

Design of Frog Virtual Learning Environment (Frog VLE) Aesthetics Model for Malaysia Primary Schools

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Abstract

Virtual Learning Environment (VLE) is used to enhanced teaching and learning in Malaysia government public schools since 2012. Frog VLE has been used as a teaching and learning cloud-based internet platform in government schools which means that can be accessed anywhere and anytime. Currently main criteria for evaluating Frog VLE e-learning platform have focused on usability and acceptance. The sensory dimension of e-learning platforms is non-existent enough due to the rapid emerge the ideals of 'hyper-functionalism' nowadays. Therefore, in order to accommodate to future needs the focus on e-learning platforms need an aesthetic perspective instead of mainly addressing usability and function. So, there is need to produce the pleasurable design and aesthetic model of e-learning platform in order to increase the usage of the Frog VLE for teachers. This paper presented a research model for designing an aesthetic e-learning platform for Frog VLE.

Keywords: Frog VLE; Virtual learning environment; aesthetics

1. Introduction

E-learning systems, or Virtual Learning Environment (VLE) are rapidly becoming an integral part of the teaching and learning process [1]. VLE is an integrated course delivery systems that provide an environment for the management for delivery and assessment for the students studying via Web. Furthermore it enables improvements in communication efficiency, both between student and teacher, as well as among students [2]. A VLE is a web-based communication platform that allows students, without limitation of time and space, to access different learning tools, such as program information, course content, teacher assistance, discussion board, document sharing systems and learning resources [2].

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Frog Virtual Learning Environment (Frog VLE) is used to enhanced teaching and learning in Malaysia government public schools since 2012. Frog VLE has become the main mechanism in supporting on-line education in primary and secondary schools in Malaysia [3]. Thus, Frog VLE was introduced by Malaysia's Ministry of Education (MoE) [4] as a tool to support student's learning which evolved from the 1Bestari Net Project.

While many studies have been conducted on teachers' adoption and acceptance of e-learning system, only a few research has been done on teachers' aesthetic perception on e-learning [26]. Thus, in order to accommodate to future needs the focus on e-learning platforms need another perspective view, aesthetic perspective, instead of mainly addressing usability and function. In fact, the aesthetics also need to produce the pleasurable design and aesthetic model of e-learning platform in order to increase the usage of the Frog VLE for teachers.

The paper focuses on the research model will be as useful inputs for future researcher in MoE and software designer for improve the quality of Frog VLE in the development of an interface that both support learning activities. In circumstance, the finding can be also help to create higher degree of aesthetic awareness regarding the aesthetic factors that determine the teachers' willingness to use Frog VLE

2. Previous Study

In spite of the initiatives taken, some doubts have surfaced. The Audit-General's 2013 report [5] has shown that the implementation of virtual learning using Frog VLE among schools in Malaysia is less than 5%. Furthermore, according to The Sun Daily [6] reported that teachers are crying foul over the physical and mental pressure they are subjected to under the 1Bestari Net Project.

Frog VLE implementation by teachers is surrounded by several factors that Ministry of Education (MoE) should consider to ensure successful implementations. The reviews of the literature revealed some of the Frog VLE barriers by several researchers. Those factors would be considered as indicators that represent success factors if tackled properly. At the same time, they would be considered as obstacles or barriers that hinder in implementation. To close the gap in the literature about the Frog VLE implementation and in response to increasing use of the concept, these factors include:

- Not realize the benefits [7]
- Insufficient of teaching time and heavy workload [6,8]
- Lack of technology facilities [9, 10]
- Limited access to Internet [8, 11]

- Low English proficiency [11]
- Lack of class management control [11]

Due to the problems mentioned above, in the domain of the Frog VLE technology acceptance, lots of issues of acceptance have long grabbed the attention of researchers in Malaysia had been widely used to discover the factors of low usage of Frog VLE. However, the potential impacts of visual aesthetics are often ignored by instructional designers; in addition, they assume emotional or aesthetic design as trivial task [12]. This statement is supported by Sanchez Franco et al. [13] as they later stated that in their work that visually pleasing design is traditionally neglected by scholars in electronically-supported learning domain. This also implies that visual aesthetics is seldom taken into account when building a web-based educational platform. It is crucial and proven that visual aesthetics helps to interest users, promote further browsing, encourage the revisit of users and improve task performance [14].

