CPTS 543 Assignment 1

Critical Review of Applying the Norman 1986 User-Centered Model to post-WIMP UIs

Yang Zhang

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Summary. This paper talks about the relationship between cognitive theories and user behaviors and how users affected by specific types of user interfaces (UIs) that applied cognitive theories. Moreover, the paper argues that those cognitive theories may be informed and updated from applying them in HCI area. To illustrate and explain this theory, the authors of this paper apply Norman (1986) model of interaction to exam post-WIMP (windows, icons, menus, pointer) UIs. In the end, the authors want to provide readers a better understanding of post-WIMP UIs and how it contributes to relevant theory in HCI.

From the result of empirically exploration, the authors confirm that the proliferation of post-WIMP UIs offers new chances to use the enhance older theories. In particularly, the applications of Norman model (1986) in the past focused on the interplay between the UI and mental representation of the UI, while it focused on the influence of the UI on mental representation of the task. Finally, the paper concluded that Norman model is a good framework to exam and design post-WIMP UIs and underlying cognitive process, and having a better understanding of cognitive structures and interactions is important in designing UIs with high performance.

Critical Review. The paper is written and published by the following 7 people: G. Michael Poor, an assistant professor at Baylor University in the Computer Science department and mainly focused on issues in human-computer interaction. Samuel D. Jaffee and Laura Marie Leventhal, they are professors at Bowling Green State University in the Psychology and Computer Science department. Jordan Ringenberg, an assistant professor at University of Findlay in the Computer Science department. Dale S. Klopfer and Guy Zimmerman, they are professors at Bowling Green State University in the Psychology and Computer Science department. Brandi A. Klein, professor from Missouri University of Science and Technology in Psychological Science Department.

This paper showed its strength successfully. Firstly, the authors provide the introduction and overview of Norman's model (1986) before talking about the later sections that uses this concept. By doing so, readers who are lack of related experiences and background knowledge would follow the idea of this paper smoothly. Secondly, the paper express its main idea and theory in proper steps with detail. The authors firstly rise their argument by making hypotheses from applying Norman model. Then, the authors test the hypotheses in theoretical manner. Lastly, the authors formed an empirically experiment to further test their theory. Moreover, the authors showed widely research scope in their analyses by quoting support evidence from a large amount of academic papers, which make their argument stronger.

However, this paper also has its drawbacks in convincing its readers. One weakness is that the comparison between WIMP and post-WIMP is not complete. The authors listed detailed 7 stages of Norman model and mapped each step to the specific procedure (both post-WIMP UI and WIMP UI) in CCT (Cube Comparison Task) experiment. They analyses participants' behaviors of post-WIMP and WIMP UIs and then make a conclusion that post-WIMP UIs provide better-structured understandings of the problem space than WIMP UIs. However, the authors don't fully explain the reasons that make post-WIMP UIs having richer mental representation of task than WIMP UIs. For example, in table 2, the authors note that "*The user cannot apply RNI knowledge*" (in the column of WIMP UI CCT) without further explanation. Though figures provided to illustrate the difference between WIMP UI and post-WIMP UI, the figures are similar with each other. This weakness make reader feel confusion and make the paper's claim less persuasive.

Another weakness showed in this paper is that the data analyses and result graphs shows significant bias. In section 4.3, the authors talked about the participants of CCT experiment. Surprisingly, all the 67 participants are from undergraduate computer science classes. We can easily image that the participants would have the similar age and similar knowledge background. This participant selecting method makes the experiment lack of variety samples, which makes its result lopsided and biased. A better way is to

choose participants from different age range and different background, which can conduct to the more generalized results as solid support proof.

Integration with Related Work. Post-WIMP UIs are widely used and discuss in this world. In Don Gentner and Jakob Nielsen's paper "*The Anti-Mac Interface*" published in 1996, they claimed that standard WIMP interfaces are well suited to current hardware and software capabilities, and the challenge for application and interface designers is to take advantage of the coming computing power to move the computer-human interface to a new plateau. Don's opinion is similar with the theory that the cognitive theories themselves may be informed and updated from applying them. (raised in the paper *Applying the Norman 1986 User-Centered Model to post-WIMP UIs*). However, the two papers express in different angles. Don's paper focus on realistic, he uses a real-life UI design (Mac OS) to stand his point. While the other one analyze its argument in a theoretical way by applying Norman model.

The analyzing method of this paper has strong theoretical base and could fit in other related research. For example: Michel Beaudouin-Lafon's paper *"Instrumental Interaction: An Interaction Model for Designing Post-WIMP User Interfaces"* published in 2000 claims that Instrumental Interaction model which generalizes and operationalized direct manipulation is a suitable tool to analyze WIMP interfaces. In Jakob Nielsen's paper *"Noncommand User Interfaces"*, he argued that the transformation from character-based interfaces to graphical interfaces is evolution with enhance of the mental representation of task. Andries's paper *"POST-WIMP User Interfaces"* express the idea that the WIMP user interfaces have been evolved since it was pioneered in early 1970s. The above articles could also adapt Norman model into their analyses, which can provide more detailed and more concrete theoretical proof to their statements.

Implications for HCI. The implication for HCI researchers from this paper is that Normal model is essential approach in doing research in this area. When researchers raise a theory in HCI, it is helpful to applying Normal model in analyzing theoretical principle and designing experiment to test the theory, because by following Norman model (the seven stage of actions), the researchers can easily observe how their theory adapt to the current HCI environment.

An implication for HCI practitioners from this paper is designing a post-WIMP user interface is the crucial. It is significant factor that affects the performance of UIs. The paper exams and proofs that the post-WIMP provides users a richer representation of the UI and task, in which helps users to execute their rotations as they intended. It is important for HCI practitioners to understand the theory from this paper and apply it to their empirical design.

One main implication for users of technology is that with post-WIMP UIs commonly used in today's design process, the users will benefit from it. The post-WIMP UIs provides users richer representation of the task, and this will help user to focus on their task and lower the risk of making incorrect actions with the post-WIMP interfaces.

References Cited

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