobile as a smart phone application. Apps Mobile was defines as a new application which is develop for mobile digital technology such as personal digital assistant (PDA), enterprise digital assistant or mobile hand phone. Apps Mobile usually already associates with mobile digital technology. Apps mobile also able to get from play store or Apps Store (Victor Utomo, 2010)
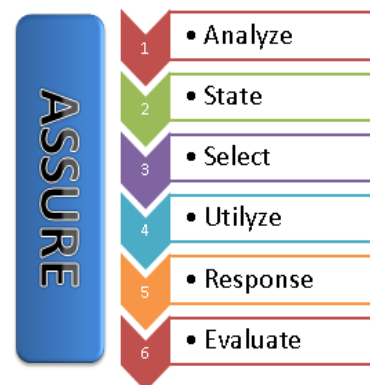
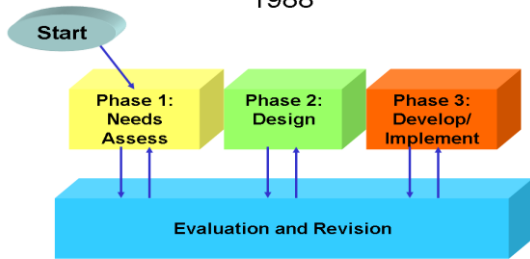## Analysis of Interaction and Instructional Design Model
ADDIE Model

Advantages	Disadvantages
• This model is the originate model that is emergence of other models such as the Morrison Model, Ross and Kemp Model, Seels & Glasgow Model, and Dick and Carey Model. The proof almost all the instructional design model has five main principles ADDIE that is "Analyze", "Design", "Develop", "Implement" and "Evaluate" • The effective and systematic model	The level of analysis require a long time. (Need to run the performance analysis and needs analysis first).
References 1] Kruse,2004 2] Ummu Nasibah Nasohah, Muhammad Izuan Abd Ghani, Nazipah Mat shaid, 2015. 3] Gusmayani,2012.	

ASSURE Model

Advantages	Disadvantages
ASSURE Model have a very strong foundation to develop "courseware" in teaching and learning. Based on previous studies, this model does not only give guidance to teachers in teaching and learning even every feature contained in ASSURE could change the perception of the process of teaching and learning has always been considered boring. • Simple, relatively and easy to implement.	The preparation of media in Instructional design is not compatible with the analysis phase.
References 1]http://www.geoandyou.com/kajian_ilmiah/kajian_model_assure.pdf 2] https://dapurilmu.files.wordpress.com/2012/03/makalah-modelassure.docx 3] http://wajayu.blogspot.com/2013/06/model-pengajaran-assure.html	

Hannafin and Peck Design Model, 1988

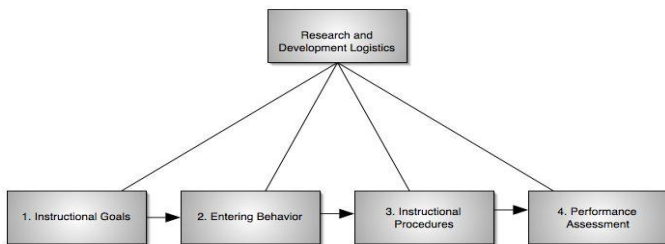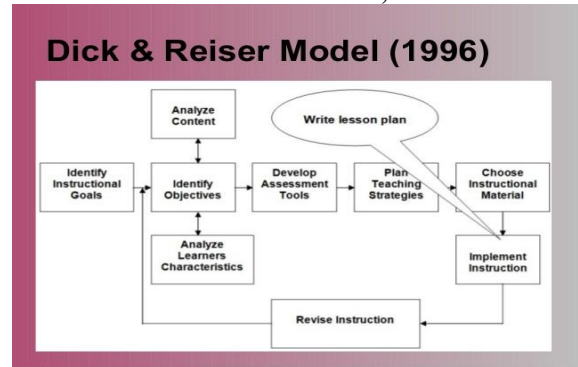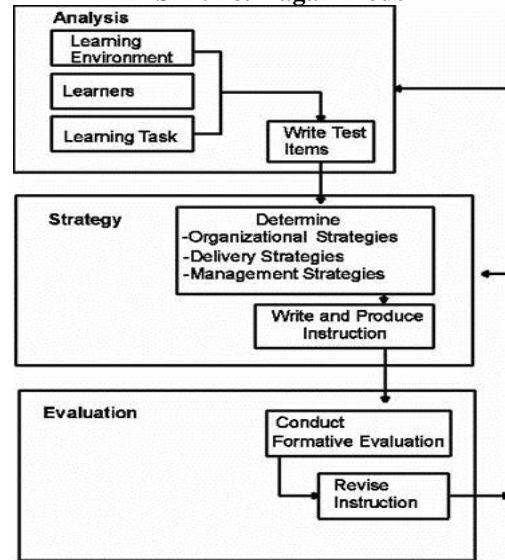| Advantages	Disadvantages
• Hannafin and Peck design model is an instructional process without take a long time from needs analysis phase, design phase, and develop / Implement phase. • The evaluation process and repetition will take place at each phase continuously	Very complicated model and every phase need to be evaluate and revise. The process of evaluation and revision for each phase will waste time and take a long time to design instruction process.
References [1] Nyoman Yudistiawan1, Wayan Romi Sudhita2, Kadek Suartama /http://ejournal.undiksha.ac.id/index.php/JJTP/article/download/1491/1352 [2] Noor Azean Binti Atan & Siti Nur'ain Binti Mohd.Said, 2010 [3] Norah Bt. Md Noor & Ling Ik Hie,2011	

