Introduction of the Game

The game I will be doing usability research on is a concept game that I made for a custom controller in my first year for COMP140.

The game is a generic vertical shoot 'em up bullet hell type of game, in which you get to control the spaceship with a physical custom controller that is in the same shape as the in-game spaceship.
The game is very much just a basic prototype to show how the controller could be used, there isn't much content within the game, all the player can do is move around and shoot at enemies, there is no win or lose states.

I will be doing research on seeing how usable and enjoyable it is to use the custom controller to control the in-game spaceship.

I will also research on what users think about the design and comfort of the controller, to see how it could be improved.

Images of the game

Methods

Heuristic Evaluation:

Instead of finding a already existing heuristics evaluation sheet to use, I made my own as none of the ones I found fitted the controller that I wanted to test.
The first 4 heuristics of my sheet were taken from
https://www.researchgate.net/publication/200553251_Using_heuristics_to_evaluate_the_playability_of_games
They were the only heuristics that I could find that best suited the things I wanted to research about my custom controller.

The rest of the heuristics I made up myself in order to get the specialists to test the main things I wanted tested. Such as the way the controller is shaped, the look and aesthetics of the controller and whether the control works well with the game or not.

If I had just used a pre existing heuristics sheet I wouldn't of been able get feedback from the specialists about these things. So it was best to make them up and add them in.

Of course it might of been better to use a heuristics evaluation sheet that has already been tried and tested by professional researchers before in order to get the best results, but in this situation it was better to come up with some new ones to better fit the components I wanted to test out.

This is my heuristic evaluation sheet:
https://docs.google.com/document/d/1C8ij_98STQPIzw8rwy4_x5-KbQaGAtaQ_pPs0dALz_I/edit?usp=sharing

I got 3 specialists/peers from my course to test and analyze my custom controller and then fill out my Heuristics evaluation sheet.

The heuristics tested:

	Heuristics
1	**Intuitive Controls** *Player should be given controls that are basic enough to learn quickly yet expandable for advanced options.*
2	**Controller Feedback** *Provides immediate feedback for user actions.*
3	**Cohesive art** *Art should be recognizable to player, and speak to its function.*
4	**Controller actions** *Mechanics/controller actions have consistently mapped and learnable responses.*
5	**Form factor** *The controller's shape and design feels good to hold and use*
6	**Aesthetics** *The controller looks aesthetically pleasing*
7	**Synergy** *The controller and game work well together*

From these questions I got some good results into finding out what the specialists thought about my controller and inform me on what might need changing for improvement.

Based on their answers I created a survey.

Survey:

I chose to do a survey as my quantitative research method, as I believed it would be the best way to get answers on how my controller is failing in its design and how it could be improved.

The survey was created to get a more general view on the design and feel of the controller from people around the games academy.

Ideally I would of liked to get people from outside of the games academy to do the survey as well, but I was limited for time, and it was generally easier to get people I knew from the games academy then to spend more time trying to get lots of people from all over to play test and fill in my survey.

In this report I will refer to the people who filled in the survey as playtesters as they had to play test the controller game before filling in the survey.

The questions in the survey were made based on the notes I got from the specialists who did my Heuristics evaluation sheet. In the survey I really focused on the design and Usability of the custom controller and seeing if users enjoyed the experience of the controller.

List of the questions asked:

1. Do you play video games in your spare time? (yes, no, sometimes: tick box answer)
2. The controller was fun to use (5 point likert scale)
3. The controller felt intuitive (5 point likert scale)
4. Input feedback from the controller felt satisfying (5 point likert scale)
5. The custom controller ergonomically feels good in your hands (5 point likert scale)
6. The look of the controller made me feel immersed in the gameplay (5 point likert scale)
7. Would you be interested in playing a finished game with a custom controller like this? (5 point likert scale)
8. Which controls system was more fun to use? (Keyboard controls, Custom controller: tick box answer)
9. Do you think the controller could be improved, if so, how? (short written answer for the tester if they wanted)

How the survey was conducted:
I got playtesters from around the games academy on different courses and routes and sat them down to play test the controller and the basic space shooter game.

