#transparentbuckets

CSC 591, Spring 2019

Stage 5 - Evaluate

Team

#	Name	UnityId
1	Arjun Madhusudan	amadhus2
2	Pooja Patel	pkpatel5
3	Prachi Gupta	pgupta24
4	Rahul Sethi	rsethi3
5	Zachariah Mathews	zmathew
6	Zelin Sun	zsun12

Participants / Customers

- **No. of participants:** 6
- **List of desirable characteristics:**
    - The person's age should be between 18 to 40 because most of our actual operators fall in this age group.
    - The person can be a novice in terms of driving as well.
    - The person should be a frequent driver or at least familiar with the semantics of the driving.
    - The person should be familiar with gaming.
    - The person should be familiar with the joysticks, if not joysticks then at least with the gaming consoles.
    - The person should be familiar with the construction vehicles.
- **List of actual characteristics:**

  We got a total of 15 responses with the following characteristics:
    - Students with age of 22-25.
    - Mostly with experience of 2 years of driving.
    - All the students were familiar with gaming.
    - Around 20% of the people were familiar with joysticks or consoles.
    - 70% of the people were familiar with construction vehicles.

  One person had a background in mining and construction and was familiar with the construction vehicles. One person was familiar with the concepts of Human-Computer Interaction.
- **Recruitment technique:**
    - A survey form was created using Google Forms.
    - The survey was broadcasted among our own network using WhatsApp and iMessage.
    - Link to the survey: https://forms.gle/4GpKBnPKGyweRRb9A
    - Chocolate was given to all the participants as a form of reward.

Lab

Figure 1

We reserved two digital rooms in the library for lab setup and evaluation. Tools we use are listed below:

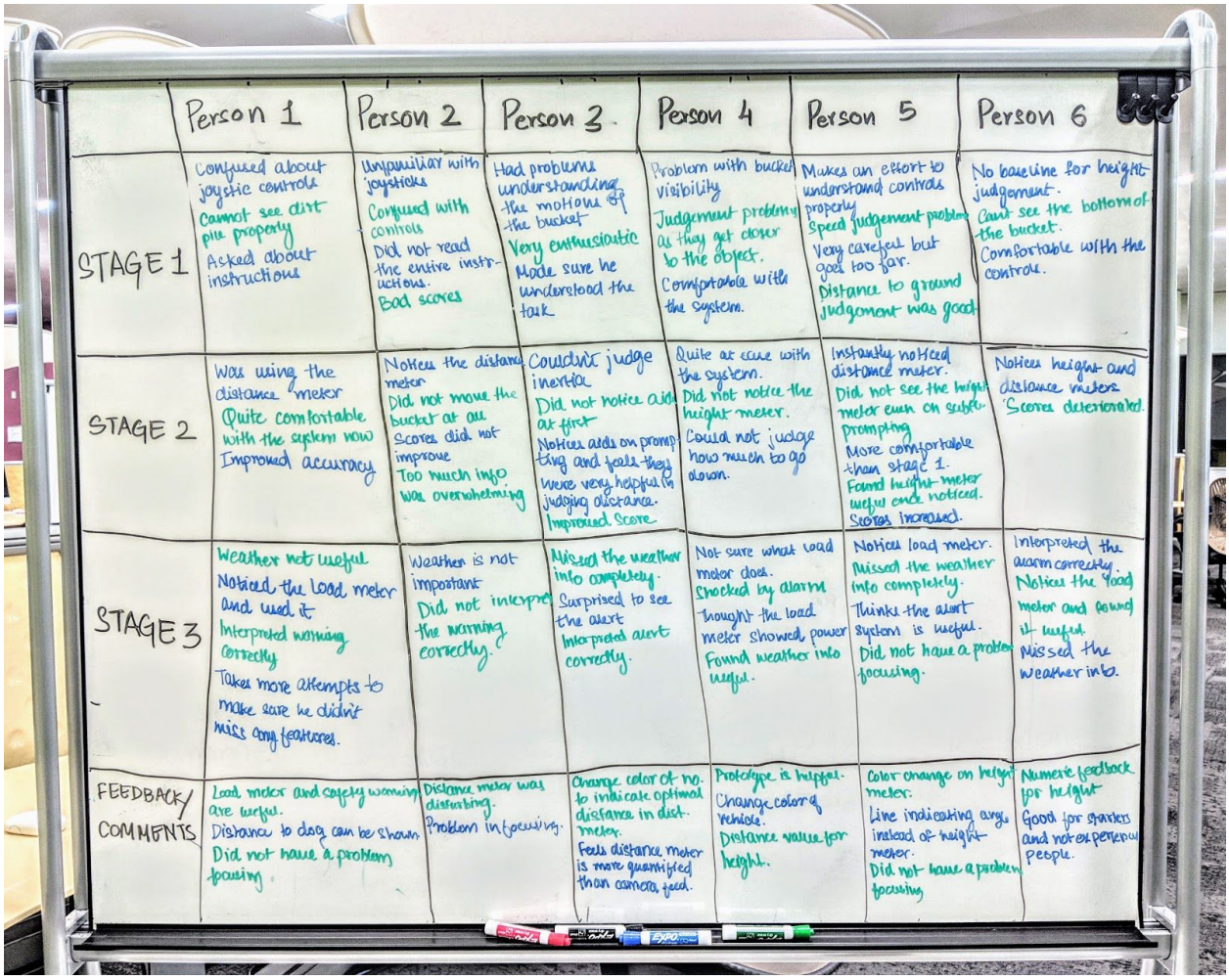
- A computer to run the prototype.
- Screens to project the prototype and evaluation process.
- A joystick for participants to interact with the prototype.
- Google Hangout to set up a remote connection between two rooms.
- A whiteboard to record the details of the interview.

