

## References

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## Appendix

(Attached)

Wireflow

User journey map

### **METHODS**

Bodystorming

Interviews

Contextual Observation

Think-a-loud

Lit review

Research

Personas

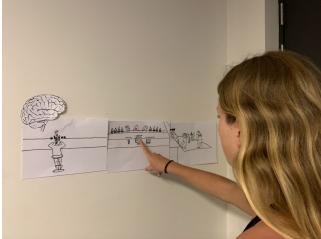
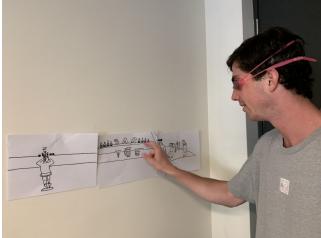
Storyboards

Insights

User Journey Map

## Stage 1 - Paper iterations testing

Participants = 5

Name	Photographic Evidence	Name	Photographic Evidence
Sean		Maddy	
Francesca		Ollie	
Lucy			

In order to test our first stage of iteration, we placed out the sketched paper prototype on the wall at eye level in front of our users - aimed at giving them the best possible realistic experience with VR and having it straight in front of them.

The main reactions we looked for were: understanding the environment and context, if they understood and engaged with the activities that we had planned within our simulation and whether they knew what and where to look - what they did intuitively.

## **INSIGHTS:**

- It was hard for the user to imagine what it would feel like when actually seeing this in a VR context - however, they did understand and know that it was a bar.
- Found the “activities” really interesting - we tried to visually show users through putting a cut out of the brains next to each other and told them what would happen when using
- The user would intuitively select the larger cup as it was the one in the middle - however, it was the most important.
- Paper does limit the ability of the user understanding the environment and context
- Importance of visual prompts to direct them to turn left to right once selecting the bottle

This lead us to create a cardboard mockup. The goal of this round of Testing was to learn how users interact with our designs and how to then take the visual design and prompts needed for the next round of testing. We decided to do this at a larger scale to simulate the physical and sensorimotor affordances of interacting with VR. This next stage then required the users to stand in front of the cardboard again we wanted to further understand what inutive movements they had and interactions they naturally took.

In an attempt to replicate the feeling of being in a VR simulation - we gave the users google to wear to reduce vision on either side of them.

This was an effective stage of testing as we were able to move around paper cutouts of the various objects within our simulation. Allowing us to convey the different scenarios and activities that take place within our VR environment. However upon reflection we do think that maybe having a two different designs that the user would be able to interact with - through A/B testing would have been better in designing the environment not just basing it off the visual prompts that were needed or what was intuitive for them.

Another piece of feedback that we implemented was an arrow which we tried to use as a prompt to them allow the user to know which way to turn or face once an action was complete. The need and use for visual prompts is definitely something that will be implemented in our digital simulation in our higher fidelity mockups.

## Stage 2 - Cardboard

Participants = 5

Name	Photographic Evidence	Name	Photographic Evidence
Gigi		Francesca	
Lucy	 		 
Ollie			

## **INSIGHTS:**

- Users were able to engage in a more realistic simulation enjoyed that they were looking at a larger scale mockup and allowed them to get a sense of the scale / simulation they would feel if they were using VR - however some people had never used a VR headset so this was how they imagined the scenario to look like.
- All 4 users mentioned that they would like to see visual prompts such as arrows or lighting to show them that when clicking on a certain object they would then know to turn a certain way.
- In particular user 2 (ollie) mentioned that when the digital version was made - lighting up next to the bottle selected would be an interesting way to allow the user to know to then implement these actions.
- Another user mentioned whichever one to selected would be good if it got enlarged when selecting the bottle.
- Another user did not understand what the point for the text messages were - although yes it shows fights and or arguments it may not be valid as each person's interpretation is different.
- Basic environment - They were able to recognise that it was in a bar - low fidelity and they demonstrated an understanding of the general movements we were looking for.

### Stage 3: VR google Box

Participants = 4

Name	Photographic Evidence	Name	Photographic Evidence
Gigi	 	Ally	 
			 

This was the first built virtual prototype of our environment, so our users could be immersed in the context in which they would interact with our product. We then wanted to iterate this virtual world as it “gives a clearer picture of the complexity of the whole experience” just showing them the virtual environment - quite restrictive and basic but enjoyed that they could recognise it is a bar and they would turn their head and see around the scene.

We tested this on 4 people:

Feedback: was based around the idea that it was quite a basic layout and our users didn't understand what activities would take place within the simulation. However they enjoyed using the VR googles and seeing it in front of them.

#### Stage 4: High-school Students testing

Participants = 5



**Reflection:** This stage of user testing-involved going into a high school where we wanted to test our prototype on our target demographic. We wanted to learn what drives positive experiences for them and how to take those insights from the synthesis stage to an appropriate VR education tool.