Robert Glasea Model

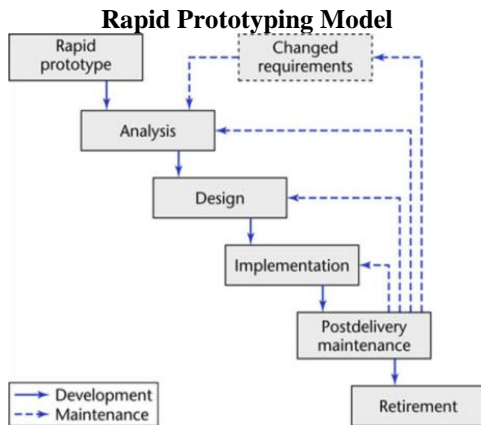| Advantages	Disadvantages
• Emphasizes student feedback as an important aspect in the process of teaching and learning.	Objective set was too high and therefore difficult to achieve.
References [1] http://www.sabah.edu.my/skpmtdonotes/teori & model p&p.pdf [2] Mohd Reduan Buyung,2013 : 18	

Dick & Reiser model, 1996

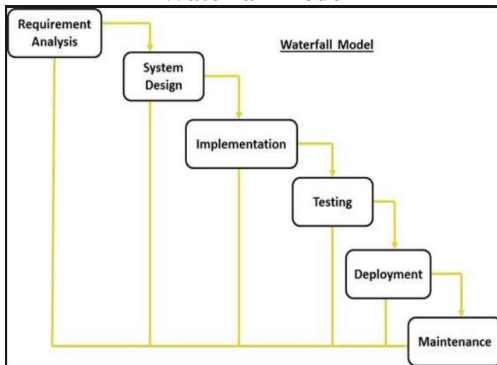| Advantages	Disadvantages
• As a guideline to help teachers design effective lesson plans. • There are elements that discuss the introduction of the concept, the discussion regarding the project and examples of usage of the concept in a real project model. • It also presents the process shorter and fewer steps.	.
References [1]http://www.fp.utm.my/epusatsumber/pdffail/ptkghdfwp2/p_2010_9757_bd8a4da1f1fd4ae9a0ce49acffc7862a.pdf [2]http://www.fp.utm.my/epusatsumber/pdffail/ptkghdfwp2/p_2010_9757_bd8a4da1f1fd4ae9a0ce49acffc7862a.pdf [3] Barbara Seels & Zita Glasgow,1997	

Smith & Ragan Model

Advantages	Disadvantages
• Instructional systems design model popular among students and professionals who have a tendency towards the implementation of cognitive learning theory. • Student-centered learning model	This design model according to Gustafon and Branch, is very comprehensive in its implementation step in the development of learning strategies. This is often an area of weakness for models other learning systems design.
References [1] Benny,2011 / http://faizal-ahsan.blogspot.com/2014/09/analisis-model-desain-pembelajaran.html [2] Learner centered instruction. Benny,2011 / http://faizal-ahsan.blogspot.com/2014/09/analisis-model-desain-pembelajaran.html	

Rapid Prototyping Model

Advantages	Disadvantages
• The design of the traditional teaching system is concern about the effectiveness of outcome were produce rather than the efficiency of process itself. Rapid prototyping is the answer to the efficiency of the system and more than that, it could answer how problem solving can be achieved or obtained by non-linear.	The using of rapid prototyping model will sometimes encourage informal design methods that can cause more problems. The chosen of rapid prototyping use is depending on the goals and context of teaching materials development.

