

The Value and Insights of User Evaluation in Interactive Computer System Development

An Observational, Reflective, and Learning Report

Abstract: This article introduces the content and results of the two experiments I participated in and discusses their relevance to website design and development. The first experiment investigates the relationship between emotions and attentional breadth by displaying terrifying and erotic images and observing changes in participants' attention. The second experiment aims to build a framework for assessing the quality of answers on an online knowledge exchange platform, where participants provide feedback to evaluate answer quality. After reviewing the processes and analyzing my personal experiences in these two experiments, it is concluded that user participation in experiments is of significant importance to website design and development. Simplifying website design, prioritizing user feedback, and defining target audiences clearly are key factors in enhancing user experience and meeting user needs.

Introduction:

This article describes the content of two experiments and the participants' experiences, as well as explores the relevance of user participation in these experiments to website design and development. The first experiment aimed to investigate the relationship between emotions and attentional breadth by displaying horror and erotic images and observing participants' changes in attention. The second experiment aimed to establish a comprehensive framework for assessing the quality of answers on online knowledge exchange platforms, where participants provided feedback to evaluate the quality of the answers.

By comparing these two experiments, the article discusses the time and effort required, the accuracy of the experimental results, and the relevance of user participation to website design and development. The first experiment was relatively simple, and participants were able to complete it easily and obtain clear experimental results. However, the second experiment was more complex and time-consuming, and participants faced challenges in providing feedback, resulting in potential uncertainty in the accuracy of the results.

In the discussion, the relevance of user participation to website design and development is addressed. Firstly, a clear and concise website design contributes to improving visitor satisfaction. Secondly, user involvement in design and evaluation can provide valuable insights and suggestions through feedback mechanisms to enhance the functionality and effectiveness of the website. Finally, clearly defining the target audience is crucial for providing relevant information and features.

By considering the experiences of user participation in the experiments holistically, guidance can be provided for website design and development, enhancing user experience and better meeting the needs of the target audience.

First Experiment:

The project is titled "Emotion and Attentional Breadth." The experiment aims to test the relationship between emotion and attentional breadth (Appendix A). The testing method involves displaying visually impactful images on a computer screen, such as images from intense and disturbing scenes in R-rated horror movies or images from R-rated erotic movies that elicit positive emotions (Appendix A). Participants are then required to react to subsequent letter images (Appendix A).

Overall, I don't consider this experiment to be difficult, and I also find it quite interesting. The inclusion of erotic and scary images in the experiment represents two different emotions, one being comforting and the other being fearful. Throughout my participation, I could even clearly perceive the changes in my attention (increase or decrease), and I could even summarize the results of the experiment for myself as an individual. As time progressed, attention gradually declined, and prolonged exposure to positive images (erotic images) did not increase attention. However, once external stimuli (scary images) were introduced, attention increased.

Second Experiment:

The project is titled "A comprehensive framework of quality assessment for answers exchanged on online knowledge platforms." The experiment aims to investigate people's knowledge evaluation behavior on online knowledge exchange platforms like Quora (Appendix B). A research example is shown in Figure 1, which illustrates a Q&A session on a knowledge exchange platform. Participants will provide feedback through various means to help researchers assess the quality of these answers. The ultimate goal of the experiment is to assist in designing a knowledge management system that promotes better knowledge dissemination and communication, ultimately improving overall societal efficiency (Appendix B).

A sample question for your reference

Topics: business, fitness center, running business, business strategy

Question: What is the best way to attract new customers for a fitness centre? Lower fees?

Answer: Lowering fees will definitely attract more members as price plays a really huge factor in choosing fitness centre. However other methods like providing a free trainer for a period and installing other fitness centre complimentary such as yoga classes are a great idea too. A free trainer (for a period) is good because most people are usually new comers and they feel quite confused for the first few sessions if they were to work out without any advice. Providing a trainer could significantly improve their gym experience and make gym more effective to them. Classes like yoga could be opened for customers who wanna do additional exercises.

Figure 1: An example of a QA-pair on these knowledge exchange platforms (Appendix B)

The experiment's content is highly open-ended, covering various topics. I believe participants need to have diverse social experiences in order to responsibly evaluate the quality of the answers to this question. The feedback for each answer is highly subjective and entirely based on the participant's subjective judgment.

