Chapter 20

The Impact of Visual Complexity on Children’s Learning Websites in Relation to Aesthetic Preference and Learning Motivation

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ABSTRACT

Websites in addition to being usable must also be pleasurable to look at. However, although much research has been conducted into usability, subjective issues have been far less explored. The purpose of this research is to look at the relationship between visual complexity, aesthetics, and learning motivation in children’s learning websites. An experiment was set up that involved 132 11-12 year-old children using homepages taken from Websites designed for children as test materials. In the experiment, the children were randomly assigned into 3 groups and given a different visual complexity Website according to their group. The Websites given were: homepage with a low degree of visual complexity; homepage with a moderate degree of visual complexity; and homepage with a high degree of visual complexity. This study is guided by Berlyne’s experimental theory, which suggests that there is an inverted-U shaped relationship between preference for a stimulus and its complexity. The study applies his theory and aims to understand the relationship between visual complexity, aesthetic preference, and learning motivation. The findings show that children prefer aesthetics of a medium level of perceived complexity, supporting Berlyne’s theory. It also shows that children’s aesthetic preferences and learning motivation are correlated. The findings have implications for Web designers working on children’s Websites as they suggest that by manipulating visual complexity viewing pleasure can be enhanced or depreciated.

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1. INTRODUCTION
In recent years, the use of the World Wide Web (WWW) as a resource for learning has increased. As the Internet keeps expanding, it is becoming increasingly important for educational organizations that host websites deliver a good user experience for people. Although much research has been conducted in this area with respect to usability (Lindgaard, Fernandes, Dudek, & Brown, 2006), many subjective aspects have, until recently, been neglected. One subjective aspect which has started to receive attention is that of visual appearance. Research conducted in this area includes studies into: first impressions (Lindgaard et al., 2006); the prototype related to first impressions (Tuch, Presslaber, Stocklin, Opwisa, & Bargas-Avila, 2012); and the importance of aesthetics with respect to mode of use (Schaik & Ling, 2009). Although much of this research is still in its infancy, there does seem to be evidence that visual aesthetics critically affect how a user perceives a website in terms of interaction enjoyment (Van de Heijden, 2003; Schenkman & Jönsson, 2000).

One of those factors which severely influence visual aesthetic preference is visual complexity. Its impact on aesthetic preference is very well documented in numerous publications (Pandir & Knight, 2006; Tuch, Bargas-Avila, & Opwis, 2010; Michailidou, Harper, & Bechhofer, 2008), but knowledge about the influence of visual complexity on children’s learning websites, and their aesthetic preference, is limited. Another point that needs clarification is whether there is any correlation between aesthetic preference and learning motivation.

The importance of affective variables was already well recognised as factors influence learning motivation and achievement (Dweck, Mangels, & Good, 2004; Hidi, 2006). Aesthetic preference was acknowledged to be one of the critical affective variables that influence people’s emotions and feelings. There are studies on learning motivation, primarily covering topics such as interest (e.g. Bergin, 1999; Pintrich, 2003), self-efficacy (e.g. Hidi & Renninger, 2006; Gaffney, 2011), and self-determination (e.g., Deci & Ryan, 1985; Deci, Koestner, & Ryan, 1999). Nevertheless, studies investigating aesthetic preference with respect to learning motivation are rare. Thus, it is important that researchers and practitioners examine possible interactions between aesthetic variables and learning motivation. In this study, we therefore investigate the effect of visual complexity on learning website aesthetics in relation to learning motivation.

1.1. Visual Complexity
Psychologist Berlyne (1974) made an important theory contribution to experimental aesthetics. According to Berlyne’s theory, aesthetics relates to a number of so-called ‘collative variables’, where each person’s pleasure is related to the arousal potential of a stimulus. This relationship is linked to the Wundt (inverted-U shape) curve for pleasure, with a linearly increasing line for the arousal potential of a stimulus (see Figure 1). One prediction of the model is that medium levels of stimulus would be preferred, whereas stimuli with low and high arousal potentials are less pleasant. In line with his theory, arousal potential is linked to collative properties such as complexity, novelty, and hedonic value. These are the most important predictors for visual aesthetic preference. Among those properties, visual complexity plays a crucial role in the perceived aesthetic preference (Tuch et al., 2010).

A number of experiments have been conducted with respect to users’ preference and perceived visual complexity. However, the experimental support for this inverted U-curve relationship is mixed. In a study of children’s aesthetic preferences for websites, Wang and Bowerman (2012) showed that children preferred both classical and expressive aesthetics of a medium level of perceived visual complexity, supporting Berlyne’s theory. A similar result was