UNIVERSITY of York

DEPARTMENT OF THEATRE, FILM AND TELEVISION

Undergraduate Cover Sheet

****PLEASE COMPLETE AND SAVE THIS FORM AS THE FIRST PAGE OF YOUR DOCUMENT FOR SUBMISSION****

BSc in Interactive Media Term: 2

Module Code and Module Title: TFT00017I

Exam Number: Y3856950

Agreed Mark: ☐ Penalty Marks: ☐

Essay Title: Summative Assessment 02

Report

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Title

An interactive, touch screen kiosk, demonstrating the effect of plate tectonics on the continents over the course two billion years.

Overview

I'm creating an interactive application for use in the Yorkshire museum, displayed as a touch screen kiosk. with the intent of showing users the effect that tectonic plates has on the movement of continents over billions of years. The application involves an animated map which shows the movement of continental crust several while having elements to get the user to engage with the map, increasing their learning.

I was inspired by various animations which show the tectonic plates in action, I wanted to do this but in an interactive environment which goes into more detail of how they work while engaging the user and making the experience more enjoyable for them.

I started off by gathering user research through observations and questionnaires. I then created some basic designs first on paper, and then on Adobe Xd. To create the prototype itself I used the Unity game engine. I continued to iterate upon my designs and user testing to make sure the final product was appropriate.

Design Approach

The first data I got which influenced my design concept was from the Head of Collections at the museum who gave a description of the current display as well as some ideas for what they would like to see in a new one. The notes I took from this can be found in appendix 4.

Before attempting to gather data on any participants they were all asked if they were above the age of 18 to avoid any ethics issues. I also told the front of house staff that I was going to be conducting some user research. I have also completed an ethics checklist which can be seen in appendix 7.

Observations

The first data gathering approach I took was to observe how people used the current exhibit in place. I observed users on an individual basis, studying how they used the exhibit, the amount of time they spent using it and the ages of people using it. I had the sheet of paper as seen in appendix 1 which contained information about what I was doing which could be given to anyone if they asked what I was doing.

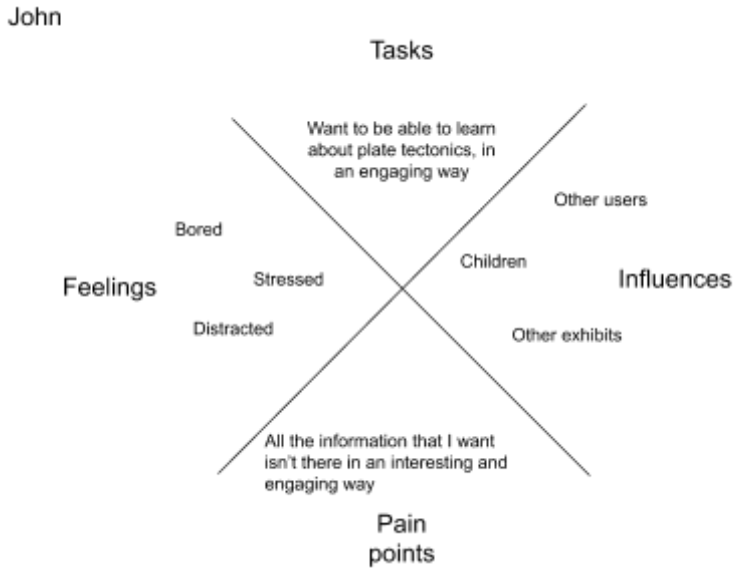
Overall my observations, as seen in appendix 5, showed the the vast majority of users were disengaged from the exhibit. The jigsaw didn't really seem to appeal to anyone other than the children, and the children likely didn't really understand what each piece of the jigsaw represented as they weren't able to read the display itself. Inversely the adults would read the display but rarely engage with the jigsaw properly. I think the problem was that the jigsaw was an okay visual aid for the text on the wall, however didn't provide a proper experience to go with it. I designed my prototype with this in mind, ensuring it provided a good visual aid while also ensuring all the information is still there.

Questionnaires

To follow up on the observations I conducted questionnaires on several people who used the exhibit to get an idea of what their experience was like. Before conducting it I introduced myself and I read out the statement in appendix 2 so they understood what was going on and that I had their consent to ask them the questions.

The results of the questionnaire, as seen in appendix 6, mainly reflected the results of the observations, whereby users seemed disengaged from the exhibit. I found that people wanted more information and that they prioritise the ease of use and the actual content before anything else. The majority of users claimed that the came away without learning anything from the exhibit which indicates it was too basic and not challenging or informative enough.People didn't really want to use a jigsaw, I think it came across as childish.

Empathy maps



I used empathy maps to really try and understand what the user wanted. From this I identified points of pain which my application needs to solve. For this specific map that involved not having all the information and it not being presented in an interesting enough way. The solution to this is my interactive version of the exhibit which should provide an engaging and information filled experience.