3. Method

Literature review on Stimuli-Organism-Response (S-O-R) theory, based on the assumption that environmental cues influence people's cognitive or emotion, which subsequently influence their behaviours has been widely applied to examine how environmental factors influence users' responses. There are numerous of research on the influence of product aesthetic on consumer behaviour has been conducted on based on Stimulus-Organism-Response or S-O-R Model. This model introduced by Russell in 1979. Then, Russel collaborates with Mehrabian [15] and initiated Pleasure, Arousal Dominance (PAD) and emotional state model SOR suggest that human being responds in accordance with different stimuli. The stimulus indicates that the characteristics or interactive design, layout, colour, graphic and others characteristics of the website. The organism indicates that the emotional dimension of the users toward the website. On the other hand, the response indicates the users' satisfaction or dissatisfaction with experience of approach or avoidance toward the website.

There are five models performed review and analyses by using the comparative analysis and deduction methods. Thus, our analysis is narrowed down into two categories, components and elements as showed in Table 1 and Table 2. Table 1 showed that the summary of components that applied in previous researchers from the five S-O-R models. From Table 1 shows that three main components, the aesthetic design, emotion and behaviour intention indicated the high degree as the main component in aesthetic perception model.

Table 1 Summary of components that applied in previous researchers from the five S-O-R models

	Authors	Chang et al. (2014)	Lin & Chen (2014)	Wang et al. (2011)	Koo & Ju (2010)	Deng & Poole (2010)	Total N=7
Dimensions							
<i>Aesthetic Design</i>	Website	√	√	√	√	√	5
<i>Emotion</i>	Pleasure	√	√		√	√	5
	Arousal	√	√	√	√	√	
<i>Aesthetic Perception</i>	Classical/Simplicity	√	√	√		√	4
	Expressive/Diversity	√	√	√			3
<i>Behaviour Intention</i>		√	√		√	√	6
<i>Satisfaction</i>			√	√		√	4

Apart from components, meta-analysis and keyword mapping on the elements in aesthetic relevant articles is carried out to study the important elements needed for a holistic framework of aesthetic Frog VLE. After revised all the 10 existing articles, there are five high frequency of visual elements are identified, the layout, colour, typography, text and graphic. Table 2 showed that the summary and frequency of elements that applied in previous researchers.

Table 2 Summary of elements that applied in previous researchers

	Authors	Naim & Ibrahim (2014)	Lavie & Tractinsky (2004)	Moshagen & Thielsch (2013)	Fogg et al. (2003)	Hancock (2004)	Adline & Mahalakshmi (2011)	Liu & Ma (2010)	Lin (2013)	Lee & Koubek (2010)	Deng & Poole (2012)	Total N=10
Visual Elements												
<i>Layout</i>		√		√	√	√	√	√	√	√	√	9
<i>Colour</i>		√		√	√	√	√	√	√	√	√	9
<i>Typograph</i>		√	√	√	√	√		√	√	√	√	9
<i>Text (Font)</i>			√	√	√	√	√	√	√	√	√	9
<i>Graphic</i>			√	√			√	√	√	√	√	7
<i>Visual Complexity</i>		√		√								2
<i>Engage</i>							√					1
<i>Credibility</i>					√							1
<i>Craftmanship</i>		√		√								2
<i>Ease of use</i>						√						1

Based on the findings and comments of Table 1 and Table 2, the integration of aesthetic dimension from SOR model and visual design elements are proposed to be considered in facilitating the understanding of pleasurable design of Frog VLE in Malaysia primary schools. Further, a preliminary study has been done involving 10 working in a primary school to help confirm the relevancy of the aesthetic dimension and visual design elements in the context of Malaysian primary school.

