University of Victoria - Fall 2021
CSC497 Literature Review
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# CSC 497 Interdisciplinary Project Literature Review

## 1. Introduction

This research will focus on whether personality traits play the role of the interaction of user and digital interface. We are going to add personality traits features to e-book reading. The case study has chosen Kindle as the software to do the research, and add a personality traits feature on the iOS version. The research will take the Big-Five personality test as a reference, allowing users to conduct self-questionnaire on their own personality. The system will provide a personalized reading mode based on user's result. The personalized reading mode includes the color, layout, and functional usability when users read the e-book. The propose is to investigate whether personality traits feature can improve user's satisfaction of reading e-book by kindle. This literature review will go through the previous study about the relationship among personality, color, layout, navigation, and commenting feature.

## 2. Color

**Color Hue and Personality**

Experimental evidence from F. Birren's claims stated that introverts prefer "cool" (green-blue) colors, while extraverts prefer "warm" (yellow-red) colors (Birren, 1956; 1961; 1963). Extraverts to prefer warm color more than Introverts (Choungourian, 1967). The extraverts tend to choose brighter color, and introverts choose lighter color (Rider, 2010). The extraverts prefer a higher contrast and introverts prefer a desaturated color (Karsvall, 2002). A personality and color relationship table from the research by Honaker in 2001:

Honaker (2001). Page 4b

Table 2.5 (converted from image above for easier reading but lacks the connecting arrows.)

| True Colors Personality Types | MBTI Dichotomous Functions | SII General Occupational Themes | CISS Orientation Scales |
|---|---|---|---|
| **Blue** Focus on harmonious relationships; compassionate; authentic; warm communicative. | **Feeling** Value based decision-making with a consideration for the consequences on others. | **Social** Prefer working with individuals and groups; helping, caring, and nurturing others; teaching; solves problems through feelings and interaction with others. | **Helping** Aiding others through teaching, healing, and counseling; value compassion, interpersonal hannony; nurturing and enjoy solving human problems; giving service to others. |
| **Green** Curious; seeking; inventive; theoretical; complex; philosophical; principled; rational, | **Thinking** Logical-based decision-making with inquiry; consideration for fairness; cause and effect | **Investigative** Prefer academic/scientific ideas, data, things, working alone; gathering/analyzing new data and theories; value curiosity | **Analyzing** Analyzing data using mathematics and carrying out scientific experiments |
| **Gold** Organized; conventional; orderly; procedural; practical; responsible; tradition; loyal. | **Judging** Prefer to plan ahead to avoid stresses/changes at the last minute; Organized, | **Conventional** Prefer organizing, detail, accuracy math, data, management, work well in corporations; value stability, | **Organizing** Organizing the work of others; managing and monitoring financial performance. |
| **Orange** Active; realistic; daring; spontaneous; opportunistic. | **Perceiving** A high value for spontaneity; open and adaptable to change. | **Realistic** Prefer outdoors and working with tools; prefer action concrete problems; higher risk-taking; value Tradition, common sense. | **Producing** Like to produce products using hands-on skills in farming, gardening, construction and mechanical crafts. |
| | **Sensing** Focusing mainly on what can be perceived; by the five senses; attending to facts that are observable. | **Enterprising** Prefer persuading, managing, and selling; motivating and directing; value risk-taking, competition. | **Influencing** Like to make things happen; negotiate and debate take charge; direct others; set policies and Motivate. |
| | Intuition Focus on perceiving patterns and interrelationships; attend to meanings and possibilities, | **Artistic** Focus on self-expression, aesthetics, and art; creative; value originality, independence, imagination and beauty, | **Creative** Inventive, clever and imaginative; value self-expression and independence; designing, creative activities. |
| | **Extraversion** Directing energy mainly toward the outer world of people and objects. | | **Adventuring** Focus on activities involving risk-taking, teamwork; value physical challenges and competitive outlets. |
| | **Introversion** Directing energy mainly toward the inner world of experiences and ideas. | | |

Note: Excerpted from Keys to Personal Success, Lowry (1988), MBTI Manual (1998), sn Manual (1994), & CISS Manual (1992).