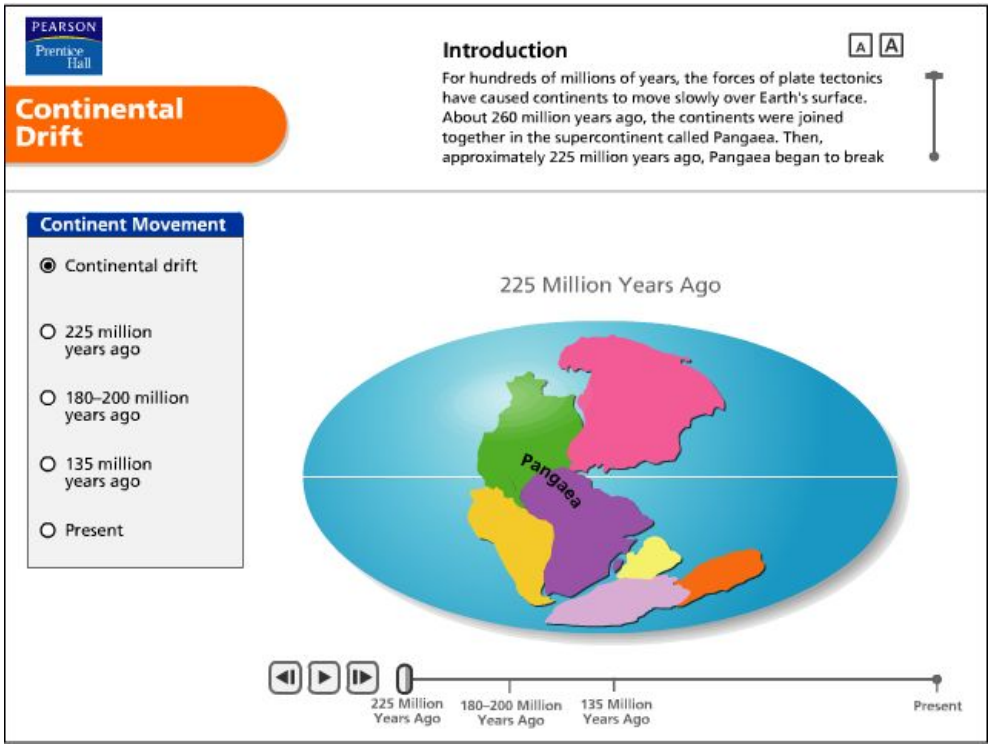
Design Statement

I have chosen to focus on the plate tectonic exhibit in the museum. I find this particular topic interesting and I felt that the current display wasn't really getting the attention it deserved, mainly due to the quite simplistic nature of it. I felt like there was a lot that could be done to make it more

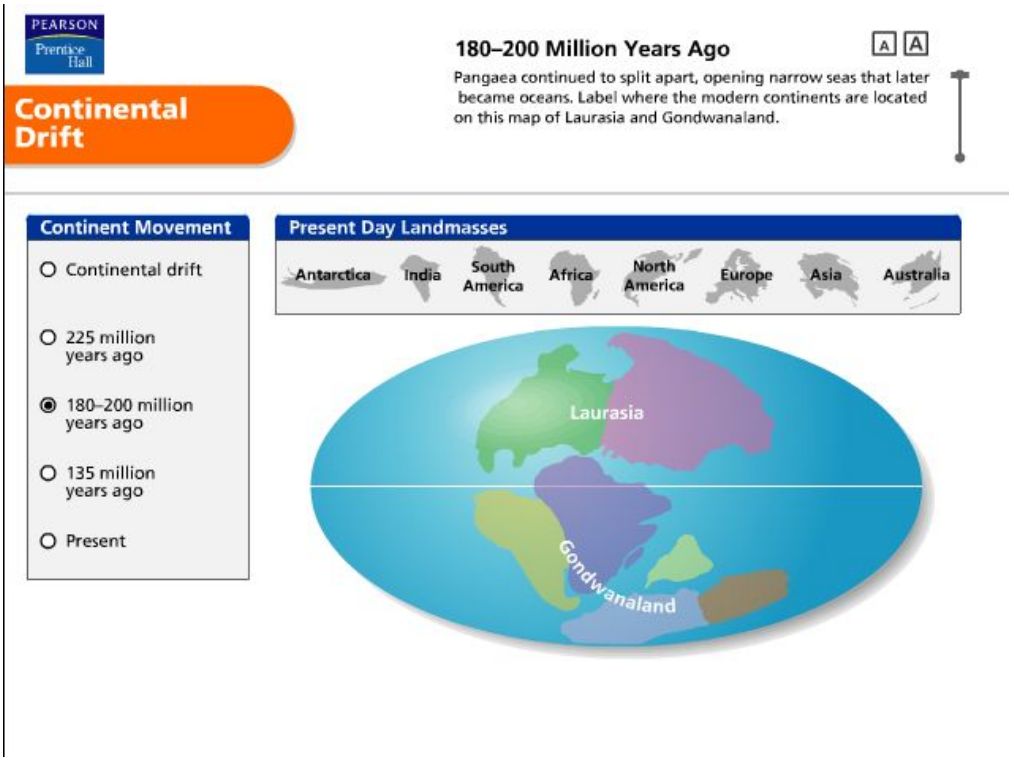
engaging through the use of an interactive application. This was reflected in my user research where I found that people were found the jigsaw puzzle to be underwhelming and unimaginative.

Design Context

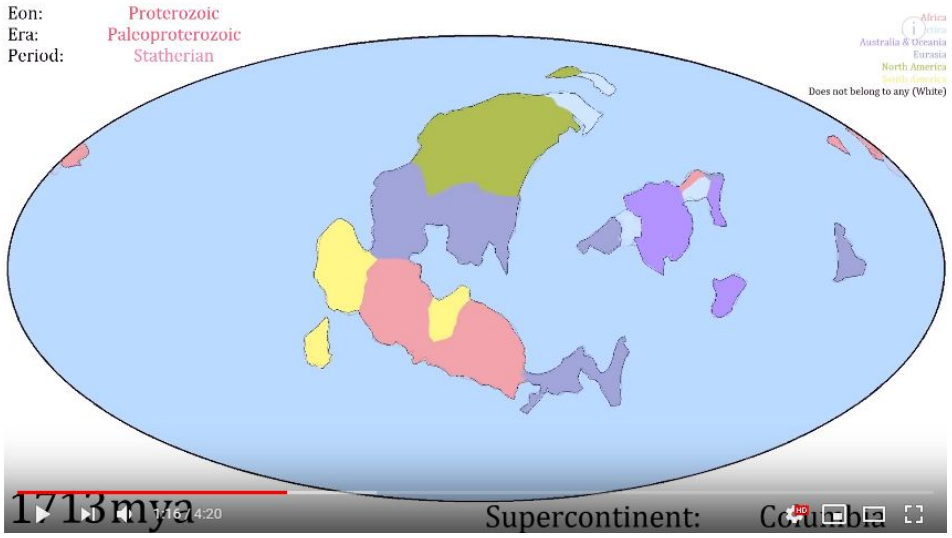
phschool.com offer a small web application which demonstrates continental drift on a world map, showing the continents drifting apart from each other over time (http://www.phschool.com/atschool/phsciexp/active_art/continental_drift/).



