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| **Client:** | Jiawen Zhang | **File:** 25-002 |
| **Dept:** | Computer Graphics Technology | **Faculty:**  **Student:** |
| **Date:** | 1/28/25 | **Initial Meeting:**  **Follow-up:** |
| **Consultant and Attendees:** Jiawen Zhang, Sumeeth Guda, Dr. Nandhini Giri, Dr. Chong Gu | | |
| **Statement of Problem:** To determine if integrating Mandala practices into a guided meditation app improves the overall love kindness meditation experience. | | |
| **Goal of this Project:** Master’s Thesis | | |
| **Background:**  The client is a master’s student in CGT doing a master’s thesis project on how combining mandala creation with loving-kindness meditation (LKM) affects user engagement. LKM is a practice that involves sending goodwill and kindness to oneself and others. Mandala creation is based on Buddhist practices based on creating designs with colored sand. The aim of the client is to integrate the fundamentals of Mandala cultural practices into an LKM app to compare if it improves the meditation experience. They will conduct a pre and post survey experiment process to evaluate the effectiveness of cultural integration in digital meditation.  The client came to the SCS since they needed validation that the survey design was appropriate for their study, as well as to see if having 20-30 participants is sufficient for analysis, and to learn what methods are most appropriate for the analysis. | | |
| **Progress of project at this time:** Design (no data collected) | | |
| **Relevant information presented at the meeting:**  Experiment Design:   * A sample of 20-30 participants, representing a diverse range of meditation experience levels, will be recruited for user testing.   The testing will be conducted in two rounds:  Round 1:   * + Participants complete pre-test questionnaires (demographics, FFMQ, SCS-SF)   + Participants engage in guided Loving-Kindness Meditation (without Mandala practices)   + Post-session questionnaires (FFMQ, SCS-SF)   Round 2:   * + Participants use the developed application integrating Mandala practices with LKM   + Post-session questionnaires (FFMQ, SCS-SF)   + Brief qualitative feedback on the experience * Independent Variables: Meditation type (traditional LKM vs integrated mandala-LKM), Time (pre vs post intervention) * Dependent Variables: Mindfulness scores (FFMQ), Self-compassion scores (SCS-SF), Qualitative feedback   Five Facet Mindfulness Questionnaire (FFMQ): A 39-item scale assessing five facets of mindfulness.  Self-Compassion Scale - Short Form (SCS-SF): A 12-item scale measuring six components of self-compassion.  Qualitative feedback: Open-ended questions about the user’s experience with the application.  Survey Design:   * FFMQ Survey: 39 5-point Likert Scale questions with a results section containing 6 aggregate score sections adding 6-7 of the responses from the 39 survey questions. The responses of the Likert scale can be combined since they are all ordinal. * SCS-SF survey: 12 5-point Likert Scale questions with the scaling of the Likert Scales not being consistent (Some are in reverse order).   Client’s Research Questions:   * Does mandala integration significantly improve mindfulness scores compared to traditional LKM? * Are there significant differences in self-compassion scores between traditional and integrated approaches? * Is integrated meditation more engaging than the traditional approach?   Meeting Notes:  In the beginning of the meeting, Jiawen presented to Sumeeth and Dr. Gu the background of the project and the rationale for why they would like to incorporate Mandala cultural elements into the experimental design. For the most part Dr. Gu questioned how the effect of the Mandala would be received by the participants of the experiment, and if the result of incorporating the Mandala practices into the LKM app would have any significant effect on the experiment. Dr. Giri mentioned that they are trying to improve the digital meditation experience, and they are comparing a guided meditation app like Calm against a Mandela meditation to see if that activity enhances the experience through cultural practices. She mentioned that there are limitations with the meditation apps for beginners, Mandela is a lot more simple and easier to visualize for beginners. Their focus is more on Human Computer Interaction (HCI) and how to take the cultural elements of the Mandela and use it to improve overall experience. Dr. Gu was a bit concerned, because without prior education on the Mandela practice, the people who are in the survey might not have experience or know what the meaning of Mandela is. Incorporating Mandela might not have much difference. Dr. Giri mentioned that they are starting with people who don't have experience with Mandela, they aren't interested in the beliefs only the surface level meaning of Mandela. Dr. Gu mentioned that if participants don't have prior knowledge of Mandela and they collect data from them it might not add any extra meaning to the analysis and adding a component or not might cause confusion with the participants hence their