References
[1] Tripp & Brickelmeyer,1990 / http://kujurulatihankomp.blogspot.com/2010/01/aktiviti-2-rekabentuk-pengajaran-rapid.html
[2] Rosyiatimah Ismail,2010 /http://kujurulatihankomp.blogspot.com/2010/01/aktiviti-2-rekabentuk-pengajaran-rapid.html

Waterfall Model

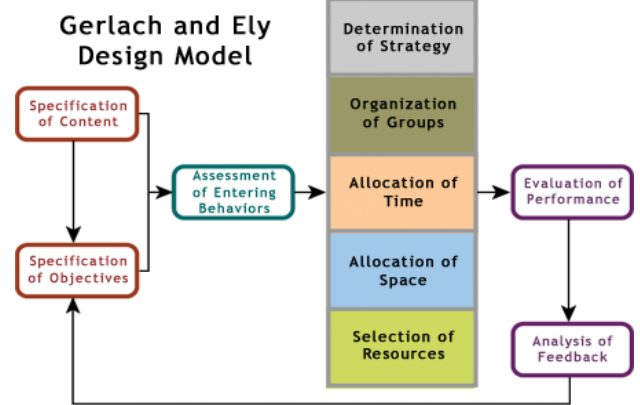| Advantages	Disadvantages
• Ease-to-understand, easy to use, the system requirements are stable, in terms of management control, as well as the good work and quality take precedence over the cost and schedule (deadline) model is simple and easy to understand and use • It is easy to manage because of the rigidity model - each phase has specific deliverables and the review process. • In this model, all phase will be process and completed one after another. Phase not overlap. • Waterfall model works well for small projects where the need is very understandable.	• Not a good model for complex projects and object oriented. • Model is weak for a long term and continuous project. • Not suitable for projects where the requirements are moderate to variable high risk. • High risks and uncertainty.

References
[1] Imam Fahrurrozi, Azhari SN

/http://jurnal.stmikelrahma.ac.id/assets/file/Imam Fahrurrozi, Azhari SN_stmikelrahma.pdf
[2] http://istqbexamcertification.com/what-is-waterfall-model-advantages-disadvantages-and-when-to-use-it/
[3] http://istqbexamcertification.com/what-is-waterfall-model-advantages-disadvantages-and-when-to-use-it/
[4] http://www.tutorialspoint.com/sdlc/sdlc_waterfall_model.htm

Gerlach & Ely Design Model, 1980

Advantages	Disadvantages
• A prescriptive model that is suitable for use by K-12 schools and higher education institutions. • It is ideal for designer who have specialized knowledge and expertise in a particular field. • This model contains media selection strategy and resource allocations. • Gerlach and Ely design model (1980) also suitable for use by novice designers who have knowledge and expertise in a particular field.	• Are inclined in the direction of the teacher (Teachers will determine the objectives and determine the content). • Not fully consistent with the ADDIE (missing inventory design tasks and performance objectives, implementation) • This model is somewhat weak for the execution (implementation)

References
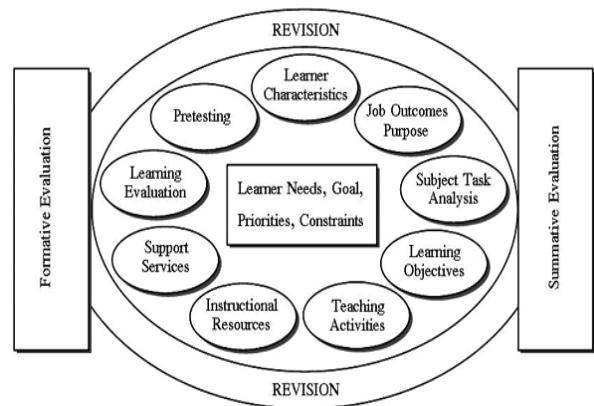[1] Braxton,Bronico&Looms,1995 / http://studentsrepo.um.edu.my/1710/5/BAB_2.pdf
[2] http://studentsrepo.um.edu.my/1710/5/BAB_2.pdf
[3] Qureshi 2001, 2003, 2004 / Lee Tien Tien & Kamisah Binti Osman,2010.
[4] http://www.slideshare.net/pgmiehl/gerlach-ely-idm
[5] Chen,2004 / http://www.slideshare.net/pgmiehl/gerlach-ely-idm