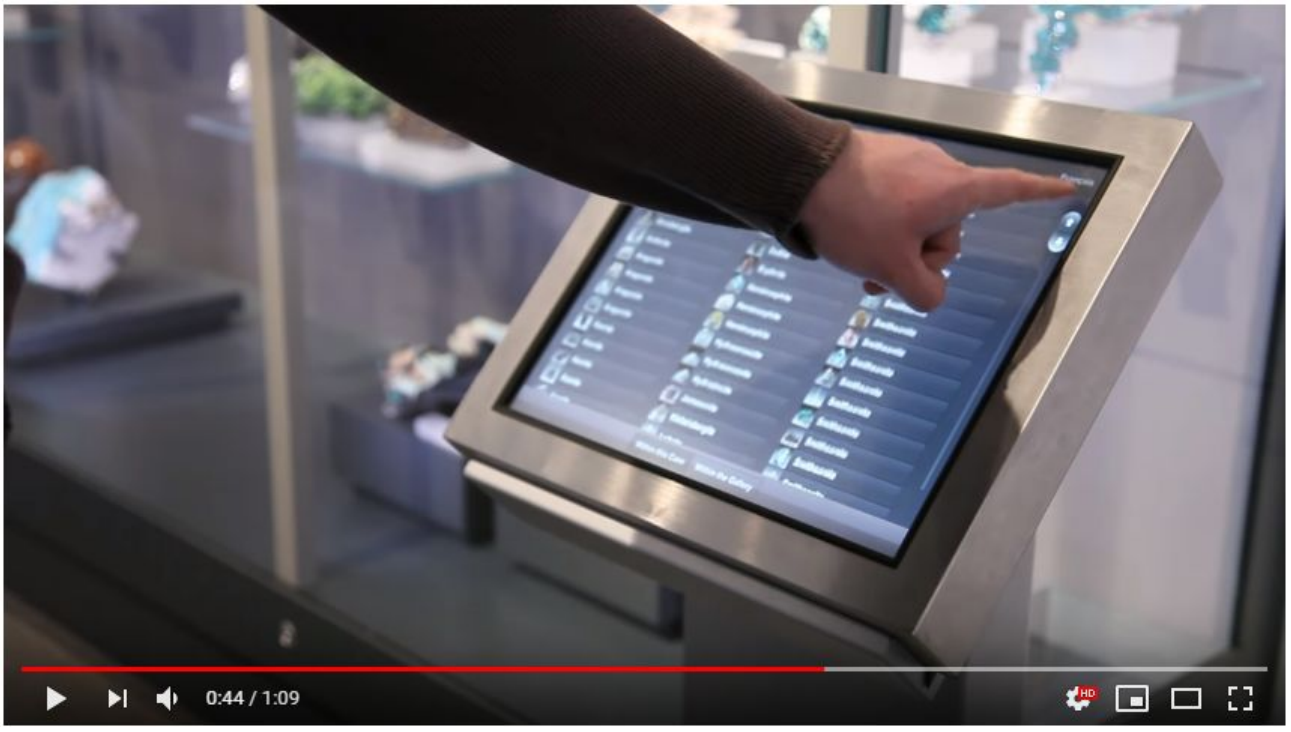
The application provides a timeline at the bottom to give an indication of what time period the map is displaying. I think this gets the idea of tectonic plates across really well, and demonstrates how the continents have moved over hundreds of millions of years. It also features a description at the top of the page but this is quite tricky to navigate and doesn't really explain much more than what is obvious from the map itself. I think the application is simple and easy to use, something I want to replicate in my own design. It doesn't require any sort of instructions on how to use it and the experience is short but informative.I do think however that the interface is a little cluttered which could be confusing for some users, this is something I would address in my design. The way the colours are used to represent the continents is also very useful as it allows the user to track them the whole way through and see how far each one has travelled.



Accessible through the grouping on the left, the user is able to interact with the map by trying to link current day land masses with their positions millions of years ago. This is an effective way to get the user to interact with the animation and also help them get a better understand of the extent of continental drift.