From my perspective, completing this experiment is not easy. The provided case studies and reading material are extensive, and there are numerous feedback options for each answer. Additionally, deciding on each feedback option requires some time and consideration. Therefore, the entire experiment requires a significant amount of effort and time to complete. As the experiment progresses, the prolonged thinking becomes burdensome, and I even started having thoughts of taking shortcuts. Consequently, I cannot guarantee the accuracy and correctness of my feedback for the last few Q&A pairs.

Comparison of the two Experiments:

The objectives of both experiments are very clear. The first experiment aims to examine the relationship between emotion and attentional breadth, while the second experiment aims to build an efficient knowledge management system. They have remained focused on their respective objectives throughout the design of the experiment.

The time and effort required for each experiment are different. The first experiment was not designed to be difficult, and I could easily complete it. However, the second experiment required a tremendous amount of effort and time to select the feedback options for each item.

There is a difference in the accuracy of the experimental results obtained. I believe the first experiment was very successful. Although it was not designed to be challenging, it could yield clear and desired results. Moreover, since the entire experiment was simple and quick, participants could maintain their attention and enthusiasm to complete it. On the other hand, due to the lengthy duration of the second experiment, I cannot guarantee that my attention was fully focused throughout, nor can I ensure the accuracy of the feedback options I provided. Therefore, I have doubts about the accuracy of the experimental results obtained in the second experiment; they may be unreliable.

Relevance of user-participation experiments to web design and development:

First, the complexity of website design. I believe we don't need to make the website overly complex and advanced. We just need to present the content we want to showcase in a very clear and straightforward manner (World Wide Web Consortium., 2023). For example, the first experiment was simple and straightforward, where I only needed to distinguish letters. However, the second experiment required me to constantly think about different aspects of the questions (which is equivalent to designing complex functionality on a webpage), and I couldn't obtain the desired results quickly. The complexity of a website can affect visitor satisfaction.

Second, evaluate design decisions. Both experiments required us to rate the experiment before it was completed, and the researchers also sent emails after the experiment to ask if there were any shortcomings. This approach allows users to participate in the design of the experiment and also helps evaluate its effectiveness and impact. Therefore, in the process of website development, I can follow this design idea by creating a feedback page to obtain user feedback and improve the website (Yaman, S. Fagerholm, F. Munezero, M. Männistö, T & Mikkonen, T., 2020).

Third, identify the target audience for the website. Both experiments clearly stated the type of participants they needed at the beginning. For example, the first experiment required individuals who could tolerate graphic and explicit content, while the second experiment required individuals who could read Chinese for a long time. By defining the target audience for our project, the final experimental results will be more accurate (World Wide Web Consortium., 2023). This concept is also important in website design. Only when a website has a clear understanding of its target audience can it provide relevant and effective information for that specific group of people (Yaman, S. Fagerholm, F. Munezero, M. Männistö, T & Mikkonen, T., 2020). Take Amazon as an example. Its positioning is a global online shopping platform. It needs to ensure the integrity and effectiveness of features such as product display, purchasing and selling, shipping, and customer service.

By considering these aspects during website development, we can enhance the user experience, improve the effectiveness of the website, and better cater to the needs of our target audience.

Reference:

World Wide Web Consortium. (2023). Involving Users in Web Projects for Better, Easier Accessibility. Retrieved from <https://www.w3.org/WAI/planning/involving-users/#range>.

Yaman, S. Fagerholm, F. Munezero, M. Männistö, T & Mikkonen, T. (2020). Patterns of user involvement in experiment-driven software development [PDF file]. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0950584919302629>.

Appendix A:



Participant Information Sheet

Researcher:

This research is part of an ongoing program of research by academic staff member Dr Stephanie Goodhew in the Research School of Psychology, College of Health and Medicine, at the Australian National University.

Project Title: Emotion and Attentional Breadth

General Outline of the Project:

- **Description and Methodology:** This project aims to test the relationship between emotion and attentional breadth. The general methodology of this project includes the presentation of visual stimuli (e.g., pictures, letters) on a computer screen and participants being asked to make responses to them. Importantly, you will be presented with some images, including those that typically elicit feelings of disgust or fear (e.g., pictures of vomit, mutilated bodies, scenes of violence, or animals poised to attack). The intensity of these images is akin to those you might expect to see in R-rated horror movies. Importantly, you will also be presented with some images, including those that typically elicit positive feelings (e.g., erotic pictures, such as naked or scantily-clad adults, and couples engaged in romantic and sexual acts). The intensity of these images is akin to those you might expect to see in R-rated erotic movies. You will also be asked some demographic questions (e.g., age, ethnicity). You may also be asked questions about your mood and feelings in the past week, and also questions about your experiences with attention and concentration in general. You may decline to answer any questions that you do not wish to answer.
- **Participants:** Participants will be young adult humans (18-40 years of age). Individual experiments as part of the broader project will typically consist of 30-50 participants.
- **Use of Data and Feedback:** It is intended that this data will be presented at scientific conferences and published in scientific journals. They may also form parts of students' theses. Participants can access the results after study completion here: <https://tinyurl.com/ybfhm6me>
- **Project Funding:** This research is funded by an Australian Research Council (ARC) Future Fellowship awarded to Stephanie Goodhew.

