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A Theoretical Framework for Designing a Multimedia App in Increasing Knowledge and Perceived Awareness towards Cyber-bullying among Adolescents

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Abstract
This paper discusses the theoretical framework in designing and developing a multimedia app intended to increase knowledge and perceived awareness towards cyber-bullying among adolescents. Given that cyber-bullying has become more serious lately, steps should be taken to ensure that this threat is curtailed (Willard, 2007). Other than the conventional methods and the involvement of parents, schools and the society in curtailing this problem, other initiatives that could be taken include developing a Multimedia App on tablets that would be able to assist adolescents in increasing their knowledge and awareness on cyber-bullying. Development of an interactive Multimedia App that comes with attractive graphics, audio and animation have great potential in attracting the interest of adolescents in gaining a deeper understanding of this issue. Therefore, the theoretical framework maps and integrates all relevant theories, principles and guidelines to form a concrete pathway for the design and development of the multimedia app.

Keywords:*Cognitive Theory of Multimedia Learning, Principle of Multimedia Learning, Personalization Principle, Persuasive Technology, Constructivist Learning Environment, Cyber-bullying*

Introduction

Wolak, Mitchell, and Finkelhor (2007) defined cyber-bullying as sending or posting text messages or images intended to hurt or embarrass another person by using the Internet, cell phones, or other technology. Other researchers define cyber-bullying as a destructive and intentional act carried out by a group or individual, using electronic forms, repeatedly, and over time against a victim who cannot easily defend him or herself (Smith, et. al, 2008).

Generally, based on research carried out between the 2006 and 2012 by Patchin and Hinduja (2012), the highest number of victims of cyber-bullying in those six years was adolescents. The problem of cyber-bullying has become more widespread, not only because of the ease with which an adolescent is able to access the Internet, but also because the Internet makes it easier for a person to interact with another person without revealing her or his true identity, or in other words, anonymity (Patchin and Hinduja, 2006). However, knowledge and awareness of cyber-bullying is still looked upon lightly by the society (Nadia and Wan Ahmad Jaafar, 2012). What the public are not aware of is the threat of cyber-bullying that can be compared to an illness that will destroy the society especially, adolescents. A national survey in 2013 also showed that adolescents' awareness of cyber-bullying were still low (*CyberSAFE in Schools 2013 Survey*, 2013).

Given that cyber-bullying has become more serious lately, steps should be taken to ensure that this threat is curtailed (Willard, 2007). Some schools currently use small group discussions, large school assemblies, or lecture workshops to address the problem of cyber-bullying with students and these methods are often ineffective (Beale and Hall, 2007; Diamanduros et. al, 2008; Keith and Martin, 2005). Other than the conventional methods and the involvement of parents, schools and the society in curtailing this problem, other initiatives that could be taken include developing a Multimedia App on tablets that would be able to assist adolescents in increasing their knowledge and awareness on cyber-bullying.

Development of an interactive Multimedia App that comes with attractive graphics, audio and animation have great potential in attracting the interest of adolescents in gaining a deeper understanding of this issue. Moreover, advanced Internet technology and the existence of gadgets like tablets and smart phones make it easier for adolescents from all walks of life to access these applications (Upadhyay, Jesudass, and Chitale, 2014). Therefore, the researcher needs to construct a theoretical framework to map and integrate all relevant theories, principles and guidelines to form a concrete pathway for the development of the multimedia app.

Theoretical Framework Development

As suggested by Reigeluth and Merill (1978) in Van Patten, Chao, and Reigeluth (1986), the development of the theoretical framework will take such an approach by combining the macro and micro strategies. Macro strategies involve the selection, sequence and organization of the subject-matter topics that are to be presented. It is also described as the overall strategic plan (Gibbons and Fairweather, 1998). On the other hand, micro strategies are concerned with the individual displays; including their characteristics, inter-relationship and sequence that are to be presented to the learners. Micro strategies are also known as presentation strategy; as they involve details of each individual presentation to the learner (Chen, Toh, and Wan MohdFauzy, 2005). Persuasive design principles are the macro strategy while Cognitive Theory of Multimedia Learning (CTML) and Design Guidelines for Teenagers serve as the micro strategies for this study. The study also utilizes the Constructivist Learning Environment (CLEs) which was established by Jonassen (1999). The theoretical framework is illustrated in Figure 1.