I first got them to play the game with keyboard controls and once they felt like they had tested it enough I got them to play the game again with the custom controller.

After a few minutes of playing with the custom controller I had them fill in the survey.

Results

Results for the Heuristic Evaluation:
The main points that were brought up from the 3 specialists that did my heuristic evaluation was:

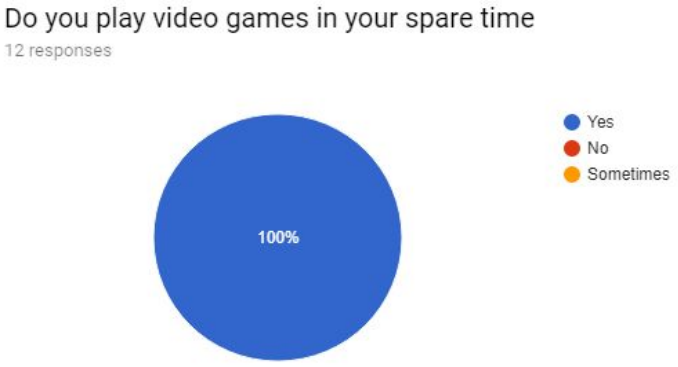
- Overall the controller felt intuitive to hold and control
- Controller still looks very rough, would look nicer if it was coloured and more polished
- 1 specialist suggested it could be wireless
- In game spaceship should accelerate depending on how much the physical controller is tilted, for better control of the speed of the in game spaceship
- 1 specialist would of like to hold the controller as if it was a model toy plane/spaceship, like the way you hold a paper plane to feel more immersed when moving the spaceship.

The results for the Heuristic Evaluation were great as they helped me really design the survey and know what to ask the playtesters to see if they felt the same way as the specialists.

Results for the Survey:
The survey had a total of 9 questions to answer, 8 of them being Quantitative questions for solid data and the last one being a Qualitative question to get the opinion of the play tester.

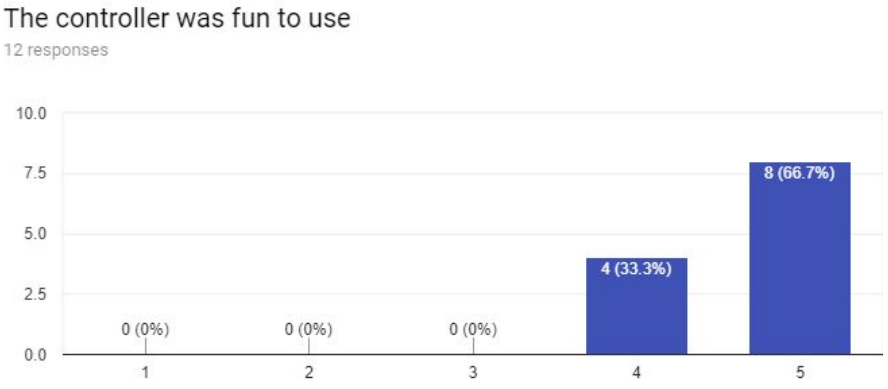
I got a total of 12 playtesters to fill in the survey, which isn't a whole lot for a survey, ideally you would want to get a lot more people to fill in a survey in order to get accurate and well defined data, but I just didn't have the time to try and get a bigger sample of people to playtest and fill in the survey.

