**Controlled Experiment Report**

By Zhuoli Xiao

1. Introduction

Most instant messengers support 3 types of messages in the conversation: text, voice and photos. Those types of messages have their own advantages and disadvantages. I set up a series of controlled experiments to see how to use these 3 types of messages to communicate in a higher efficiency. In these experiments, I enroll10 participants and divide into 5 groups to complete 3 tasks and record their time and messages sent during conversation. All of the participants are my friends but I still do an Ethics for to legalize the experiments. At the end of the experiment, I find one of the participants are under 18 and eliminate his data from dataset because it requires a more complicated procedure to legalize his data.

1. Tasks and Experiments Details

These controlled experiments consist of 3 tasks. I divide 10 participants into 5 groups. In each group, 2 participants are arranged in different rooms and can only communicate with WeChat messengers. Participants take turns to complete tasks in random order of using text only, using text and voice, using text, photo and voice. I and another observer will monitor their behaviors besides and record related data.

Note: All the participants are Chinese they have used WeChat for a long time already.

**Task 1**: Explaining Vertex Cover Problem

**Goal**: We want to see how those 3 types of massages work in explaining workplace problems

**Detail Description**: Vertex Cover means that you need to find out a solution which is set of vertices from a graph that for each edge at least one of their endpoints is in the solution. I explain the definition of Vertex Cover Problems and how to find out the solution to Participant A. When I make sure he understands the problem well. Then Participant A will explain the problem and how to solve it to Participant B. When Participant B fully understands the problem, I cease the experiment and record the time.

**Quality Control**: I prepare 30 datasets of graph. When I think Participant A gives enough details, I will give 3 of the graph from datasets. If he can find out the optimal solution successfully I will record the data. Otherwise, the experiment goes on and I ask Participants A to give more details.

**Task 2:** Sell the Book Computational Geometry in WeChat

**Goal**: We want to see how those 3 types of massages work in descripting an object in business.

**Detail Description**: I give the book to Participant A beforehand explain some properties of the book. Participant A look into the book to get more information about it then describe it to Participant B.

**Quality Control**: When I think there is enough information about the book, I will cease the experiment and record the data.

**Task 3:** Tell the Fairy Tell Snow White(Modified Version)

**Goal:** We want to see how those 3 types of massages work in telling a long affair to others.

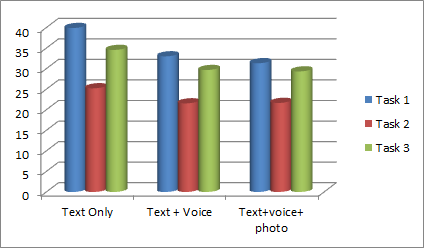
**Detail Description**: I modified the story Snow White in many details and tell it to Participant A. He will record the details and retell the story to Participant B.

**Quality Control**: I pause the experiment when I think there is sufficient information about the story. Then I will ask 3 details in the story to Participant B. If he answers it all correct I will stop the experiment and record the data. Otherwise, experiment goes on for Participant B to fetch more information.

1. Data Sets

In these controlled experiments I not only record the time eclipse to finish the tasks, but also record the number of messages sent through WeChat. Detailed data can be found in the file

WeChatNMessages.xlsx and WeChatTime.xlsx



Graph 1. Time to Finish 3 Tasks with Different Types of Messages in WeChat

Graph 2: Numbers of Messages Sent during Conversation

1. Bias

There many bias in the experiments:

Participant group size is too small.

Some data messed up in recording. The data is correct but which data belong to which participants are partially incorrect.

Due to the small size of participant group, when Participant A finish tasks to Participant B, I ask

them to change the position and do the tasks again. At this time Participant B already has some

information about the task.

1. Observations

From the controlled experiments we found that:

1. Combination of 3 voice types of messages can reach the highest efficiency
2. When allowed to use all 3 types of messages, voice messages are the type used most frequently.
3. In some data, we found some users spend more time using photo than without using photo. By observation, we found that it is because the need some time to draw pictures before taking and sending photos.
4. Participants use photos much more frequently in Task 1: Vertex Cover than other two tasks.
5. Sending a photo message takes more time than a text message and voice message. Sending a voice message takes the least time of the 3 types messages.
6. Conclusion

In the controlled experiments, we find that a combination of 3 types of messages are with highest efficiency when completing large size of tasks, but in small size of task, voice massages are the most convenient one. Therefore, we will implement all 3 types of messages into our final messenger design.