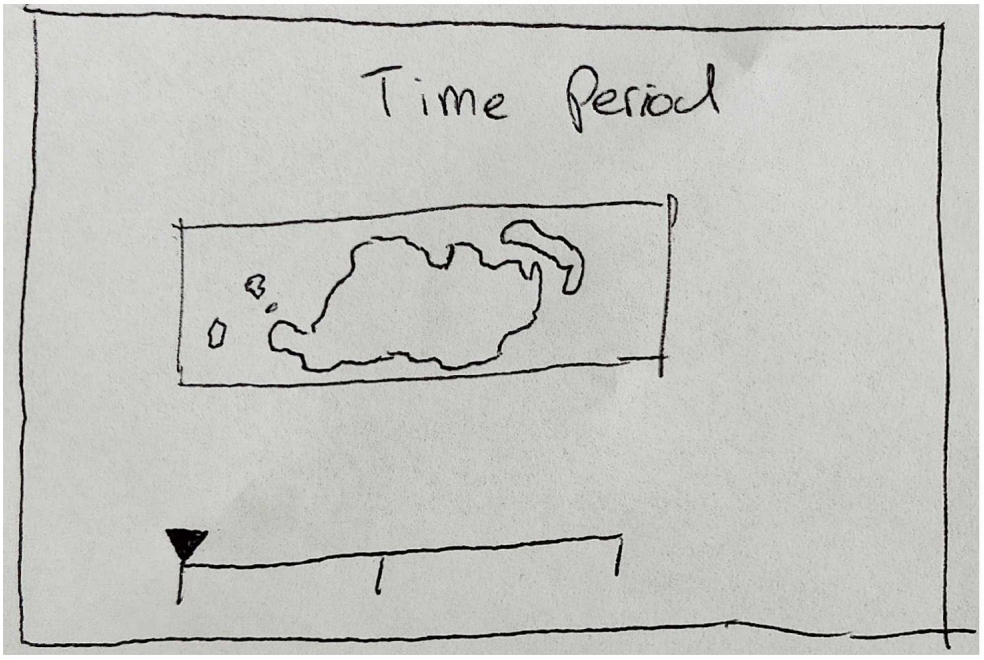


My next inspiration is from the YouTube video where I got the images for the map that I used in my prototype (https://www.youtube.com/watch?v=UwWWuttntio). This was my favorite animation showed the impact of tectonic plates over a large period of time that I found. It's simple and easy to understand everything that's going on. I do think think that it lacks context and details explaining what's happening. I think this would be particularly important for a museum piece, which really needs to give the user context and history behind an exhibit.



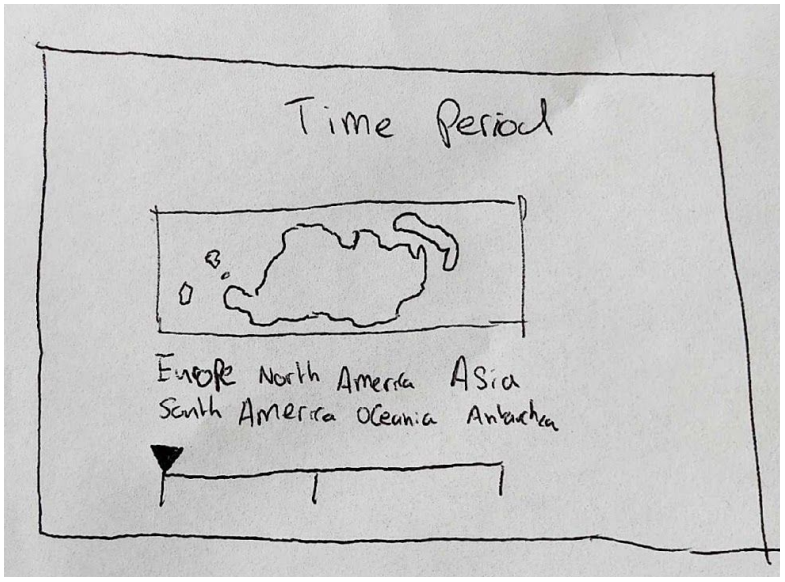
For the exhibit in the museum I was aiming for something like in the image above, full video can be found at https://www.youtube.com/watch?v=IzD9ypMIz2g. This is a touch screen kiosk found in the Royal Ontario Museum. I think touch screen designs are intuitive to everyone, and require little technological knowledge to use. This is ideal for a museum where a lot of the visitors are both old and young, and could struggle with complex systems. While my interaction with the touch screen is much simpler than the one above it demonstrates a similar sort of experience the user may have. I think the kiosk would fit in well with the exhibit, without looking out of place.

Development Process



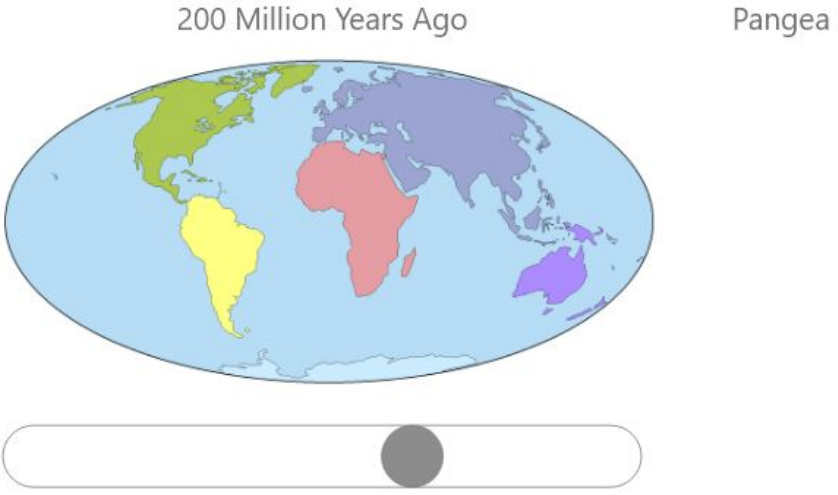
I first drew a very basic sketch on paper. This included all the information that would have to be shown. It first tells the user the time period at the top, in large text so that it can be read by those who may have difficulty reading. It features a map in the middle that will hopefully be animated, it

will show the transition from pangea to the world we know today. There is a timeline at the bottom which shows the progress through the animation. It's possible that the user could scroll through the animation themself but I will have to do some user testing to see how this works out. The key point are indicated by the vertical lines, so pangea could be one and Laurasia could be another. At this point the animation will briefly stop and the user a small interactive task will occur. For example the user will have to connect the current-day continents to the landmasses of pangea.

