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A Summary & Comparison of Two Experiments along with Their Relevance in Web Design

Report on Experiments in Web Development
Course: COMP6780

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1 EXECUTIVE SUMMARY

This work combines findings from two separate research experiments—on depression detection and e-reader usability—with my views as a participant in these investigations. Through an examination of both studies, this report seeks to highlight the importance of user-participation approaches in improving Human-Computer Interaction (HCI) practices, notably in software and online development.

The first experiment challenged untrained people to identify depression in short film clips, utilising physiological responses like skin conductance and pulse rate as additional data points. The main finding was that physiological reactions predicted depression better than human judgement or image processing technologies, despite the participants' low conscious prediction accuracy.

The second experiment had participants evaluated the usability of budget e-readers through real-world tasks like accessing books and adjusting settings without prior guidance. The results highlighted varied experiences influenced by prior familiarity with similar technology, with data suggesting a solid comparative analysis of the devices' usability.

The two experiments, while focusing on different technologies, shared a common emphasis on user-centred design (UCD) principles. Both studies demonstrated the importance of involving users in testing phases to gather actionable insights that can drive iterative improvements—a key strategy in web design and development. This participatory approach not only aids in refining product interfaces but also enhances the overall user experience by aligning technological solutions more closely with user needs and expectations.

Ultimately, these experiments illustrate the pivotal role of user participation in the development and refinement of technological interfaces within HCI. They provide crucial lessons on the integration of user feedback into design processes, reinforcing the value of such practices in creating effective, user-friendly, and inclusive digital environments.

2 INTRODUCTION

This report highlights the experiments from the two research publications "Felt depression is different to algorithmic depression: A user experiment using an image processing depression dataset " and "Popular eReaders" as well as my perspective as one of the experiment participants. I go over the synopsis of each, the experience of the experiment, and what I believe the merits and flaws of each were. I then compare the two experiments and discuss how participating in both activities can be beneficial to a prospective software/web developer as well as the web development course.

3 FIRST EXPERIMENT (GEDEON, ET AL., 2015)

3.1 SUMMARY

The experiment's goal was to see how well untrained human subjects predicted depression status against image processing tools. Participants were shown brief German-language movies from the AVEC depression database and asked to categorise the individuals' depression condition. While watching the videos, their physiological reactions, such as skin conductance and heart rate, were recorded.

3.2 EXPERIENCE

The participants, who were first-year Computer Science students, saw 29 short movies and assigned a depression categorization at the end of each one. They were assessed for skin conductance and heart rate. Many participants did not find the experiment challenging, yet their accuracy rate in predicting depression status was only little higher than chance at 31.4%. Despite the language barrier, participants were able to engage with the videos. As an empath, if I placed myself in the shoes of these participants, I would react in a very specific way to each video and be able to classify them with ease. However, I believe that depression classification is dependent on

the individual doing the classification. The study also indicated that female participants were more confident in their abilities, which I can see because they are more empathic.

3.3 Weakness and Strengths

3.3.1 Strengths:

The experiment was well-structured, with clear instructions and an even distribution of videos to avoid order effects. The use of physiological data allowed for a nonconscious examination of depression recognition. The experiment revealed new insights by demonstrating that physiological responses predicted depression status more accurately (79%) than both human conscious forecasts and image processing techniques.

3.3.2 Weaknesses:

The participants did not speak German, which may have hindered their ability to comprehend the videos' context and nuances. The sample size was small (10 participants) and limited to students with no training in psychology or behavioural sciences, therefore the results may not provide a complete picture of depression recognition ability in the broader population. While the physiological data yielded fascinating results, the participants' conscious selection process demonstrated low accuracy, raising concerns about the trustworthiness and representativeness of the data acquired from such a small and sample group.

4 Second Experiment (Gedeon & Rampaul, 2015)

4.1 Summary

The study aimed to compare the quality and usability of e-readers within a budget range using a scenario-based approach. Twelve participants, including one female and eleven male third-year Computer Science students, were given an e-reader as an unexpected gift, and asked to perform tasks without a manual. The tasks assessed the practical usability of each device in real-world scenarios.