Jarrold Kemp Model

Advantages	Disadvantages
• Monitor before heading to the next stage. • The lack of a certain degree can be reformed and renovated from time to time.	• It mere focuses on lesson plan in classroom. • Teacher in the only person those has an authority in the classroom.
References	
[1] http://www.slideshare.net/smpusy13/kelemahan-dan-kelebihan-model-jerrold-kemp	

Advantages	Disadvantages
• This model has a very systematic procedure. It is a core of special behavioristic instructional. • Able facilitates students within learning process. It is expect to provide guidance for teachers in guiding students to achieve competency standards.	
References	
[1] Mohammad Maskan dan Ahmad Fauzi, 2014. [2] Onik Farida Ni'matullah,2014	

Gentry Model
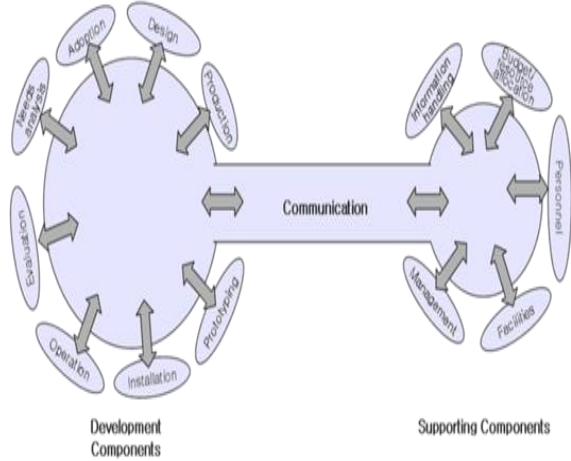
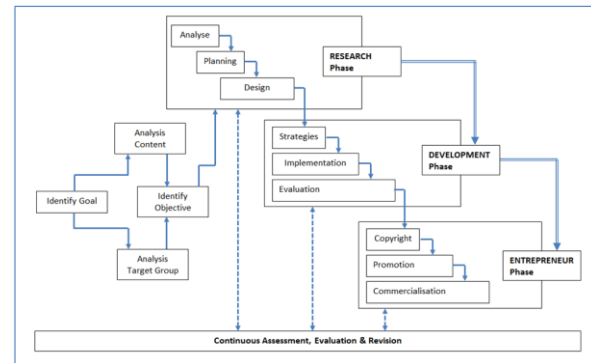## The Model of Digital Chronological Infographic Interaction Development

Figure 2. A New Interaction Design Model for Digital Chronological Infographic Development

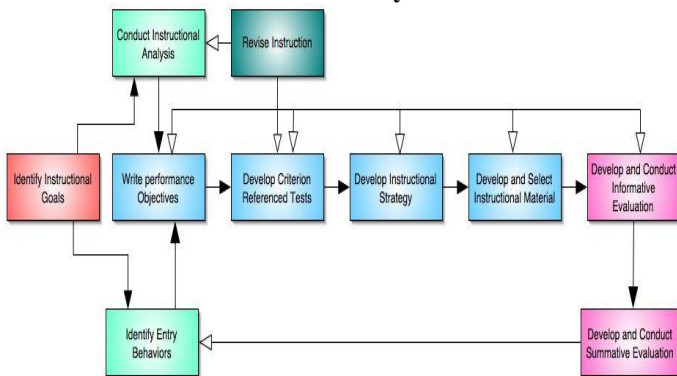| Advantages	Disadvantages
• An efficient and comprehensive instructional design model • Use to develop a prototype of product. • Flexible • Can be applied in the classroom, courses, training, organization and industry.	• The success of its implementation depends strongly on the component support • If one component of the system will greatly affect, it has inflated other components and overall outcome itself. • The application of this model is difficult because it contains too many components. •
References	
[1] Christian Fowler,1996 / Kajian Pustaka Model Gentry / http://makalahpaperjournal.blogspot.com/2008/12/model-pengembangan-intruksional_22.html	

Based on the analysis of several selected models, in concern to reduce the limitations of each model and to enhance the existing of instructional and interaction model, there is a proposed of new interaction design model for digital chronological infographic development. This new model included with three main phase as followed [1] research phase, [2] development phase, and [3] entrepreneur phase. Refer to the figure above shown the first step must be consider before go to the three main phase is must to identify the goal of interaction. The identified goals must be analysis in two aspects, which are their content and their target group concurrently. After that, the objective of interaction were determines.

When the objectives of the interaction were determines, the next process were followed. The first phase of this process is research phase. Research phase have cover the process of analyze, planning and design. After the research phase has followed, the next pace is development phase. Development phase is the process to develop the digital chronological infographic. In development phase, the process to identify strategies development, product implementation and product evaluation have recovered (in this case, product referred to digital chronological infographic).