Results for each question/section:

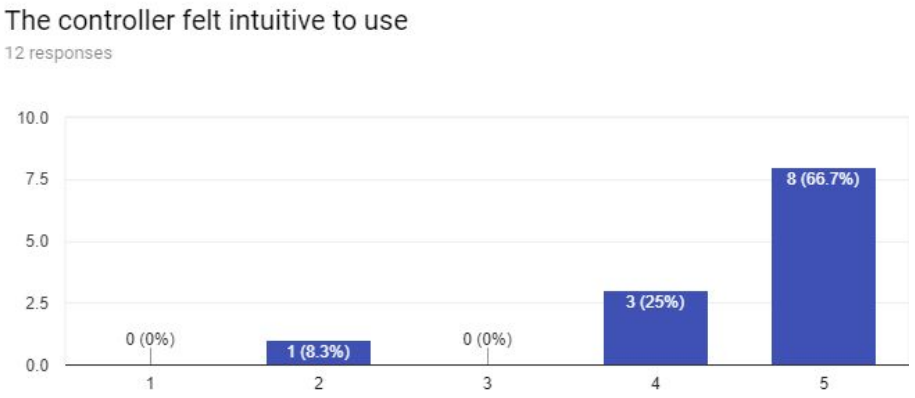


I decided to make my first question about the playtester, to see if they were gamers and knew how most games usually play out to see if there was a correlation between someone who played games before felt the controller was more intuitive than someone who hadn't played many video games before.

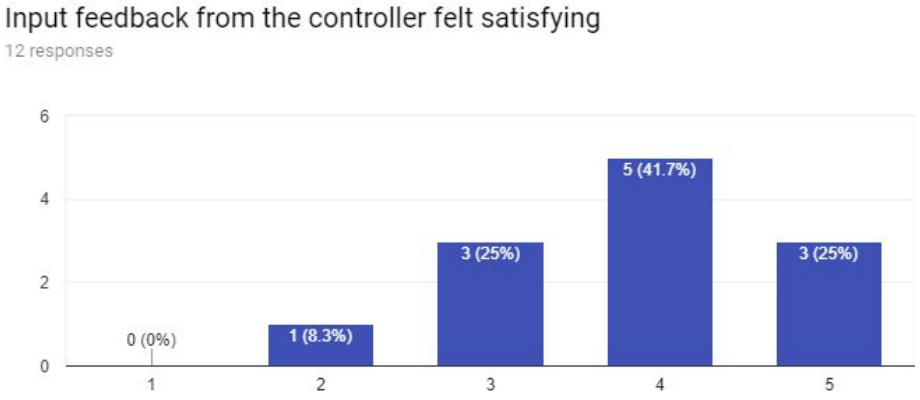
Unfortunately I only got the time to ask people from the games Academy to play test meaning that 100% of my play testers were gamers and were familiar with playing video games.



Probably the most important question, which got some very positive results.
This question was asked to see if the playtesters actually enjoyed the use of the controller. From the results you can see that the majority of users found the experience enjoyable.

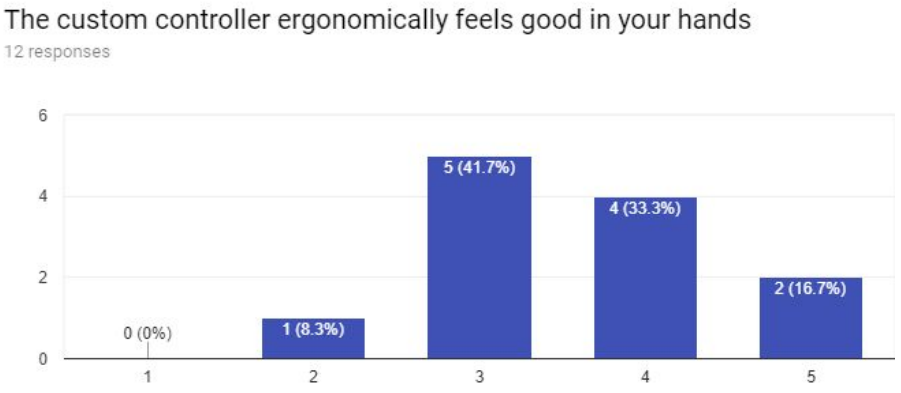


This question was asked to see how intuitive the control felt to the playtesters.
A majority felt that it was very intuitive, but 1 out of the 12 playtesters answered with a 2 on the likert scale so they felt that it wasn't very intuitive which is interesting.