**Color invokes personality associations**

In the study of Wu and Lin in 2017, they discussed how color evokes personality associations, which is color-personality association (CPA) (Wu & Lin, 2017). They stated that a lighter color can evoke a deeper extrovert, moody, pleasant, broad interest or disorganized impression. Purer colors can evoke deeper impression of extraversion, moodiness, disorganization or wide range of interests. The most interesting thing was brightness seems to be more important than chroma for pleasant traits. In addition, the effect of hue mainly appears in the yellow area, and the results showed that when the hue of the yellow area changes from orange to yellow-green, the color will evoke a deeper introverted, calm, narrow interest or organized impression.

**Color Brightness**

In the study of Ferweda in 2016, he investigated a prediction of user's personality by using Instagram pictures The openness factor correlates negatively with the feature brightness, they prefer pictures with low brightness. Conscientiousness is a mix of saturated and unsaturated colors. Extraversion is low in brightness and a mix of saturated and unsaturated color. Agreeableness prefers few dark and bright areas. Neuroticism prefers high brightness (Ferwerda, *et al*., 2016).

## 3. Layout

**Distraction and Personality**

In the article of Arazy, Nov, and Kumar, they stated that people who are making a quantity judgment will influence by externally presented information when the information is available to them. The results showed that people who have higher emotional stability are not easily affected by social anchoring, which is basing one's attitude, value, and action on the positions taken by

others. UI should be adapted to present the social anchoring cues to people who have low emotional stability (Arazy, *et al.*, 2015).

Neurotic participants generally perform better on search tasks with visual interfaces. The highly neurotic participants were significantly more accurate. Overall, aggregating all four views and both question types (Alves *et al*., 2020).

**Font Family/ Font Size**

In the research of Arockiam and Selvaraj in 2013, they explored the interface design for E-learning based on personality traits. The results showed that students who are extravert personality do better on the design with Times New Roman font and blue color background (Arockiam & Selvaraj, 2013).

In the study of Sarsam and Samarraie in 2018, they concluded that using personality in the UI would have positive influences on user's perceptual attention by providing the necessary visual elements that facilitate their cognitive processing. Their eye movement experiment showed that when participants interact with the design of their profile, they extended to exhibit higher visual efficiency and greater visual comfort when they try to process and browse the content of the interface. Some design elements such as colors and fonts apparently played an important role in causing different levels of cognitive between participants in the two personality groups. This is because the preference for a particular font size affects the overall reading behavior of people interacting with the display. It can be said that participants' choice to read a certain size font has significantly affected their central question. This is observed from the changes in pupil diameter and gaze duration during the entire learning process. They also observed that when switching

between the two designs the Verdana and Arial fonts seemed to greatly contribute to the participants' eye movement control while reading (Sarsam & Samarraie, 2018).

**Sensing/Intuition Type personality in Layout**

In the study of Su *et al.* in 2013, they developed two interfaces, which was focusing on sensing/intuition and thinking/feeling pairs. Since the perception type prefers to see the difference between concepts and separate the process from the goal, the author designed a scrolling interface with a global view so that the perception type can build a complete mental model. In contrast, intuitive people associate processes with goals and see integration. Therefore, the author created a switching interface to reduce unnecessary searches. They prefer to look at things globally and may not be able to detect small changes. In contrast, intuitive user prompt areas show possible solutions because they learn from theory and may overthink when dealing with situations. The results show that in some critical situations, the reaction time is shortened and the number of errors is also reduced (Su *et al*., 2013).

In the field of education, Abrahamian *et al.* (2004) found that the interface designed based on the students' extrovert/introvert and sensory/intuitive characteristics came from MBTI, describing two of the four interface examples where students must learn a binary tree. The most significant difference is that while the introverted intuitive type can understand concepts presented in an implicit and unstructured way, the extroverted intuitive type prefers well-structured information displays (Abrahamian *et al.*, 2004).

**Depth-first and Breadth-first Strategy**

Kim *et al.* (2013b) also studied Extraversion/Introversion of using interfaces to provide depth-first or breadth-first structured learning. The depth-first strategy was designed for the

introverts because it uses a bottom-up approach, starting with low-level details and then continuing to teach more abstract concepts. In contrast, the breadth-first approach is to first establish a conceptual overview before getting into the details, because extroverted learners prefer the big picture before dealing with the details (Kim *et al.*, 2013).