During the evaluation, participants and an assistant were in the evaluation room (right one in Figure 1) and the observing team members were in the other room watching the evaluation through Google Hangout and took notes on what the participants “thought aloud”.

Interviews

The script/questions asked to the participant can be found here.

The grid that we produced :



	Person 1	Person 2	Person 3	Person 4	Person 5	Person 6
STAGE 1	Confused about joystic controls Cannot see dirt pile properly Asked about instructions	Unfamiliar with joysticks Confused with controls Did not read the entire instructions. Bad scores	Had problems understanding the motions of the bucket Very enthusiastic Made sure he understood the task	Problem with bucket visibility Judgement problems as they get closer to the object. Comfortable with the system.	Makes an effort to understand controls properly Speed judgement problem Very careful but goes too far. Distance to ground judgement was good.	No baseline for height judgement. Cant see the bottom of the bucket. Comfortable with the controls.
STAGE 2	Was using the distance meter Quite comfortable with the system now Improved accuracy	Notices the distance meter Did not move the bucket at all Scores did not improve Too much info was overwhelming	Couldn't judge inertia Did not notice aids at first Notices aids on prompting and feels they were very helpful in judging distance. Improved Score	Quite at ease with the system. Did not notice the height meter. Could not judge how much to go down.	Instantly noticed distance meter. Did not see the height meter even on subtle prompting More comfortable than stage 1. Found height meter useful and noticed. Scores increased.	Notices height and distance meters Scores deteriorated
STAGE 3	Weather not useful Noticed the load meter and used it Interpreted warning correctly Takes more attempts to make sure he didn't miss any features.	Weather is not important Did not interpret the warning correctly.	Missed the weather info completely. Surprised to see the alert Interpreted alert correctly.	Not sure what load meter does. Shocked by alarm Thought the load meter showed power Found weather info useful.	Notices load meter. Missed the weather info completely. Thinks the alert system is useful. Did not have a problem focusing.	Interpreted the alarm correctly. Notices the load meter and found it useful. Missed the weather info.
FEEDBACK/ COMMENTS	Load meter and safety warnings are useful. Distance to dog can be shown. Did not have a problem focusing	Distance meter was distracting. Problem in focusing.	Change color of no. to indicate optimal distance in dist. meter. Feels distance meter is more quantified than camera feed.	Prototype is helpful. Change coloring vehicle. Distance value for height.	Color change on height meter. Line indicating angle instead of height meter. Did not have a problem focusing	Numeric feedback for height Good for starters and not experienced people.

Results

Patterns

- The scores of almost all participants improved during the second stage as compared to the first one.
- Most participants did not have a problem focusing on the road while at the same time grasping the extra information on the screen
- The weather information was majorly considered as not useful.
- The warning was generally useful but was a little too alarming.
- The height meter was quite useful but wasn't easily noticeable.
- The height meter did not properly quantify the distance from the ground.
- Participants could not properly judge the inertia of the accelerator.
- The load meter was noticeable and useful.

Follow Up

Based on the patterns we noticed among participants during the interviews and their feedback, we have shortlisted a few improvements that can be made to the prototype.

- The weather module can be removed.
- The warning needs to be mellowed down a bit while at the same time making sure that it is not so subtle that the user may not notice it. A possible solution could be to make it a gradual alarm that starts off at a low volume when the vehicle is farther away from the object and becomes louder as the vehicle approaches the object.
- The height meter can be emphasized more so that users can easily notice it. A numeric scale can also be incorporated with it to quantify closeness to the ground better.
- A different color can be used as an indication of closeness in the distance meter.