When the digital chronological infographics has completed develop and implement, then the process to disseminate chronological information through apps mobile, must be going with final phase of interaction process development. The final phase for digital chronological infographic development is entrepreneur phase. Entrepreneur phase have cover the process of copyright, promotion and commercialization. In every phase of this model, the process of continuous assessment, evaluation and revision are allowable to arrange from time to time.

Dick & Carey Model

Conclusions

Through this research, hopefully this study can identify a visual interaction model that able to implement while designer want to develop a chronological infographic design. This chronological infographic design then been applied by use of mobile applications digitally. The study will also examine critically the existing instruction model and will establish a new interaction model infographic chronological then be referred to and used to develop a chronological infographic design for mobile applications.

The lifestyle of the 21st century has changed from a conventional to a digital lifestyle. Communication and information obtained through the latest communication gadgets such as smartphones, iPad, Facebook, WhatsApp and others. As such, this study is seem as essential to ensure that all relevant information can be disseminated to the entire community through mobile applications. Society no longer tied to the conventional reading materials such as newspapers, magazines, scientific books and so on. People are more likely to use digital material such as magazines virtual cyberspace, virtual books, and others. Therefore, it makes sense to move all methods of information delivery to cyberspace. However, currently many scholars focusing research in interface aspect such as infographic design. This kind of study is very important that the information has delivered in an effective and easy to understand. People are also less likely to read, but the use of visual plays a very influential role in conveying historical information to all hierarchy of the community's.

References

[1]Ambigapathy Pandian. (2005). Literasi Teknologi Maklumat Di Kalangan Guru Pelatih Bahasa. Pulau Pinang:Universiti Sains Malaysia.

[2] Baharuddin Aris . Rio Sumarni Shariffudin dan Manimegalai Sbramaniam. (2002). Reka Bentuk Perisian Multimedia. Skudai, Johor.: Universiti Teknologi Malaysia.

[3] Bruce L.Mann. (October 2006). Making Your Own Materials, Part II: Multimedia Design for Learning. International Journal of Instructional Technology And Distance Learning, 3.

[4] Churchill. D. (2006). Active Lessons [Electronic Version], Learning Object Sites from http://www.learnactivity.com/activelessons/index.html.

[5] Datuk Dr. Syed Othman Alhabshi. (2002). e-Learning: A Malaysian Case Study. Paper presented at the Africa-Asia Workshop on Promoting Co-operation in Information and Communication Technologies Development.

[6] Dr. Micheal D. Williams (Ed.). (2000). Integrating Technology Into Teaching And Learning. Singapore: Prentice Hall.

[7] Fred Percival, H. E. (1984). Buku Panduan Teknologi Pendidikan (N. F. Yaacub, Trans. second edition ed.). London: Kogan Page Limited.

[8] Iraklis Varlamis & Loiannis Apostolakis. (2006). The Present and Future of Standards for E-Learning Technologies. [Electronic Version]. Interdisciplinary Journal of Knowledge and Laerning Objects, 2.

[9] Jabatan Pengurusan IPT. (2006). Modul Khusus. In K. P. T. Malaysia (Ed.), Asas Pengajaran Dan Pembelajaran Pensyarah Baru IPTA. Shah Alam: Pusat Penerbitan Universiti (UPENA).

[10]Karen Swan. (2004a). Issues of Interface [Electronic Version], 1 from www.eurodl.org.

[11]Molebash, P. E., Capps, R., & Glassett, K. (2009). Conceptual change and the process of becoming a digital history teacher. Research in Social Studies and Technology. Information Age Press, 67-97.

[12]Mark Smiciklas (2012). The power of infographics. Published by Pearson Education. Inc. ISBN-13: 978-0-7897-4949-9

[13]Massironi, M. (2002) The Psychology of Graphic Images. Mahwah, NJ. Lawrence Erlbaum Associates.

[14]Mark Smiciklas (2012). The Power of Infographics: Using Pictures to Communicate and Connect with Your Audience

[15]Smith, Shelley J., Jeanne M. Moe, Kelly A. Letts, and Danielle M. Paterson. 1993. Intrigue of the Past: A Teacher's Activity Guide for Fourth through Seventh Grades. Washington, D.C.: Bureau of Land Management, U.S. Department of the Interior. [This lesson is adapted from "Chronology: The Time of My Life" on pp. 22–26, courtesy of the Bureau of Land Management.]

[16]Ware, C. (2004) Information Visualization. San Francisco, CA: Morgan Kaufman Publishers.