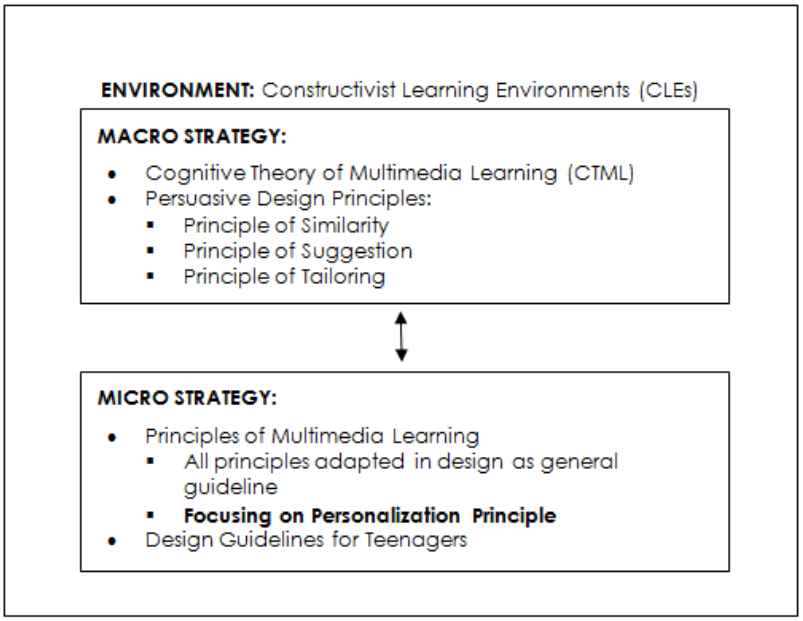

Figure **Error! No text of specified style in document.**: Theoretical Framework of the Study

Although there are a few theories, principles and guidelines supporting this research, the Personalization Principle is the major principle being investigated in this study. This is because the main focus of this study is to investigate the effects of personalization towards knowledge and perceived awareness of cyber-bullying among adolescents.

A. Persuasive Technology

Persuasive Technology is the study related to attitudes and how to change attitudes and behaviour (Fogg, 2003). Persuasive Technology is believed to play an important role in education (Lucero, et. al, 2006). Fogg (2003) outlined many principles of persuasive technology which can be put into use as guidelines while designing and developing a computer technology that is capable of changing the attitude and behaviour of someone. In this study, three principles are applied as the macro strategy in designing the Multimedia App. These principles are:

i. Principal of Similarity - learners are more readily persuaded by a Multimedia App that is similar to them in some ways.
ii. Principle of Suggestion – the Multimedia App will have greater persuasion power if it offers suggestions at opportune moments.
iii. Principle of Tailoring – This principle suggests that information that has been prepared by a computer application would be more persuasive if it is constructed and tailored to the needs, interest, personality and usage context relevant to the user.

B. Cognitive Theory of Multimedia Learning (CTML)

Mayer (2009) proposed the *cognitive multimedia learning model* as the human information processing model. This model divides the human memory into three parts, which are (i) sensory memory, (ii) working memory and (iii) long term memory. This model explains that multimedia information is received through sensory memory and the received information is then moved to the working memory. The main process of learning with multimedia takes place in the working memory and the role of the working memory is to actively process the information received through sensory memory (Mayer, 2009). The processing of information which involves the integration of recently received knowledge with existing knowledge in the long-term memory produces new knowledge or coherence mental representation. This new knowledge is stored in the long-term memory in the form of schema (Mayer, 2009).

C. Principles of Multimedia Learning

Focusing on real learning situations, Mayer (2009) conducted several in-depth studies involving the testing of learning theories. From the results of these CTML-related studies, he successfully developed 12 principles of multimedia instruction that have been widely accepted and used by instructional designers and researchers the world over. These 12 principles are as follow:

i. Multimedia Principle – People learn better from words and pictures than from only words.
ii. Coherence Principle – People learn better when extraneous words, pictures and sounds are excluded rather than included.
iii. Signalling Principle – People learn better when cues that highlight the organization of the essential material are added.
iv. Redundancy Principle – People learn better from graphics and narration than from graphics, narration and on-screen text.
v. Spatial Contiguity Principle – People learn better when corresponding words and pictures are presented near rather than far from each other on the page or screen.