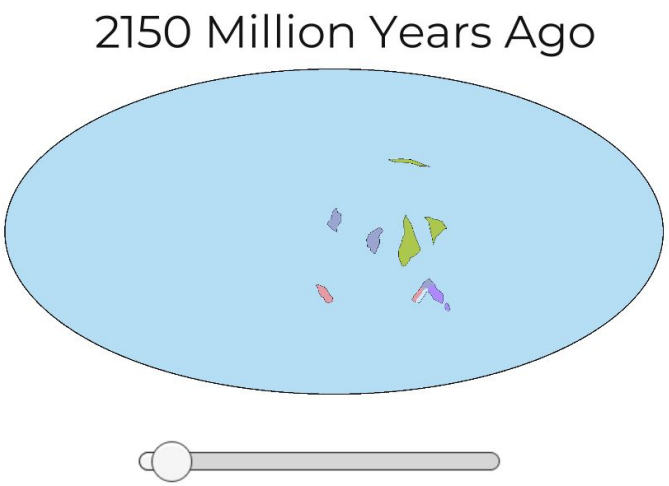


This is an example of what the interactive element could look like. The names of the continents appear under the map and the user has to drag them to the correct places.

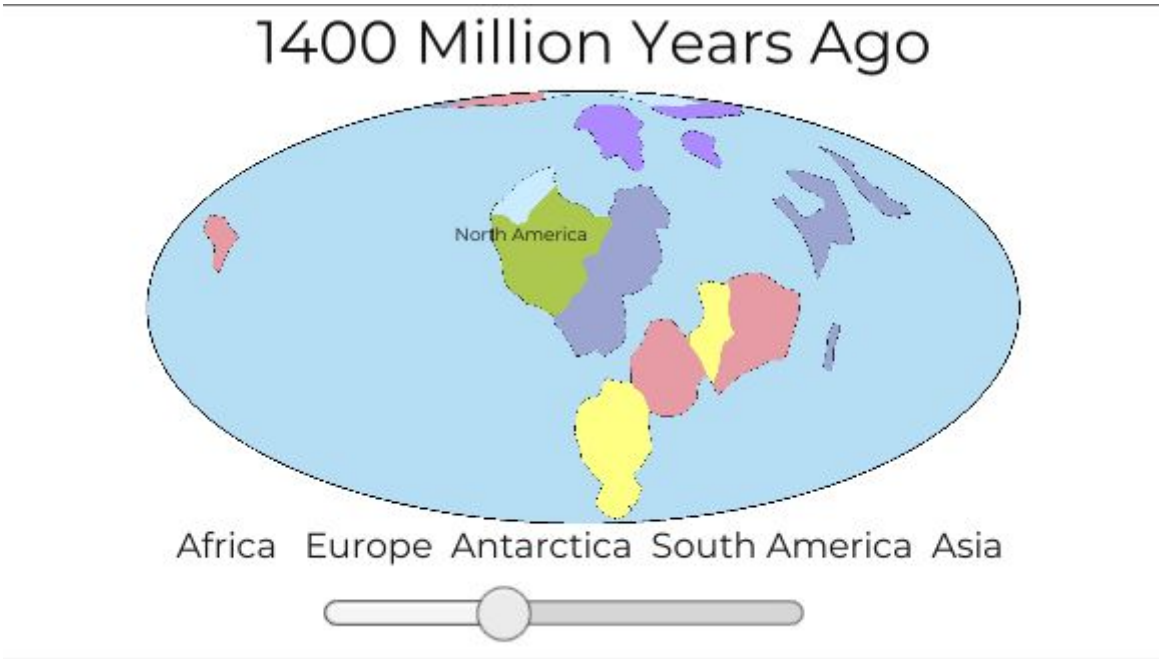
I created several prototypes using Adobe XD to get a close to finished version of what my final application will look like.



This is a better representation of what my final design will look like. Based on the feedback from my user research I have simplified and stripped back the design to the point where there is no unnecessary information, and it is straightforward to use. It was created with Adobe Xd, as to get a non-functional prototype.



The photo above shows a working prototype of the application, as created in Unity. It is completely functional with the animation playing and slider displaying how far through the animation is. It has a countdown at the top which indicates how many years ago the animation is displaying, with present day being the latest.



I added to the prototype an interactive game, where the user has to match the continent to the landform. I felt like this could be a way to better engage the users. I conducted useability testing with several users and got lots of feedback. The general consensus was that it didn't really serve much purpose, wasn't enjoyable and mostly consisted of guess work. I wanted to ensure that it was both enjoyable, desirable and effective. I felt like the game wasn't achieving this and so I removed it.

Most of the feedback was positive and suggested that the application had good useability. It was said however that there needed to be context to the animation and that there should be explanations of what was happening. For this reason I added several information boxes at various points during the animation which gave the user some context to the map.

Critical Reflection:

I found myself doing testing quite late into the project, which was a mistake. It meant I didn't have much time to adapt to the feedback from the testing. The feedback I got encouraged me to remove the minigame as it didn't add to the experience, and if anything seemed like a waste of time as people found that it didn't really teach anything. As a result the final prototype felt a little lackluster, and too engaging. Given more time I would have liked to iterate on the design, and take the feedback from my testing and implement more appropriate interactive activities. I should have tested at various points during the project so that I was constantly gathering feedback rather than waiting until very late to get feedback, which by then it was mostly too late to make any major changes.

Another change I would make would be the map and some of the other graphics. It would have taken an extremely long time to create an animated map which was aesthetically pleasing. Instead of spending all my time creating a map, I found one online which I had permission to use. The map doesn't scale great in Unity, which results in some pixelation of the image. The animation is also not smooth at all, which really detracts from the overall experience and can sometimes be hard to follow. This was however, as stated in the brief a prototype, and as such I believed that the animation was good enough quality for one. If I was to iterate on the project for installation then I would spend time working on a better quality animation.

My user research could have been better. If I was to go back I would conduct interviews to get a better understanding of what people were looking for. I felt like while the data I got from observations and the questionnaires were helpful, it didn't give me enough detail. The flexibility of an unstructured interview would have allowed me to ask follow up questions and get a better understanding of the users needs. This would have resulted in a design that better fit the brief and the user requirements. I ideally would have collected more observations of the exhibit to get a bigger sample size however due to the simple nature of the exhibit the majority of users were having identical experiences so there was nothing new to observe.