## 4. Navigation

**Information Seeking and Solving in Personality**

In the study by Heinstrom in 2013, he found that extroverts are more purposeful in terms of information needs, and found that their search enthusiasm is high. They are found to actively use, share, and exchange information to the greatest extent, which are characteristics of high information seekers (Heinstrom, 2003). Extroverted students have enthusiastic, positive and confident personalities, which are characterized by quick problem-solving and social skills, which are reflected in their information search (Heinstrom, 2003), so they encounter fewer obstacles in the search process.

Another study by De Raad and Schouwenburg in 1996 showed that people who had a positive search motivation, use diverse methods when seeking information, and use the largest range of sources were found to be openness trait of personality. While extraverted students often obtained low grades,  students with high openness to experience were successful in their studies (De Raad and Schouwenburg, 1996). Therefore, as the open students are energetic and intellectual curiosity, they were found to be very satisfied with their information seeking and solved most of the obstacles on their way (Costae and McCrae, 1992; Heinstrom, 2003).

In the research of Halder, Roy, and Chakraborty in 2010, they stated that the quality of conscientiousness is very helpful for individuals seeking positive information. Highly responsible

people are found to be highly information seekers. Therefore, because of their responsibility, mechanicalness, and discipline (highly conscientious), they feel less obstructed when searching for information (Halder, *et al.*, 2010).

Agreeableness people are found to be easily acceptable and less egocentric. They are to be high on zeal for information seeking. Due to their motivations, they were found to be very diverse in search patterns and used the information obtained more frequently. They were found to use the most informative source. Because of their positive accepting nature, they feel that there are fewer obstacles on their way forward, so they are very satisfied with their information search mode (Halder, *et al.*, 2010).

Neuroticism trait of personality was found to be negatively correlated with all the dimensions of information seeking behaviour (Heinstrom, 2003). A person can control his emotional stability, calm, relaxed, or less neurotic, then the person can more satisfy with his information retrieval and he can solve most of the obstacles coming in his information searching process (Halder, *et al.*, 2010). Green and Fisher stated that people with more neurotic or trait-anxious personalities tend to be more attentive to problem-solving tasks up to a certain level of complexity (Green & Fisher, 2010).

**Sensing/Intuition Type personality in Navigation**

Cheng stated that cognitive style are neither constant nor unchangeable, especially perceptual style, which is affected by emotional components. The difference in information perception between sensing/intuition can fundamentally affect the interface design of information display (Cheng 1986). Sensing is identified as collect data through five senses, uses primarily inductive reasoning, focuses on details, learns experientially, sees the differences between two

concepts, is able to focus on and isolate component parts of system, disassociated process with goals, and knows something because she or he has seen or experienced it. Intuitive is identified as develops knowledge through deduction, prefers to view things globally, sees the similarities between two concepts, sees the connections and integration between parts of a system, learns theoretically, connects processes with goals, knows something (cognition) because it is a logical deduction or extension of a theory/concept. In the research of Su *et al.* in 2013, they designed two user interfaces for Sensing and Intuition participants. The results showed a complex system which needs amounts of theoretical and operating knowledge is hard to get familiar with it in a short time. In this situation, operating knowledge will influence more on response time than interface design. However, if a simpler system requires fewer actions and less familiarity with theories of operating knowledge, the interface design is much more important and a slight change could have a significant influence. The reason is that an inappropriate interface will force users to spend a considerable amount of time on unnecessary searching and handling (Su *et al.*, 2013).

## 5. Commenting Feature

**Commenting Behaviors and Personality**

Extroverts are motivated by goal-oriented and instrumental use of internet services such as sharing information and music (Amiel & Sargent, 2004; Tuten & Bosnjak, 2001). Online trolling behaviors found participants higher on extraversion were more likely to choose trolling as their favorite activity. Extroverts tend to use information and comments as a platform for expressing opinions and sharing knowledge and information. They may also use entertaining comments, especially humor, in discussions and debates with others. In addition, due to they are highly social,

extroverts may use social interaction comments to strengthen the connection with their friendship network.

Neuroticisms spend most of time on the Internet seeking to gain a sense of belong and social support (Hamburger & Ben-Artzi, 2000). Highly neurotic people do not tend to actively participate in online group discussions (for example, in forums), which may be due to the high level of anxiety and apprehension associated with this feature and the need to avoid criticism or confrontation from other community members (Amiel & Sargent ,year 2004). In addition, individuals high in neuroticism have been shown to use the Internet to gain a sense of belonging (Hamburger & Ben-Artzi, 2000) and to seek information and for educational purposes (Amichai-Hamburger & Ben-Artzi, 2003; Tuten & Bosnjak, 2001). This suggests that those who score high on neuroticism may seek novel and unusual information related to possible problems, perhaps to balance internal anxiety and insecurity (Amiel & Sargent, 2004). It can also be inferred that highly neurotic people may write informative comments (for example, asking questions) as a means of obtaining better information and gaining a sense of security.