vi. Temporal Contiguity Principle – People learn better when corresponding words and pictures are presented simultaneously rather than successively.
vii. Segmenting Principle – People learn better from a multimedia lesson presented in user-paced segments rather than as a continuous unit.
viii. Pre-training Principle – People learn better from a multimedia lesson when they know the names and characteristics of the main concepts.
ix. Modality Principle – People learn better from graphics and narrations than from animation and on-screen text.
x. Personalization Principle – People learn better from multimedia lessons when words are in conversational style rather than formal style.
xi. Voice Principle – People learn better when the narration in multimedia lessons is spoken in a friendly human voice rather than a machine voice.
xii. Image Principle – People do not necessarily learn better from a multimedia lesson when the speaker's image is added to the screen.

Generally, all the principles suggested by Mayer (2009) are applied during the design and development of the Multimedia App. However, the researcher will emphasize on Personalization Principle developed by Moreno and Mayer (2004), where its effects are investigated in this research.

D. Personalization Principle

The Personalization Principle, developed by Moreno and Mayer (2004), is the main principle underpinning this study and it has been used to investigate the effectiveness of this principle in increasing knowledge and awareness towards cyber-bullying among adolescents. Personalization Principle states that when instructional messages are presented in a conversational rather than formal style, deeper learning will occur. The theory suggests that as a result of a conversational style language being used, feelings of presence are elicited and these feelings facilitate deeper learning (Moreno and Mayer, 2004). This principle also emphasis that learning materials should be written in conversational style that addresses the learner directly as "you" instead of in a formal style that is in the "objective third person" (Moreno and Mayer, 2004). Below are examples on how narration in conversational style has been used in a few screens of the Multimedia App:

i. If you would like to know, all the actions mentioned just now are Cyber-bullying! If you would like to know more about cyber-bullying, please click "Enter"
ii. Guys, say "No!" to cyber-bullying. Let's follow this simple guide to overcome cyber-bullying.
iii. Remember! If you are a victim of cyber-bullying, follow the three most important steps immediately: Stop, Block and Tell!

E. Design Guidelines for Teenagers

Loranger and Nielsen (2005) had conducted empirical usability studies with real adolescents to determine specifics on how websites can be improved to match their abilities and preferences. From the studies, they outlined 61 design guidelines to effectively construct websites for teenagers. Even though these guidelines are developed for constructing websites, they are also suitable to be applied for designing Multimedia App, particularly for adolescents. They are five categories of design guidelines for teenagers applied in this study namely (i) visual design, (ii) interaction design, (iii) multimedia, (iv) navigation and (v) writing.

F. Constructivist Learning Environments (CLEs)

Constructivist Learning Environments (CLEs) was suggested by Jonassen (1999). This environment is based on problem-based learning whereby the learners need to solve the problem by exploring all knowledge components such as related cases, information resources, cognitive tools, conversation as well as collaborative tools and social contextual support. This form of design is the strategy that supports student achievement (Jonassen, 1999). In this study, five out of six components of CLEs have been adapted to ensure that this Multimedia App will foster the problem-solving and conceptual development of the learners.

Conclusion

This paper discusses the theoretical framework in designing and developing a multimedia app intended to increase knowledge and perceived awareness towards cyber-bullying among adolescents. As number of cyber-bullying cases is increasing from day-to-day (Rivers and Noret, 2010), it is crucial for the adolescents to be given ample knowledge and awareness regarding what is cyber-bullying and the method through which cyber-bullying is conducted, the dangers of cyber-bullying, steps to handle cyber-bullying and ways to curb the growth of cyber-bullying. Other than the conventional methods and the involvement of parents, schools and the society in curtailing this problem, the initiatives that could be taken include developing a Multimedia App on tablets that would be able to assist adolescents in increasing their knowledge and awareness on cyber-bullying. Development of an interactive Multimedia App that comes with attractive graphics, audio and animation have great potential in attracting the interest of adolescents in gaining a deeper understanding of this issue.

In order to design and develop the multimedia app, a theoretical framework is needed as it will act as a guideline throughout the process. In this framework, Persuasive Design Principles serve as the macro strategy while Cognitive Theory of Multimedia Learning (CTML) and Design Guidelines for Teenagers act as the micro strategies for this study. The study also utilizes the Constructivist Learning Environment (CLEs) which was established by Jonassen (1999). Personalization Principle is another major principle being integrated in this research. It is hoped that all theories, principles and guidelines integrated in this framework will form a clear pathway for the design and development of the multimedia app that has the ability to increase knowledge and perceived awareness towards cyber-bullying among adolescents.