### **Implemented iterations:**

- Visual Prompts - light up beside the bottle when interacted with to prompt user to turn a certain way.
- Larger environment / Bar
- Clear scenarios in different locations of the bar
- 360 turning point.

We clearly told the students the purpose and context of our “VR lesson” so they knew that it was for educational purposes - however we allowed users to interact as if they were using it properly with no input from us. The aim of this was to understand the intuitive movements and what they would do when in the simulation.

Iteration stage 4 involved going into high school. We hoped that we would test our VR simulation on our target audience within the education system and see what feedback they had.

The aim of this stage of the user testing process was to better understand how our users would use and engage in the space and see what their preferences were when they had an environment that was a lot more detailed. With the feedback from the previous testing we were able to effectively implement things such as visual prompts - such as when the user could select a bottle it would light up red on the left side of the left bottle and blue on the right side of the bottle.

Having 3 separate scenarios - when looking right you and hover over the person it would light up actioning that something was going to take place (but nothing actually happened which made it difficult for the user to understand the point of the simulation).

- Visual prompts definitely worked well for them
- The aim of this stage of the user testing process was to better understand how our users would use and engage in the space and see what their preferences were when they had an environment that was a lot more detailed. With the feedback from the previous testing we were able to effectively implement things such as visual prompts - such as when the user could select a bottle it would light up red on the left side of the left bottle and blue on the right side of the bottle.
- Having 3 separate scenarios - when looking right you and hover over the person it would light up actioning that something was going to take place (but nothing actually happened which made it difficult for the user to understand the point of the simulation).
- They were extremely excited about the idea of using a VR headset which justifies our research - that this is an engaging and new way of teaching / captivating an audience.
- FEEDBACK on the environment - and we can embed a walkthrough of what they basically would have seen through goggles (what we did on Wednesday night)
- wanted to see how our target audience would engage in this and if they would use it.

Down side was that when they looked through the goggles they would only turn their head and visually see the environment and surroundings - but wouldn't engage or interact with the actual environment. However they got a better understanding of the afforded interactions when they used the simulation on the computer and could hover over specific characters and then see the action form there- something we would look into implementing further down the track once we have controllers and the users can have hands within the simulation.

Feedback - they liked that when you click on one of the bottles that the interaction takes place - would be better however with more direction like a prompt or arrow to make it more obvious People are confused with what they are actually meant to be seeing - the environment is made and it looks good but what activities are there.

- It was fun as they have never used a VR google box before
- They were very jumpy and kept turning around, so they would need to be in a safe environment so they don't hurt themselves
- The bar environment was very dark and a little off putting/ not engaging so that gave us insight into what someone that age then sees and demonstrates

## Stage 5: 3Dsmax and Unity Simulation

Participants = 4

The aim of this stage of the process was to better understand how our users would use and engage in the space gage what their preferences were. With the feedback from the previous testing we were able to effectively implement things such as visual prompts and objects like the brain - however, were not able to make our user walk - which is something we would definitely hope for when progressing in the future.

The technology helped them better understand how users would use the space and what their preferences were. In the end, they increased the space after aviation security and divided it according to the users' preferred layout.

**JOCK:**

*"does it move - we want walking"* - Make the environment a little lighter and the brains are cool but why only one brain not two. Would be better for visualising the aging process and the implications of alcohol on the brain.



<b>Heuristic Name</b>	<b>Heuristic Description</b>	<b>Heuristic Satisfied</b>	<b>Problem(s) Encountered</b>	<b>Severity /5</b>
<b>Natural Engagement</b>	Interaction should approach the user's expectation of interaction in the real	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure	It was obvious that it was in the social setting of a bar. The lighting was a bit dark, would have been	3/5

	world as far as possible.		good to be a bit lighter.	
<b>Task/Action Compatibility</b>	The virtual environment and behaviour of objects should correspond as closely as possible to the user's expectation of real world objects; their behaviour; and affordances for task action.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure	The character was a human that could see and spin on the spot. There were benches and chairs that were easily identified as well as other human figures.	3/5
<b>Natural Expression</b>	The representation of the self in the virtual environment should allow the user to act and explore in a natural manner and not restrict normal physical actions.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure	Yes, to an extent. Being able to see around the whole room is a bonus, but not being able to move or talk reduced the user experience.	3/5
<b>Coordination of Action and Representation</b>	The representation of the self and behavior manifest in the virtual environment should be faithful to the user's actions.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure	The vr representation should be able to actively do whatever the user instructs.	5/5