If I was to redo the project I would most likely not use Unity again. While it provided most of the tools I needed, I believe I would have had more success with the development in Processing. Unity can sometimes be a little complicated and felt a little overkill for the scale and simplicity of my project. Processing would have achieved a similar result, more easily. I think if I were to iterate on my project and add interactive 2D or 3D elements, then Unity would be more appropriate.

Word count: 2268

Appendix

Appendix 1 - Observation text sheet

As part of the BSc Interactive Media course, second year students on the User Experience Module are conducting observations across Yorkshire Museum to identify opportunities for redesigning museum exhibits.

All data gathered is fully anonymous; i.e. no names, photographs, audio or video recordings or any other identifiable information is being gathered as part of these observations.

All data collected will be destroyed after the final marks for the academic year have been ratified.

If you have any questions regarding this activity, please contact [Removed for anonimity], [Removed for anonimity] or the module convenor, Debbie Maxwell (debbie.maxwell@york.ac.uk).

Appendix 2 - Questionnaire statements, read before conducting

This questionnaire is part of a student project for a User Experience Design module at University of York, UK. The survey aims to gather information on your experience of the plate tectonic exhibit. The results of this survey will help us to create a new plate tectonic exhibit. It should take no longer than 5 minutes to complete.

All data collected will be destroyed after the final marks for the academic year have been ratified.

You have the right to not answer any question or stop the questionnaire at any time.

If you have any questions please let us know.

Appendix 3 - Questionnaire text sheet, given after the questionnaire

As part of the BSc Interactive Media course, second year students on the User Experience Module are conducting questionnaires across Yorkshire Museum to identify opportunities for redesigning museum exhibits.

All data gathered is fully anonymous; i.e. no names, photographs, audio or video recordings or any other identifiable information is being gathered as part of these observations.

All data collected will be destroyed after the final marks for the academic year have been ratified.

If you have any questions regarding this activity, please contact [Removed for anonimity], [Removed for anonimity] or the module convenor, Debbie Maxwell (debbie.maxwell@york.ac.uk).

Appendix 4 - Notes taken from museum staff

Pangea was one landmass back in jurassic time. Describe and explain plate tectonics, the moving of the earth's crust and the splitting of pangea into the continents we knows today. Would like to see volcanoes and mountains forming. Something very visual to explain that. Can see how the continents fit together with the current display but want to expand on it and show how it has changed over time.

Appendix 5 -

Observation

Time spent: 40 seconds
Age: Adult

User spent around 30 seconds reading the text on the board before looking at the jigsaw, didn't really engage with it properly though.

Time spent: 12 seconds
Age: Child

Used jigsaw to move around plates, seemed disinterested.

Time spent: 5 seconds
Age: Child

Moved jigsaw around

Time spent: 30 seconds
Age: Child

Moved jigsaw around

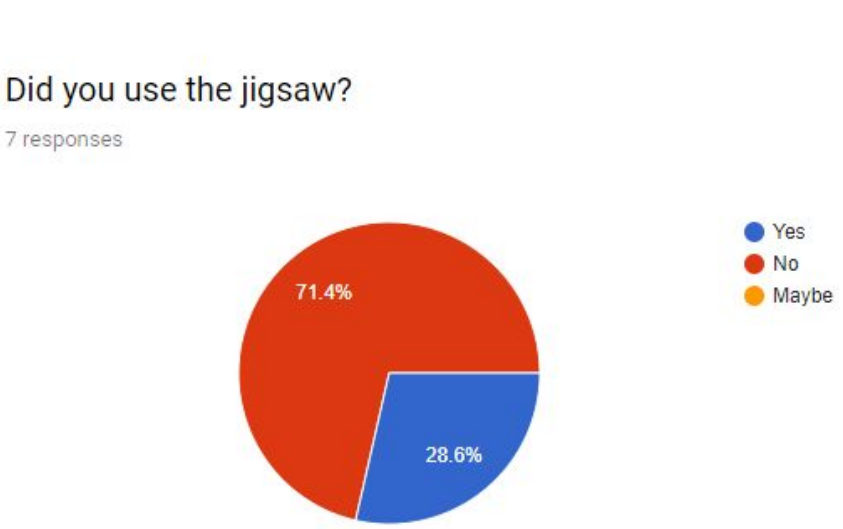
Time spent: 15 seconds
Age: Over 60

User briefly read the text on the board, looked at the jigsaw map

Time spent: 23 seconds
Age: Over 60

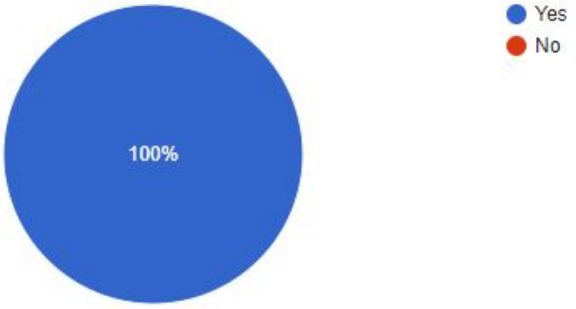
User read the text on the board

Appendix 6



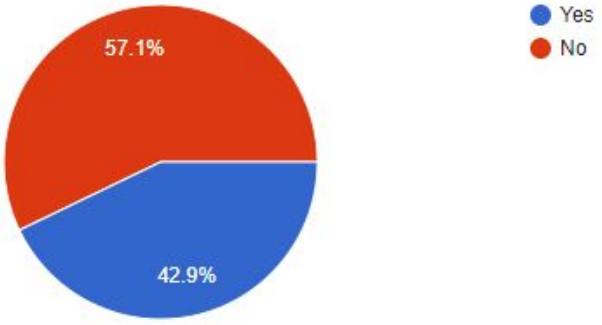
Did you read the display?