References

Beale, A. V., & Hall, K. R. (2007). Cyberbullying: What school administrators (and parents) can do.*The Clearing House: A Journal of Educational Strategies, Issues and Ideas, 81*(1), 8-12.

Chen, C. J., Toh, S. C., & Wan, M. F. (2005).*The Design, Development and Evaluation of a Virtual Reality (VR)-Based Learning Environment: Its Efficacy in Novice Car Driver Instruction.* Paper presented at the World Conference on Educational Multimedia, Hypermedia and Telecommunications.

CyberSAFE in Schools 2013 Survey. (2013).

Diamanduros, T., Downs, E., & Jenkins, S. J. (2008).The role of school psychologists in the assessment, prevention, and intervention of cyberbullying.*Psychology in the Schools, 45*(8), 693-704.

Fogg, B. J. (2003). *Persuasive technology [electronic resource] : using computers to change what we think and do / B.J. Fogg*: Amsterdam ; Boston : Morgan Kaufmann Publishers, c2003.

Gibbons, A. S., &Fairweather, P. G. (1998).*Computer-based instruction: Design and development*: Educational Technology.

Ijsselsteijn, W., Kort, Y., Midden, C., Eggen, B., Hoven, E., Lucero, A., et al. (2006). Persuasive Technologies in Education: Improving Motivation to Read and Write for Children (pp. 142).

Jonassen, D. (1999). Designing constructivist learning environments.*Instructional design theories and models: A new paradigm of instructional theory, 2*, 215-239.

Keith, S., & Martin, M. E. (2005). Cyber-Bullying: Creating a Culture of Respect in a Cyber world. *Reclaiming Children & Youth, 13*(4).

Loranger, H., & Nielsen, J. (2005).*Teenagers on the Web: Usability Guidelines for Creating Compelling Websites for Teens*: Nielsen Norman Group.

Mayer, R. E. (2009). *Multimedia learning*: Cambridge university press.

Moreno, R., & Mayer, R. E. (2004).Personalized messages that promote science learning in virtual environments.*Journal of Educational Psychology, 96*(1), 165.

Patchin, J. W., &Hinduja, S. (2006). Bullies move beyond the schoolyard a preliminary look at cyberbullying. *Youth violence and juvenile justice, 4*(2), 148-169.

Patchin, J. W., &Hinduja, S. (2012). An Update and Synthesis of the Research.*Cyberbullying prevention and response: Expert perspectives*, 13.

Rivers, I., &Noret, N. (2010). 'I h8 u': findings from a five-year study of text and email bullying. *British Educational Research Journal, 36*(4), 643-671.

Smith, P. K., Mahdavi, J., Carvalho, M., Fisher, S., Russell, S., &Tippett, N. (2008). Cyberbullying: Its nature and impact in secondary school pupils. *Journal of Child Psychology and Psychiatry, 49*(4), 376-385.

Upadhyay, M. A., Jesudass, M. J. J., &Chitale, M. P. (2014).Impact of Electronic Gadgets.*International Journal of Emerging Trends in Science and Technology, 1*(09).

Van Patten, J., Chao, C.-I., &Reigeluth, C. M. (1986).A review of strategies for sequencing and synthesizing instruction.*Review of educational research, 56*(4), 437-471.

Wahab, N. A., &Yahaya, W. A. J. W. (2012).*A Preliminary Investigation: Feasibility of Web-Based Multimedia Learning (WBML) in Raising Awareness of Cyber Bullying.* Paper presented at the Proceeding of the Post Graduate National Mini Conference, Sungai Petani, Kedah.

Willard, N. E. (2007). *Cyber-safe kids, cyber-savvy teens : helping young people learn to use the internet safely and responsibly*: San Francisco, Calif. : Jossey-Bass, c2007 (Norwood, Mass. : Books24x7.com [generator]).

Wolak, J., Mitchell, K. J., &Finkelhor, D. (2007). Does online harassment constitute bullying? An exploration of online harassment by known peers and online-only contacts.*J Adolesc Health, 41*(6 Suppl 1), S51-58.