4.2 Experience

The participants were asked to access a book, open the e-reader, locate a specific section and paragraph within the book, and adjust the font size accordingly. This experience as given in the paper varied among participants. Those familiar with e-readers generally found the tasks engaging and easy to complete. Others found some tasks, particularly navigation, challenging, especially on devices like the Nook 1st Edition. Overall, the instructions were clear, and participants understood what they were asked to do, though the ease of execution depended on the specific e-reader.

When I put myself in the shoes of these individuals, I am not an ardent reader save for textbooks, so I would struggle at first to navigate the volumes and figure out the sections. Personally, I would not appreciate the experience because I dislike the way e-books feel and hurt my eyes. However, the report claims that the experiment met its objectives, providing a clear comparison of e-readers within the budget. However, the small sample size and gender disparities were significant drawbacks. Overall, the data acquired was trustworthy, albeit future studies would benefit from a larger, more diversified participant pool.

4.3 Weakness and Strengths

4.3.1 Strengths:

The scenario-based method accurately emulated real-world usage, providing useful insights about each device's practical usability. The activities included a variety of frequent user behaviours,

providing a thorough evaluation of each e-reader's functioning. The use of Likert scales and statistical testing provided rigour to the findings, making them more dependable.

4.3.2 Weaknesses:

The sample size was small (just twelve individuals), potentially restricting the generalizability of the results. The gender imbalance (one female participant) could have influenced the results, as user preferences and convenience of use differ by gender. Using second-hand e-readers may have caused variability in device performance due to variances in wear and tear.

5 COMPARISON OF THE TWO EXPERIMENTS

Both studies aim to evaluate the usability and effectiveness of specific technologies, and they rely on human participants to provide feedback and data. Each experiment evaluates with a combination of subjective and objective measures. They use specialised scenarios to mimic real-world usage settings.

In terms of differences, both had completely different subject matters, the setups, and technologies. In terms of participant experience, I found the E-reader trial to be more interesting and straightforward, with more tasks for participants to complete. The Depression detection experiment, on the other hand, was a little more abstract, and may even be deemed difficult because it required participants to grasp nonverbal cues in a language they were unfamiliar with. The E-reader Experiment appears to be well-structured, with clear goals and objective measures. Participants may easily grasp and relate to the tasks. On the other hand, the Depression Detection Experiment used more complicated and unfamiliar approaches. The precision and reliability of the physiological sensors and image processing algorithms have a significant impact on the experiment's outcome.

6 RELEVANCE

User-participation experiments, like those detailed in the e-reader and depression detection research, are critical in the field of Human-Computer Interaction (HCI) for a variety of reasons. These studies assist designers and developers in understanding user demands, preferences, and behaviours, which are critical for developing successful and user-friendly interfaces.

Both experiments demonstrate UCD principles by including users directly in the review process. Similarly, in web design, customer feedback is essential for developing intuitive interfaces that satisfy user expectations. The e-reader experiment, which includes activities such as navigation and content access, is an example of usability testing. In online design, usability testing can detect navigation errors, confusing content, and other usability concerns, allowing for iterative improvements. Both experiments employ scenario-based testing to simulate genuine use cases. Web designers can construct scenarios to evaluate how users perform tasks on a website, ensuring that the design is suitable for real-world use.

User-evaluation experiments allow for iterative design, where feedback from users is used to make continuous improvements. This aligns with agile methodologies often used in web development. Understanding user experiences through direct feedback helps designers build empathy for users, leading to more user-friendly designs. Experiments provide objective data on how users interact with a product, which can validate design decisions and identify areas for improvement.

User-participation experiments are integral to the HCI development process, including web design and development. They provide valuable insights into user behaviour, preferences, and usability issues, enabling designers to create more effective and user-friendly interfaces. By

incorporating direct user feedback and scenario-based testing, web designers can ensure their products meet the real needs of users, enhancing overall user satisfaction.

7 REFERENCES

- Gedeon, T. & Rampaul, U., 2015. *Popular eReaders,* Canberra: Computer Science Technical Report, CSTR-2015-14, Research School of Computer Science, Australian National University.
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