Highly openness people use the Internet as a platform to gain new insight by tapping into the great variety of information and services online (Tuten & Bosnjak, 2001). Highly open individuals will first adopt changes in the user interface of new sites, and as long as the news site remains the same, they will be more likely to comment on the latest technological advances. Synchronize and use a modern interface. Some moderation may be attractive, as long as these people can still break socially acceptable boundaries (Barnes, *et al.*, 2017).

Agreeableness is characterized by sympathy, trust, cooperation, humility, and straightforwardness. Individuals with high agreeability tend to seek cooperation rather than

competition, and tend to avoid conflicts in social interactions (Tan & Yang, 2014). They are characterized by cooperation (McElroy *et al.*, 2007), strong community cohesion and a user-friendly interface facilitate online contributions, which may encourage them to participate in online communities (Jones, Ravid, and Rafaeli, 2004). In general, it can be said that although people with high affinity like to stay informed, they rarely participate in online political discussions, especially in forums where there is almost no anonymity, in order to avoid potential conflicts caused by criticism and disputes (Ha *et al.* , 2013).

Landers and Lounsbery (2006) found that although highly responsible people spend less time online, they are more willing to spend time online for academic pursuits or information sharing. It is found that conscientious bloggers talk more about daily activities, such as their work and time, which shows that they are motivated to write comments that record their lives and experiences. Based on the literature reviewed, it can be inferred that people with a high sense of responsibility may use informative comments, which will enable them to share knowledge and information and educate others, especially when knowledge sharing is related to work or study. In addition, they may tend to use it for social interaction comments (for example, to leave condolences or praise excellent work and personal achievements), because this is related to their reliable and disciplined nature (Gil *et al.*, 2009).

## 6. Summary

Extroverts are people who are always full of energy and enjoy engaging with the external world. They prefer warm colors and low brightness and a mix of saturated and unsaturated colors. They prefer the first establish a conceptual overview before getting into the details (Breadth-first Strategy). Extroverts as high information seekers are more purposeful in terms of information

needs. They are found to actively use, share, and exchange information to the greatest extent. Extroverts are motivated by goal-oriented and instrumental use of internet services such as sharing information and music. Extroverts tend to use information and comments as a platform for expressing opinions and sharing knowledge and information.

Openness people are imaginative, curious, and open-minded. Those kinds of people prefer to color with low brightness. They are energetic and intellectual curiosity, they are found to be very satisfied when they are seeking information and solved most of the obstacles on their way. Highly openness people use the Internet as a platform to gain new insight by tapping into the great variety of information and services online. Highly open individuals will first adopt changes in the user interface of new sites, and as long as the news site remains the same, they will be more likely to comment on the latest technological advances.

Agreeable people are friendly, warm, and always get along with others. They prefer the color between dark and bright. They are to be high on zeal for information seeking. They were found to be very diverse in search patterns and used the information obtained more frequently. They were found to use the most informative source. They rarely participate in online political discussions, especially in forums where there is almost no anonymity, in order to avoid potential conflicts caused by criticism and disputes.

Conscientious people are high level of self-discipline. They like to follow a plan and regulate their impulses. They prefer a mix of saturated and unsaturated colors. They are found to be highly information seekers. Because of their responsibility, mechanicalness, and discipline (highly conscientious), they feel less obstructed when searching for information. They are more willing to spend time online for academic pursuits or information sharing. they may tend to use it

for social interaction comments (for example, to leave condolences or praise excellent work and personal achievements), because this is related to their reliable and disciplined nature.

Neuroticism people are emotionally reactive. They will have an emotional response to events that would not affect most people. They prefer high brightness in color. They generally perform better on search tasks with visual interfaces. They are found to be negatively correlated with all the dimensions of information-seeking behavior. They tend to be more attentive to problem-solving tasks up to a certain level of complexity. Highly neurotic people do not tend to actively participate in online group discussions, such as in forums, which may be due to the high level of anxiety and apprehension associated with this feature and the need to avoid criticism or confrontation from other community members.

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