<b>Realistic Feedback</b>	The effect of the user's actions on virtual world objects should be immediately visible and conform to the laws of physics and the user's perceptual expectations.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure	Yes, for sure. That's what makes the image and experience exciting and real. Being able to connect on a level where you think the experience is as similar as real life is important.	5/5
<b>Faithful Viewpoints</b>	The visual representation of the virtual world should map to the user's normal perception, and the viewpoint change by head movement should be rendered without delay.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure	The head movement allows the user to achieve what they would in a real-life experience. There shouldn't be a delay as this alters the experience	5/5
<b>Navigation and Orientation</b>	The user should always be able to find where they are in the virtual environment and return to known positions.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure	This is encouraged so you can bring yourself back into real life. Knowing that you are in the VR world is of high importance.	5/5
<b>Support for learning</b>	Active objects should be cued and if necessary explain themselves to promote learning of virtual environments.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure	Maybe if you would like to find out information about an object/person you can choose this as an option?	3/5
<b>Clear Turn-taking</b>	Where system initiative is used it should be clearly signalled and conventions established for turn-taking.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure	Signals and signs that point you in the right direction should be used. Prompts that keep you on task would be useful.	3/5

<b>Sense of Presence</b>	The user's perception of engagement and being in a 'real' world should be as natural as possible.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure	<p>From the VR screen you know that you are in a bar and a social setting, but the graphics could use improvement to make the setting more realistic. Maybe more people moving around the setting and acting more freely instead of standing still.</p>	5/5

**HUGO:**



<b>Heuristic Name</b>	<b>Heuristic Description</b>	<b>Heuristic Satisfied</b>	<b>Problem(s) Encountered</b>	<b>Severity /5</b>
<b>Natural Engagement</b>	Interaction should approach the user's expectation of interaction in the real world as far as possible.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure	realistic setting with relatable images. Thought the lighting was representative of that scenario.	/5
<b>Task/Action Compatibility</b>	The virtual environment and behaviour of objects should correspond as closely as possible to the user's expectation of real world objects; their behaviour; and affordances for task action.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure	All of the people and objects in the room were obvious and very realistic in that scenario.	/5
<b>Natural Expression</b>	The representation of the self in the virtual environment should allow the user to act and explore in a natural manner and not restrict normal physical actions.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure	The full view of the room is well achieved. Would be helpful to have voice and sound within the setting.	/5

<b>Coordination of Action and Representation</b>	The representation of the self and behavior manifest in the virtual environment should be faithful to the user's actions.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure	his program should portray the way that individuals would normally act in this situation.	/5
<b>Realistic Feedback</b>	The effect of the user's actions on virtual world objects should be immediately visible and conform to the laws of physics and the user's perceptual expectations.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure	very real world and as a user, I can easily relate to the situation which makes it a comfortable experience.	/5
<b>Faithful Viewpoints</b>	The visual representation of the virtual world should map to the user's normal perception, and the viewpoint change by head movement should be rendered without delay.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure	the way the character moves should be the same manner that a real human would. I think this does that quite well.	/5
<b>Navigation and Orientation</b>	The user should always be able to find where they are in the virtual environment and return to known positions.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure	think the small scale of the room enables this. If it was bigger space, would be more challenging.	/5
<b>Support for Learning</b>	Active objects should be used and if necessary explain themselves to promote learning of virtual environments.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure	having conversations with others may be an option.	/5
<b>Clear Turn-taking</b>	Where system initiative is used it should be clearly signalled and conventions established for turn-taking.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure	In the real world, there isn't prompts so I think it works well in this regard.	/5

<b>Sense of Presence</b>	The user's perception of engagement and being in 'real' world should be as natural as possible.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure	Very realistic VR and allows the user to immerse themselves in the new world which is a very effective feature of the program.	/5
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CELIA:



CELIA:

<b>Heuristic Name</b>	<b>Heuristic Description</b>	<b>Heuristic Satisfied</b>	<b>Problem(s) Encountered</b>	<b>Severity /5</b>
<b>Natural Engagement</b>	Interaction should approach the user's expectation of interaction in the real world as far as possible.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure	It did feel very natural however I would have preferred if I was able to walk around and/ or pick things up with my hands like objects.	3/5
<b>Task/Action Compatibility</b>	The virtual environment and behaviour of objects should correspond as closely as possible to the user's expectation of real world objects; their behaviour; and affordances for task action.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Not Sure	It was really realistic and I was able to move freely and turn 360 degrees so I guess that enabled me to complete tasks. The benches were cool but I guess could have been cool if I walked around to them	3/5