4. Result and Discussion

Subsequently, from the components and elements highlighted, therefore we propose a conceptual model for designing an aesthetic e-learning platform for Frog VLE as showed in Figure 1. The proposed conceptual model derived from a consideration of integrated model of Stimulus-Organism-Response (SOR) model aesthetic perspective. The model highlights two dimensions of Frog VLE aesthetic bearing important aspects in the decision to use Frog VLE. These two dimensions are stimulus and organism. Each dimension comprises several aesthetic factors reflecting the dimension. The first dimension is stimulus consisting visual design elements and visual aesthetic-simplicity. The second dimension is organism which is reflected by teacher pleasure emotional state when he/she using the Frog VLE.

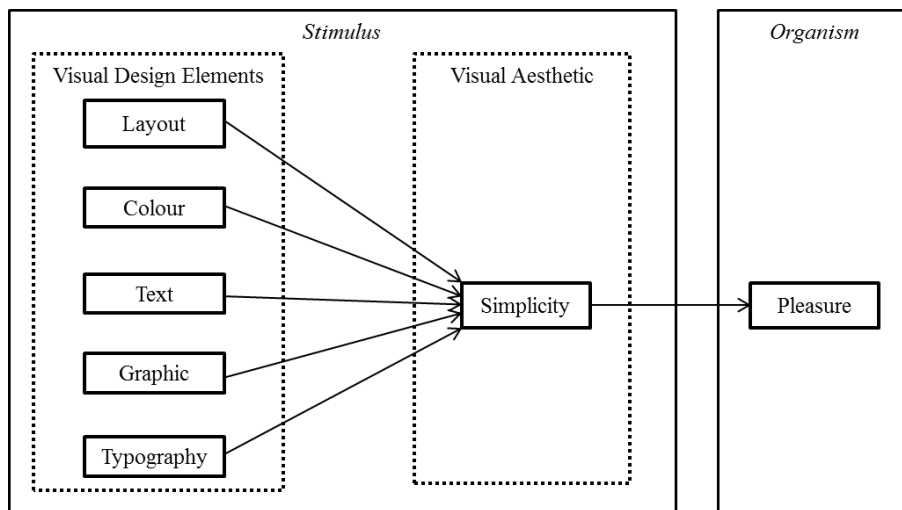


Figure 1 Proposed conceptual model of an aesthetic

The main components in this research model are visual design elements, visual aesthetic and pleasure emotion. On the other hand, the main elements to be measures are layout, colour, text, graphic, and typography. According to SOR model as discussed, the visual

design elements and visual aesthetic are the two dimension categories in 'stimulus' dimension. On the other hand, the pleasure is categories in 'organism' dimension.

a. Stimulus

i) *Visual Design Elements*

Aesthetic or visual design was always the first impression influence the user perceptions. First, a good and consistency layout, font choice, colour and positioning items is crucial in designing a aesthetic course material in e-learning. Furthermore, Hancock [16] pointed out that the standard consideration such as item alignment and placement, image usage, colour choice and usage as well as font size and type are vital in judge the visual complexity. A part from that, Reinecke et al. [17] urged that visual complexity have been confirmed and identified as the most noticeable design characteristics at first sight by several researchers. In addition, Then, Reinecke et al. [17] pointed out that research had been found that the level of perceived visual complexity can be approximated with a calculation of percentage of space taken by text and image based on the calculation of texture. Therefore, from the facts as we mentioned above, the visual complexity encompassed with text, graphic and typography. Meanwhile the layout and colour are the main standard or criteria in judging the aesthetic of the Frog VLE. Furthermore, many scholars had resulted in web users becoming more particular than ever. It takes a comprehensive combination of elements to create a high quality site, and users are looking for not just information, but also an attractive and aesthetically pleasing web page. A good Frog VLE site interface can provide users with something they need, but also offers incentive for return visits and use it. The lists of elements are layout, colour, text, graphic and typography.