Participant Involvement:

- **Voluntary Participation & Withdrawal:** Participation in the project is completely voluntary and you may, without any penalty, decline to take part or withdraw from the research at any time during the experiment without providing an explanation, or refuse to answer a question. If you choose to withdraw, your data will not be analysed. Given that participation is anonymous, it will not be possible to decline to have your data included at a later date after the experiment as we will not be able to identify which data is yours. To withdraw, please simply close the web browser you were completing the study on.
- **What does participation in the research entail?** You will be presented with visual stimuli (e.g., pictures of objects) and asked to make responses about them. You will also be asked basic demographic information (e.g., age, gender, handedness, country of birth), and may be asked questions about your current and past mood state and how well you concentrate. Importantly, you will be presented with some images, including those that typically elicit feelings of disgust or fear (e.g., pictures of vomit, scenes of attack, mutilated bodies, or animals poised to attack) and those that typically elicit positive feelings (e.g., erotic pictures, such as naked or scantily-clad adults, and couples engaged in romantic and sexual acts). The



intensity of these images is akin to those you might expect to see in R-rated horror or erotic movies. Participation is fully online.

- **Location and Duration:** The experiment will take approximately 30 minutes. It will be administered via Testable.
- **Remuneration:** If participants are enrolled in eligible ANU courses, then their participation can count toward their research participation credits (0.5 credits, earned when all course-specific written assessment requirements relating to research participation are completed). No remuneration is offered for participants not eligible for course credit.
- **Risks:** Given the emotional stimuli and procedures used in this experiment, there is some risk to participants if they are particularly emotionally vulnerable, sensitive to certain types of images, or have experiences that they do not wish to recall. If any of these apply to you, you should not participate in this research.
- **Benefits:** The purpose of this project is to improve our understanding of the relationship between emotion and attention. It is hoped that this new knowledge might lead to improved treatments of emotion-related problems in the future. However, it is unlikely that you will personally benefit from participating in this research (apart from the educational benefit if you are a student).
- **Implications of Participation:** If you are a student participating in exchange for course credit, please note that if you choose to withdraw from the study, it will have no consequences for the credit you earn, and will not have any other consequences for your study or grades.

Exclusion criteria:

- **Participant Limitation:** Participants are required to have normal or corrected-to-normal vision. This is because the project is examining visual processes, and therefore, task performance is likely to be constrained by non-normal vision. The age limit for participation is 18-40 years. This is because our target demographic is young adults, since ageing is known to have measurable impact on visual processes, and this is not the focus of the present project.

Confidentiality:

- **Confidentiality:** Only the nominated researchers will have access to the material provided by the participants. Confidentiality will be maintained as far as the law will allow. Data will be stored in a de-identified format (e.g., Participant 1). The only information to be stored with the datafile is generic demographic information (e.g., age, gender). With regard to publication of results, group results are typically analysed and reported with no identifying information, however, it is increasingly becoming normative for raw data to accompany publications. This would entail the publication individual results, all in a de-identified format (e.g., “Participant 1”, followed by a series of scores in different conditions).

Privacy Notice:

In collecting your personal information within this research, the ANU must comply with the Privacy Act 1988. The ANU Privacy Policy is available at https://policies.anu.edu.au/ppl/document/ANUP_010007 and it contains information about how a person can:

- Access or seek correction to their personal information;
- Complain about a breach of an Australian Privacy Principle by ANU, and how ANU will handle the complaint.

Data Storage:



Australian
National
University

- **Where:** Original data will be stored in Testable and downloaded onto password-protected computers. Testable does not store incomplete responses. A summary of this may be placed in online repositories such as the Open Science Framework. Testable's servers are located in Germany, and their privacy policy can be viewed here: <https://www.testable.org/privacy>
- **How long:** Datafiles will be kept indefinitely in online repositories.
- **Handling of Data following the required storage period:** Datafiles will be archived (i.e., they will continue to be kept indefinitely in online repositories).