data might be riddled with errors. Dr. Giti mentioned that it is more like a gamified version of the activity and comparing it with the app. If they are made to interact with Mandela this has a positive impact on their exposure to the meditation process. This extra component might have some significant meaning to some participants, but some might not have prior knowledge. Dr .Gu said that the SCS can analyze Jiawen’s data no problem, but the actual insights could be muddy since the participants prior knowledge can be confounded by 1. Do they know Mandala 2. Do they care about the mandala. Dr. Giri reiterated that they care more about the Mandala mechanisms to incorporate it into the experiment to track on the difference. Dr. Gu said that the beliefs might be conflicting as it might cause some issues with the analysis in the results. Most likely the results will be null since incorporating this mechanism would only benefit a smaller population who have prior knowledge of the benefits. The data analysis will only compare the 2 treatments, but those two groups might have bias due to beliefs since they will be doing a pair comparison within the study since it is pre and post.  Once the Mandala mechanism was understood, the client then talked about the experiment design. It was as follows:  Baseline Surveys -> Pre-round (LKM app) -> Administer Surveys -> Washout Period -> Post-round (LKM app with Mandala) -> Administer Surveys  Jiawen said she would administer the surveys a total of 3 times in her current design.  Concerns:   1. Dr. Gu was concerned that the results from the outcome would be noisy. The reason being is that the participants might not know the theory and significance of the Mandala cultural practices ahead of time. There is also the chance that the participants wouldn’t believe in the practices, and they won’t find benefit in Mandala. This nullifies the difference of the response means of the pre and post study results by making it not statistically significant. It was noted that we can still analyze the data and run a t-test on the two groups, however with respect to the round which incorporates Mandala practices only a small subset of the group in that round will actually benefit from the practice instead of the whole group. 2. There could be some issues with the sampling of this experiment since the client would likely use other CGT students for this study hence this could lead to a biased analysis. | | |
| **Recommendations for Design and/or Analysis:**   1. Dr. Gu recommended having the washout period between the pre and post surveys be around 2-3 weeks. 2. It was agreed that the LKM and LKM with Mandala mechanism could have some confounding variables with the belief in the Mandala effectiveness. Hence it was recommended that they split the groups in half during the experiment. In round 1, one of the halves would use the LKM app as normal, but the other half would use the LKM app with the Mandala mechanism. During the second post round, the two sides would swap and use the other mechanism for the testing. This will randomize the order to minimize on the prior bias of the participants. Additionally, they should conduct pre and post experiment surveys to get the prior conceptions and post experiment sentiments. 3. One of the concerns the client has was whether formal power analysis would need to be conducted for the survey and to get approval from the IRB. Dr. Gu mentioned that formal power analysis would not be necessary, since aggregating the Likert scale responses will compute the averages and treat the averages as continuous data. As well as neither specific noise level nor minimal signal size are present within the client’s survey. There is too much variance between the different cohorts and the changes between the Likert scores are easy to perceive. To analyze the data a paired t-test on the results would be necessary. Although one might need a few more samples to feel comfortable with paired tests for ordinal data if they use the paired t-test result. 4. If the participants feel difference with the mechanisms the client would need a higher sample size for the experiment. However, 20-30 is good enough sample size for aggregating the responses for the questions to the questions. But if the questions want to be analyzed individually, the sample size of participants needed for this study would have to increase if the client wants to see significant difference in the results. 5. Sumeeth recommended to the client that on the IRB application cite a high number of participants needed such as 100-120. | | |
| **Who will carry out these actions?**  Client:   1. Change study design to incorporate the 2–3-week washout period and split the participant pool in half during each round of the study. 2. Give data to the consultant when the data collection is complete.   Consultant:   1. Keep in contact with the client and answer any questions they have about the study design. 2. Once the data is collected, analyze the pre and post study data using R. | | |
| **Status:** Follow up not needed | | |

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