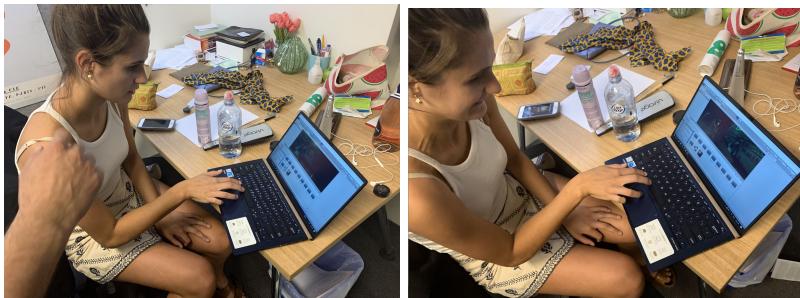
<b>Natural Expression</b>	The representation of the self in the virtual environment should allow the user to act and explore in a natural manner and not restrict normal physical actions.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure	Because I can turn my head and freely look round at the environment it works well in terms of naturally doing what I would in a normal setting.	5/5
<b>Coordination of Action and Representation</b>	The representation of the self and behaviour manifest in the virtual environment should be faithful to the user's actions.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Not Sure	I wou dhave liked to use my hands	4/5
<b>Realistic Feedback</b>	The effect of the user's actions on virtual world objects should be immediately visible and conform to the laws of physics and the user's perceptual expectations.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure	It was all very understandable.  I wasn't shocked by what I saw and it was interesting to see the brain there however it would have been better if I could touch the brain as well.	5/5
<b>Faithful Viewpoints</b>	The visual representation of the virtual world should map to the user's normal perception, and the viewpoint change by head movement should be rendered without delay.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure	As you walk into the bar its the first thing you see and when you turn your head you expect to see different things and i did as you see there are 2 different scenes going on next to each	5/5
<b>Navigation and Orientation</b>	The user should always be able to find where they are in the virtual environment and return to known positions.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure	It was only in one room so I guess this does not apply.	4/5

<b>Support for learning</b>	Active objects should be cued and if necessary explain themselves to promote learning of virtual environments.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure	Visual prompts were good and useful  I get the brains but was a bit confused as to what one was doing	3/5
<b>Clear Turn-taking</b>	Where system initiative is used it should be clearly signalled and conventions established for turn-taking.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure	The visual prompts were good – and I liked how the light would shine above the objects or the characters within the simulation	3/5
<b>Sense of Presence</b>	The user's perception of engagement and being in a 'real' world should be as natural as possible.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure	I could tell where I was in the room but it would have been better to walk around	4/5

## AIRLIE



## FRANCESCA



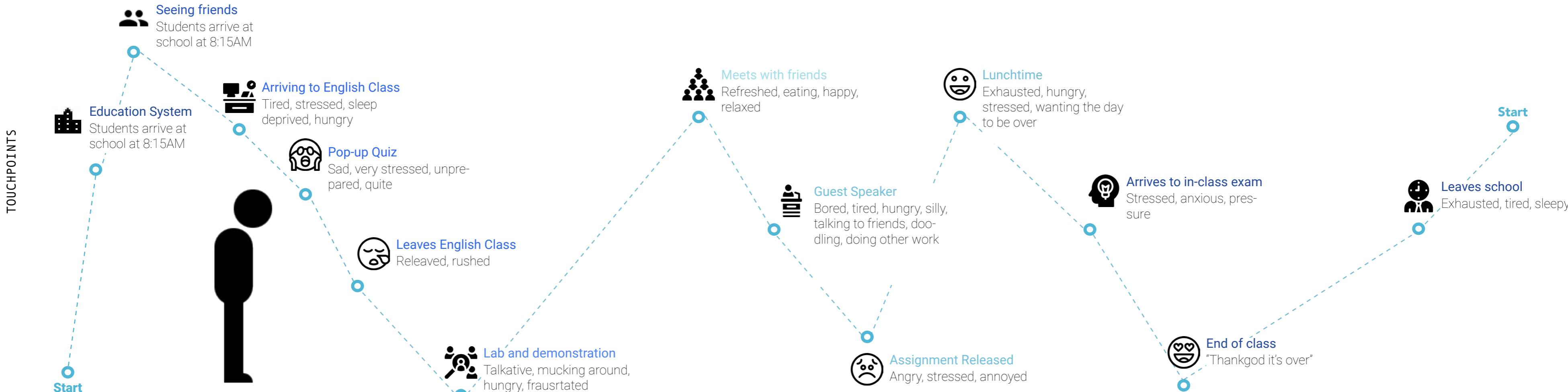
**Final iteration:**

Final changes - *make the thing lighter, use audio in it as well* and compare brains

**Visual aspects of the virtual reality**

- 2 x brain
- Lights
- Audio
- Middle bottle working (line on the floor for the walking when blurry for the google blurry vision)
- Individuals

A high-school student's journey  
**SUMMARY OF STUDENTS**



Arrives at School

Meets with friends

English Class

Science Class

Recess

PDHPE class

Lunch

Maths Class

End of School