ii) *Visual Aesthetic - Simplicity*

From the judgment of aesthetic design, we come to the aesthetic perception by the users. Moshagen and Thielsch [18] had developed a new measure covering broader aspects of perceived interface aesthetics. Eventually, he found that the facet 'simplicity' is strongly correlated to the 'classical aesthetics' and the facet 'diversity' is strongly correlated to the dimension 'expressive aesthetics' from Lavie and Tractinsky [20]. The simplicity facet as conceptualized in the VisAWI [19] defines as the important aspects that facilitate perception and the processing of a layout, such as clarity, homogeneity and orderliness [18]. According to Yong et al. [25], they pointed out that web-based educational platform that is has simple but aesthetic appearance to attract users' attention, encourage further exploration and impact users' leaning experience positively will be developed.

b. Organism

Pleasure Emotion as Visual Aesthetic Perception

Pleasure is main components in this dimension. Lin et al. [21] urged that aesthetic design on neither product nor website can affect the emotion through sensory of 'pleasure'.

Researcher Bloch et al. [22] argued that the pleasant dimension seems to correspond more to levels of classical aesthetics, respectively, on the other hand, the arousal dimension corresponds more to levels of expressive aesthetics. In addition, Tzou and Lu [23] found that aesthetic facet is the vital determinant to acceptance intention for the fashion technology product. Previous studies on the online store, Eroglu et al. [24] showed that emotional states play an intervening role in shopper's attitude, satisfaction, and various approach/avoidance behaviors. Therefore, we found that the emotional states are the crucial determinant to acceptance intention for a product or website.

5. Limitation

There are a number of limitations found in this study. The main issue limitation is the time constraint. This study was conducted within in a short period of time. Hence, it is a challenge in gathering more information through the literature review from the previous researches. This is because completed review all the content of a literature need spend more of the time. In addition, after reviewed each literatures, we do need spend other time to analysis and judge the content usability.

6. Conclusion

The findings of this study can be benefit to MoE since they invested huge expenditure in this project. By using this model, we can identify and weight the potential values (feedback from teacher) in the context of aesthetic of the Frog VLE in Kuala Lumpur. Furthermore, this research model will be as useful inputs for future researcher in MoE and software designer for improve the quality of Frog VLE in the development of an interface that both support learning activities. In eventually, this finding can be help to create higher degree of aesthetic awareness regarding the aesthetic factors that determine the teachers' willingness to use Frog VLE.

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References

- [1] K.A.Pituch, & Y-K Lee, "The influence of the system characteristics on the e-learning use," *Computer & Education*, 47, pp 222-224, 2006.
- [2] L.L. Martins, & F.W. Kellermanns, "A model of business school students' acceptance of a web-based course management system," *Academy of Management Learning and Education*, 3, pp 7-26, 2004.