7 responses



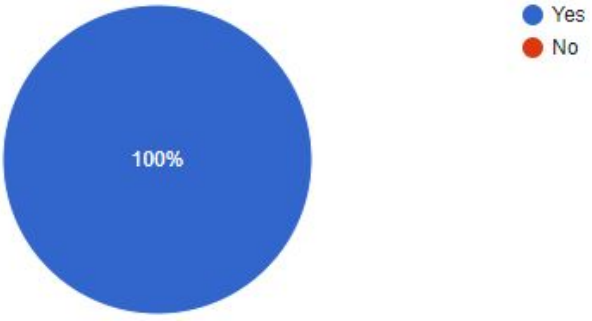
Do you think you learnt anything from the current display?

7 responses



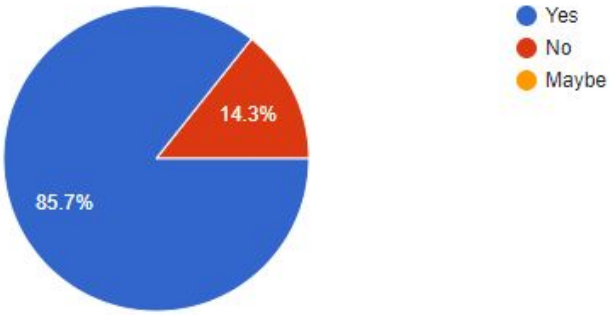
Do you think it should have gone into more detail?

7 responses



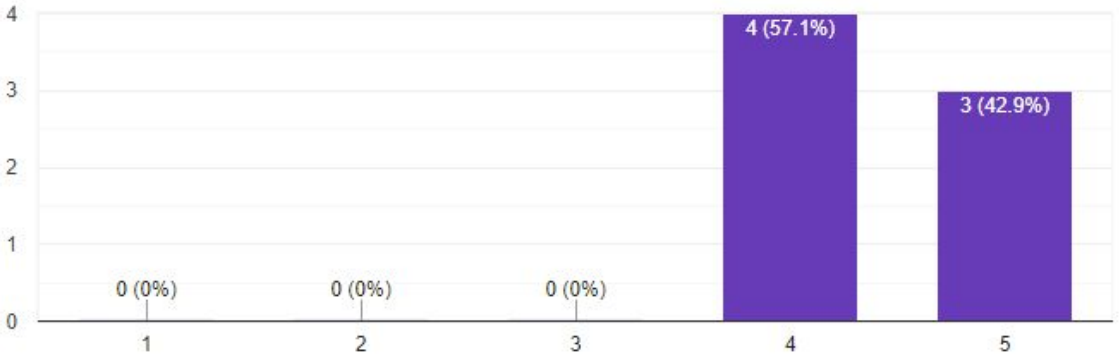
Would you be more interested in an animated/interactive version of the display?

7 responses



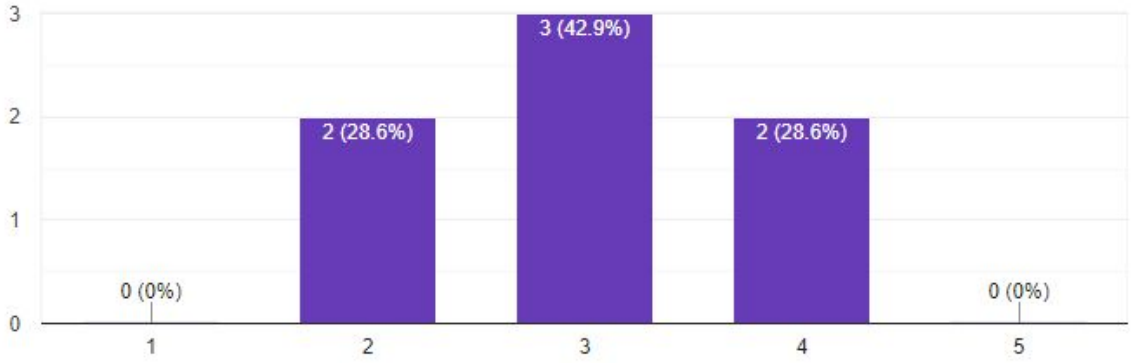
How important would ease of use of the exhibit be?

7 responses



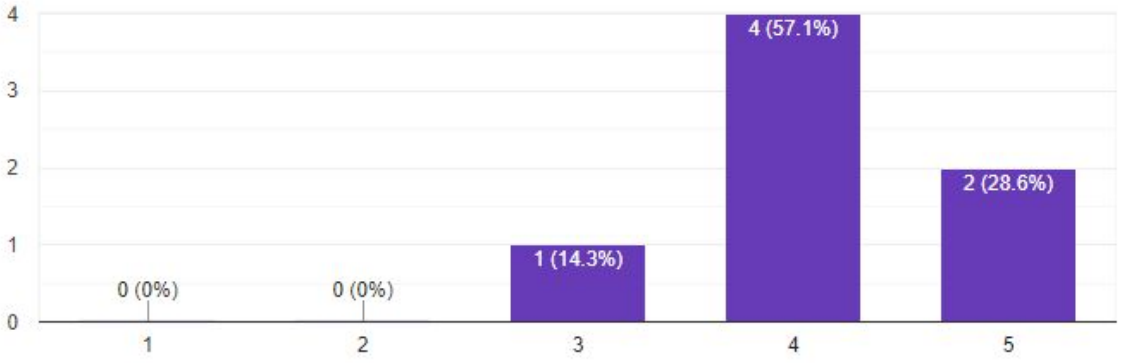
How important would the aesthetics of the exhibit be?

7 responses



How important would the content of the exhibit be?