Queries and Concerns:

- **Contact Details for More Information:** For further requests for information or queries regarding the study, please contact Dr Stephanie Goodhew. Ph (02) 612 55545: email: stephanie.goodhew@anu.edu.au.
- **Contact Details if in Distress:** If you feel distressed at the end of the experiment, please note that you can contact ANU Wellbeing and Support Line (Ph: 1300 050 327, SMS text message service: 0488 884 170) (if ANU-student), or Lifeline (131114). These services are both available 24 hours a day. You can also access multiple services via this link: <https://mhaustralia.org/need-help>.

Ethics Committee Clearance:

The ethical aspects of this research have been approved by the ANU Human Research Ethics Committee (Protocol 2018/633). If you have any concerns or complaints about how this research has been conducted, please contact:

Ethics Manager
The ANU Human Research Ethics Committee
The Australian National University
Telephone: +61 2 6125 3427
Email: Human.Ethics.Officer@anu.edu.au

Appendix B:



Participant Information Sheet

Researcher:

This is Yingnan Shi, a PhD student from Research School of Management, College of Business and Economics, at the Australian National University (ANU)

Project Title: A comprehensive framework of quality assessment for answers exchanged on online knowledge platforms

General Outline of the Project:

- **Description and Methodology:**

This experiment is to investigate people' knowledge evaluation behaviours on online knowledge exchange platforms, such as Quora.

Here is an example of a QA-pair on these knowledge exchange platforms:

A sample question for your reference

Topics: business, fitness center, running business, business strategy

Question: What is the best way to attract new customers for a fitness centre? Lower fees?

Answer: Lowering fees will definitely attract more members as price plays a really huge factor in choosing fitness centre. However other methods like providing a free trainer for a period and installing other fitness centre complimentary such as yoga classes are a great idea too. A free trainer (for a period) is good because most people are usually new comers and they feel quite confused for the first few sessions if they were to work out without any advice. Providing a trainer could significantly improve their gym experience and make gym more effective to them. Classes like yoga could be opened for customers who wanna do additional exercises.

Participants in this study will be responsible to evaluate the quality of a batch of knowledge contents (an example was provided above). The evaluation result will be used for designing a systematic, theoretically valid quality-assessment framework. Therefore, we are able to design a knowledge management system facilitates better knowledge transferring and exchanging, improving the overall efficiency of society.

- **Participants:**

We would like to have 120 participants, who are preferably fluent speaker of English.

Recruitment of the participants will mainly reply on 2 methods:

- (1) Advertising on social networks
- (2) College of Business & Economics RSM Research SONA System

- **Use of Data and Feedback:**



The data will be used to produce peer-reviewed published articles and conference presentations. A summary of the result of this research will be communicated to the stakeholders (e.g. participants) via email if requested.

- **Project Funding:**

This research has obtained funding from Paid Participant Research Grant Scheme.

Participant Involvement:

- **Voluntary Participation & Withdrawal:**

Your participation in this research is voluntary which means that you may decline to take part or to withdraw from the research without providing an explanation at any time until the work is prepared for publication. There will be no negative consequences if you do so. Once you withdraw, the data you have provided prior to withdrawal will be destroyed and not used.

You can withdraw from the study during or after the commencement experiment. If you choose to withdraw from our study during the experiment, you can just simply close the experiment webpage or the browser (i.e., by closing the webpage or your browser, you automatically withdraw from the current experiment environment). If you want to withdraw from the study after the conclusion of experiment, you can email me (via Yingnan.shi@anu.edu.au). In that case, we need you to provide the random-generated response identifier which will be assigned to you at the beginning of the experiment.

- **What does participation in the research entail?**

As a participant, you will be asked to go to a rating webpage where you can evaluate knowledge.

If you do not have such prior experience, you will need to go to Quora.com before we start the formal experiment so as to help you familiar with this type of knowledge exchange process.

With your consent, we will record data such as your button-clicking history during the experiment, your ratings for each question-answer pair in the experiment, and time used for evaluating each question-answer pair.

- **Location and Duration:**

Location: This research will be conducted entirely online. You can participate the experiment anywhere you want as long as it is appropriate to you and has a stable Internet connection.

Duration: Participants may need to allocate 1 hour for participating this experiment.