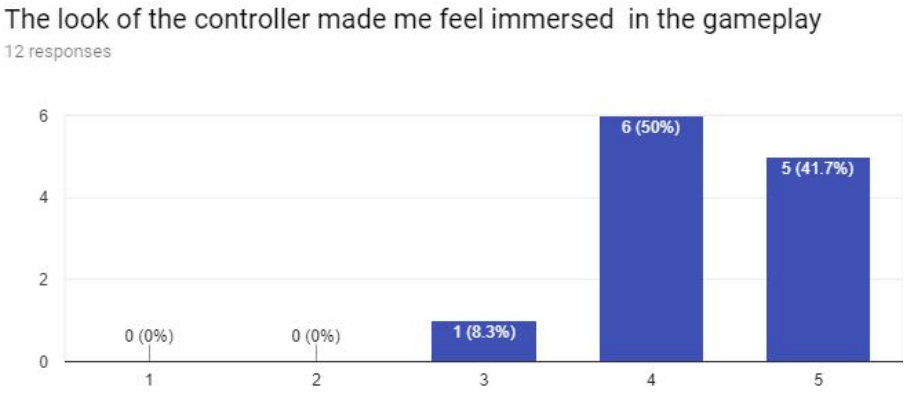


This question was asked to see if feedback of the controller felt satisfying, as in if the actions done with the controller were being conveyed properly in the game.
This question might of needed to be worded in a better way as I'm not sure if all the playtesters understood what it meant.

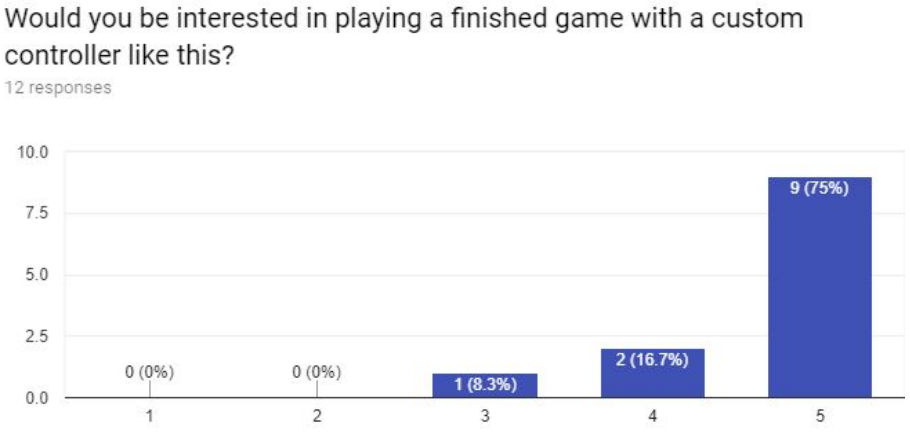
Overall the results are positive but 3 people fell in the middle and 1 person felt negative about it.



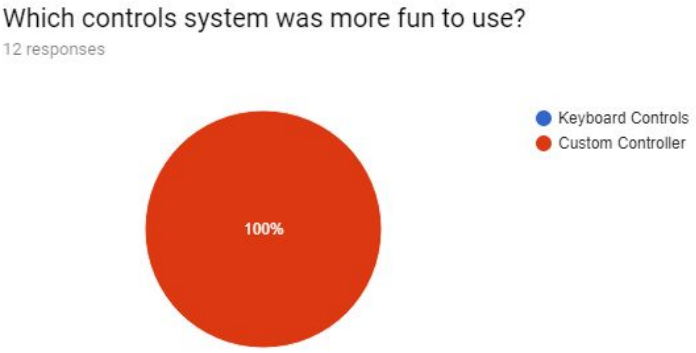
The results of this question say a lot about the design of the controller and shows that it really needs to be improved to make it feel better fo user to hold. The majority of the results fall on point 3 and 4 of the likert scale, showing that the controller was not the most ergonomically well designed for users to hold.