- [3] I. Mamat, A. S. M. Yusoff, W.S.W. Abdullah, , and F.Z.A Razak, "Factors Contributing Pre-School Trainee Teachers Adoption of Virtual Learning Enviroment: Malaysia Evidence," *Journal of Education Technology*, Thu Turkish Online, 14(2), 2015.
- [4] Ministry of Education (MoE). 1BestariNet Kementerian Pendidikan Malaysia. Retrieved on April 28, 2016, from <http://1bestari.net>.
- [5] National Audit Department, "Audit General's Report for the year 2013: Series 3," *National Audit Department: Malaysia*. 2014.
- [6] The Sun Daily, "Teachers cry foul over the cloud-based learning platform," (2015 October 5). The Sun Daily. 2015.
- [7] N. H. Hussin, J. Jaafar, and A. G. Downe, "Assessing Educator's Acceptance of Virtual Reality (VR) in the classroom Using the Unified Theory of Acceptance and Use of Technology (UTAUT)," *A Journal of Computer and Information Sciences*, 7006, pp 216-225, 2011.
- [8] Norazilawati A. , Noraini M. N. & Nik A. Y., " Aplikasi Persekitaran Pengajaran Maya (FROG VLE) Dalam Kalangan Guru Sains," *Jurnal Pendidikan Sains & atematik Malaysia*, 3(2), pp 63-75, 2013.
- [9] S. N. Sailin, "Barrier influencing teacher's technology in their practice," *Journal of Basic and Applied Sciences*, 8(23), 352-358. AENSI, 2014.
- [10] Mumtaz, Shazia, "Factors affecting teachers' use of information and communications technology: a review of the literature. Technology," *Pedagogy and Education*, 9(3): pp 319-342, 2000.
- [11] M. L. Cheok, & S. L. Wong, "Predictors of e-learning satisfaction in teaching and learning for school teachers: A literature review," *International Journal of Instruction*, 8(1), pp 75-90, 2015.
- [12] C. Miller, "Aesthetics and e-assessment: the interplay of emotional design and learner performance." *Distance Education*, 32(3), pp 307-337, 2011.
- [13] Sánchez-Franco, M. J., Peral-Peral, B., & Villarejo-Ramos, Á. F., "Users' intrinsic and extrinsic drivers to use a web-based educational environment," *Computers & Education*, 74, pp 81-97, 2014.
- [14] W. S. Ng, & 吳永水, "Critical design factors of developing a high-quality educational website: Perspectives of pre-service teachers," *MIT Journal Publication*. ISDN :1547-5840, 2014.
- [15] J. A. Russell, & A. Mehrabian, "Evidence for a three-factor theory of emotions," *Journal of research in Personality*, 11(3), 273-294, 1977.
- [16] D. J. Hancock, "Improving the environment in distance learning courses through the application of aesthetic principles," 2004.
- [17] K. Reinecke, T. Yeh, L. Miratrix, R. Mardiko, Y. Zhao, J. Liu, & K. Z. Gajos, "Predicting users' first impressions of website aesthetics with a quantification of perceived visual complexity and colorfulness," *In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 2049- 2058). ACM, 2013.

- [18] M. Moshagen, & M. T. Thielsch, "Facets of visual aesthetic," *International Journal of Human-Computer Studies*, 68(10), pp 689-709, 2010.
- [19] Moshagen, M., & Thielsch, M., "A short version of the visual aesthetics of websites inventory," *Behaviour & Information Technology*, 32(12), 1305-1311, 2013.
- [20] T. Lavie, & N. Tractinsky, "Assessing dimensions of perceived visual aesthetics of web sites," *International journal of human-computer studies*, 60(3), 269-298, 2014.
- [21] Y. C. Lin, & M. H. Chen, "Effect of Website Aesthetics on Approach Intention," *Journal of e-Business*, 16(1), 107-125, 2014.
- [22] P. H. Bloch, "Seeking the ideal form: Product design and consumer response," *The Journal of Marketing*, pp 16-29, 1995.
- [23] R. C. Tzou, & H. P. Lu, "Exploring the emotional, aesthetic, and ergonomic facets of innovative product on fashion technology acceptance model," *Behaviour & Information Technology*, 28(4), 311-322, 2009.
- [24] S. A. Eroglu, K. A. Machleit, & L. M. Davis, "Empirical testing of a model of online store atmospherics and shopper responses," *Psychology & Marketing*, 20(2), 139-150, 2003.
- [25] Y. P. Yong, A. H. Jantan, R. H. Abdullah, & A. Kamaruddin, "A theoretical framework of aesthetic design for a better learning experience on the web-based educational platform," *In Software Engineering Conference (MySEC), 2015 9th Malaysian* (pp. 64-69). IEEE, 2015.
- [26] Stenalt, M. H., & Godsk, M., The pleasure of e-learning: Towards aesthetic e-learning platforms. In *Proceedings of the 12th International Conference of European University Information Systems* (pp. 210-212), 2006.