- **Remuneration:**

The participants of this study will be paid either an electronic fund transfer (EFT) or shopping coupons. The level of payment is referenced to Australian minimal hourly salary (averagely 20 AUD). Payment will be made electronically. You can choose between a money transfer via Bank Transfer, PayPal or a coupon whichever is preferable. You will not receive your money right after the experiment because we need time to judge the validity of your inputs.



- **Risks:**

This experiment carries slight risks. You may feel uncomfortable or distressed when you encounter some questions and answers that are either too hard to you or some questions that you feel uncomfortable with. You avoid such uncomfortable questions by skipping those questions. If you are uncomfortable with the experiment environment, you may withdraw from this research at any time.

- **Benefits:**

We expect that, after the development of the comprehensive framework as we described above, we can bring at least four benefits: First, this framework can help knowledge suppliers, especially producers of genuine scientific content, to increase efficiency in transferring knowledge to general public and, in the meanwhile, be capable of balancing the need of professionalism and popularity when producing and disseminating different types of knowledge with different characteristics, which has been identified as a challenging task by many researchers. We regard when contributors writing knowledge pieces, they need to understand the fashion that can help them achieving content that is of potentially high quality (i.e., both professionalism and popularity). They need a practical and systematical framework to provide reference helping them achieve so. Second, for platform owners, a better evaluation tool can help them increase the overall quality of the knowledge content exchanged in their knowledge exchange platform, so the platforms' users will be less likely to treat their platforms as mere entertainment outlets rather than sources of high-quality professional scientific information. Henceforth, knowledge receivers can access high-quality information that presents complete, true, timely, and effective content as much as possible, which can help them increase their confidence in making following-up decisions, acquire new skills, and even drive up overall societal efficiency. Third, this study can contribute to the IAM theory by providing a valid use case and also extends the previous information adoption models by considering the contingency effects of knowledge type and characteristics. Fourth, for the future researchers who want to develop knowledge evaluation framework, this study opens a route to reliable, accurate, readily extensible, and adjustable framework.

- **Implications of Participation:**

There are no implications, to the best of my knowledge.

Exclusion criteria:

No exclusions, but preferably, we would like to have participants who are fluent speaker of English, because the tasks involves a lot of reading.

Confidentiality:

- **Confidentiality:**

We will keep your identity confidential as far as allowed by law unless you elect to be named within the research. A random-generated response identifier will be used for identification. Granted, the survey tool will automatically collect 7 types of your device details including: Browser Type, Browser Version, Operating System, Screen Resolution, Flash Version, Java Support, and User Agent. Those data will not be used for matching your personal details (e.g. names). Data of this research will be kept in a locked computer at College of Business & Economics. Access to the data will be restricted to the research team, and identifying details will be stored separately from the rest of the research data. Published results will only be reported in aggregate, and you will not be identifiable within published outputs unless you have elected otherwise. We will not intentionally collect your personal details such as names and addresses, unless you ask us to do so. Moreover, the data will be destroyed per your request.



Privacy Notice:

In collecting your personal information within this research, the ANU must comply with the Privacy Act 1988. The ANU Privacy Policy is available at:
https://policies.anu.edu.au/ppl/document/ANUP_010007

The content in the above link contains information about how a person can:

- Access or seek correction to their personal information;
- Complain about a breach of an Australian Privacy Principle by ANU, and how ANU will handle the complaints, in any.

Data Storage:

- **Where:**

Data will be securely stored on password-protected computers in the Research School of Management at the Australian National University. There will be no physical records.

- **Handling of Data following the required storage period:**

After the storage period, all identifying details will be removed from the data and the non-identified data will be archived at the Australia Data Archive (www.ada.edu.au) for use in later research, including potentially by other researchers.

- **How long:**

All research data will be retained and securely stored for at least five years following publications arising from the research.

Queries and Concerns:

- **Contact Details for More Information:**

Any requests for information or queries regarding the study participants should be directed to my email (Yingnan.shi@anu.edu.au).

- **Overseas Contacts (if relevant):**

N/A

- **Contact Details if in Distress:**

If feeling any distress, you may contact the ANU Counselling service, provided that you are at ANU. If you are within Australia, you can dial 13 11 14 for Lifeline. Notably, the risk of distress is expected to be minimal.

Ethics Committee Clearance:

The ethical aspects of this research have been approved by the ANU Human Research Ethics Committee (Protocol 2022/025). If you have any concerns or complaints about how this research has been conducted, please contact:



Australian
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Ethics Manager
The ANU Human Research Ethics Committee
The Australian National University
Telephone: +61 2 6125 3427
Email: Human.Ethics.Officer@anu.edu.au