This question got some very positive results, with the majority of playtesters feeling that the way the controller looked did in fact help them feel immersed in the gameplay.
These results are very reassuring as the whole point of the project was to create a more immersive experience by physically holding the smaller spaceship then it is to use keyboard controls.



This question was asked to see if players would of actually wanted to play a finished game with this custom controller or something similar to it. The results of this are very positive and potentially point to niche market of games that are controlled with custom controllers in the form of the character or vehicle that you control in game.



This question was asked in order to see if any playetesters actually felt the keyboard controls felt more fun to play with. I didn't think there would be anyone who thought that keyboard controls would of been more fun to use, but it would've been interesting to see why if there had been.

And the final Qualitative question being "Do you think the controller could be improved, if so, how?"
Seeing as this question is quite broad, I got lots of different answers which were all very helpful, some more than others. So i went through them to pick out the main answers that were being mentioned multiple times, showing that multiple playtesters felt the same way about the elements they would like to see improved.

These were the 3 main answers that I got from going through all 12 answers:

- The shape of it needs improvement (it was sharp, too small and not enough grip)
- More sensitivity for controlling the ingame spaceship when titling the custom controller
- Different ways to hold the controller would be good

These were some good informal feedback given for this question, a lot of the answers backed up the answers given for the heuristic evaluation given by the specialists which shows some good correlation and really informs me on what needs to be changed to improve my custom controller.

Discussion

Overall I got some great feedback in understanding where my controller did well and where it failed.

Where it went well:
My Custom Controller overall perfectly performed it's intended task, being more fun to use than normal keyboard controls. With 100% of the playtesters saying it was more fun to use than the keyboard controls and 91.6% of playtesters finding it very fun to use.

Playtesters also thought that it felt intuitive to use with 87.5% of users saying it was very intuitive, and 83.3% of users said that the look of the controller added to the immersion of the game.

And 91.6% of users said that they would be interested in using a similar custom controller with a finished game.

Where it needs improvement:
Only 64.6% of users felt that the Controller felt ergonomically good in the user's hands, which isn't terrible but could be much better if the controller's shape had been better designed, and I do feel as that I could of made it much better.

Ways in which the controller could feel better to hold is by making it slightly larger so it fits a better range of hand sizes, and to potentially use softer materials or having padding spots on the wings where it is usually held by most users. These changes could drastically increase user's comfort when handling the controller.

70.8% of playtesters thought that the feedback of the controller was satisfying, that initially doesn't seem to bad, but missing about 30% of play testers not finding it fully satisfying isn't great, for it to be as fun as possible to use, controller feedback should be a very high priority and therefore it need more work on improving the way it controls the in game spaceship.

Some of the ways this could be done is by increasing the ingame spaceship's speed by the amount the custom controller is tilted, this was a feature that was suggested to me by a specialist who did my heuristics evaluation and some of the playtesters in the final question.

Conclusion

In Conclusion, doing the heuristic evaluation and getting people to playtest and fill in a survey, helped a lot in doing HCI research and finding new ways to improve on a game component.

It also really helped to do the heuristic evaluation first to then use the results of it to aide in creating the survey, creating question based on the answers I got.

If I were to do HCI research again (which I most probably will be) I would aim to get more data overall, get more specialists to do the heuristic evaluation and get a lot more people from a wider range to playtest and fill in the survey for more accurate data.

I would also look at doing different research methods such as A/B testing and Task analysis, and I would try and do multiple passes, once a game component for example has been tested and improved I would reevaluate and get people to playtest it again to see if the results have improved.

Overall this project has been helpful and I have learned a lot from it and I feel like I now know how to get good ways to playtest features for my next games and get good and accurate results to help support and improve my work.