7 responses



Appendix 7

UNIVERSITY of York

Department of Theatre, Film and Television
Ethics Committee

RESEARCH ETHICS CHECKLIST FOR TAUGHT STUDENTS

FOR PROJECTS USING DEPARTMENT LEVEL ETHICS APPROVAL

This checklist is to be used **ONLY** for research work by TFTV students who wish to use the Department Level Ethics Approval to accommodate the ethical risks of their proposed research work.

Students must ensure that their proposed research work can be accommodated by the restrictions in this Checklist. If not, you will be unable to conduct the work without further Ethical scrutiny by the TFTV Ethics Committee as the work is considered to have higher ethical risks. To apply for additional Ethics approval you must submit the Research Ethics Clearance Form for review by the TFTV Ethics Committee. However, please note that some modules DO NOT permit students to submit individual Ethics applications.

All students who use the Department Level Ethics Approval for their work must complete this checklist and include the following as Appendices to their assessment reports:

- This completed Checklist;
- Example Participant Information Sheets and Participant Informed Consent Forms, if appropriate;

Please note that if this Ethics Checklist is associated with an assessment that has an **anonymous submission** (i.e. if you are using your Exam Number, Y123456 for submission) you **MUST** redact your name and any other information that would identify you as an individual from the appendices before submission.

Please note that your assessment markers will compare the submitted assessment work to this Ethics Checklist, Information Sheets and Consent Forms to ensure compliance.

You are also required to conduct this research work in compliance with the General Data Protection Regulation (GDPR). Information on how to ensure compliance is available on the TFTV Ethics VLE site.

Before completing this Research Ethics Checklist for Taught Students, please consult the TFTV Ethics VLE Site for guidance and further information.

SECTION 1: STUDENT AND PROJECT DETAILS

Box 1A: Student Details **ALL** students must complete this box	
Student Name OR Exam Number for Anonymous Submission	Y3856950
Degree Title	Interactive media
Stage (e.g. 2nd year Undergraduate)	2
Role in Project (e.g. Team Leader)	--

Box 1B: Project Details **ALL** students must complete this box	
Module Title and Module Code	TFT
Project Supervisor Name and Email Address	Debbie Maxwell, Debbie.maxwell@york.ac.uk

Box 1C: Project Details **ALL** students must complete this box	
Project Title	Tectonic plates
Project Submission Date	18/04/2019

Please complete Section 2: Research Ethics Concerns

SECTION 2: RESEARCH ETHICS CONCERNS

Box 2A: Checklist of Research Ethics Questions **ALL** students must complete this box		**YES**	**NO**
1	Will the project involve conducting work that would typically require NHS Ethics approval? That is, will you be working with any of the following as participants, if recruited specifically due to their involvement with the NHS: • Patients and Users of the NHS, • Relatives or carers of patients and users of the NHS, • NHS staff?		X

	OR will you be using or accessing NHS premises or facilities as part of the work?		
2	Will the project involve conducting work that would typically require Her Majesty's Prison & Probation Service Ethics approval? That is, will you be conducting research with staff and/or offenders in prison establishments, National Probation Service (NPS)/Community Rehabilitation Companies (CRC) regions or within Her Majesty's Prison and Probation Service (HMPPS) Headquarters? OR will you be conducting research on HMPPS premises?		X
3	Will you be working with vulnerable participants (e.g. those under 18, people with learning disabilities, people with mental impairment due to health or lifestyle, people who are terminally ill or recently bereaved etc.)? Note that if you are unsure whether someone you would like to work with could be considered vulnerable under the circumstances, you are required to discuss your concerns with the module leader, your supervisor and/or Ethics Chair. It is generally expected that any student working with vulnerable groups would submit the longer Research Ethics Clearance form.		X
4	Will you be identifying any of the participants in your outputs?		X
5	Will you be discussing sensitive or potentially upsetting or distressing topics with participants?		X
6	Is it reasonably foreseeable that the work could involve causing physical or emotional distress to participants or researchers?		X
7	Is it reasonably foreseeable that the participants could disclose or discuss participation in illegal activities (e.g. drug use)?		X
8	Is it reasonably foreseeable that the participants could disclose confidential or sensitive information (e.g. financial data, sensitive organisational data)?		X
9	Will you be deliberately misleading the participants in any way?		X
10	Will you be filming or making recordings of people without their knowledge and consent (e.g. covert filming of people in non-public places)?		X
11	Will you be researching or discussing issues relating to terrorism or political extremism as part of your work?		X
12	Will you be collecting online data that has been generated by human participants (e.g. social media data) from closed, restricted forums (i.e. from closed communities or those that require approved membership to view, e.g. restricted Facebook groups)?		X

13	Will you be identifying anyone from online data that has been generated by human participants (e.g. social media data) from either open or closed forums (i.e. by including information that could make the individual identifiable, such as direct quotes or usernames)?		X
14	Could the work involve potentially damaging property and/or the natural environment?		X
15	Will the work involve animals?		X
16	Is it reasonably foreseeable that the work could result in any anticipated university/institutional risk (e.g. adverse publicity or financial loss)?		X
17	Will you be compensating participants with financial inducements **OTHER THAN** reasonable incentives (e.g. chocolate, Amazon vouchers) for the inconvenience?		X
18	Will you be paying participant expenses?		X
19	Will you be conducting any of the work for this project **OUTSIDE** of the UK?		X

If you have answered "YES" to ANY of the questions in Box 2A: Checklist of Research Ethics Questions:

The Department Level Ethics approval together with this Research Ethics Checklist for Taught Students MAY be insufficient to accommodate the ethical risks of your proposed work.

Some lower-risk ethical issues can be accommodated without further Ethical scrutiny provided that you agree to follow a process that is considered appropriate. These situations and processes are described on the TFTV Ethics VLE site.

IF there is a suitable procedure to manage this ethics issue, please complete Box 2B to provide further details of how you intend to manage the ethical issues associated with your proposed work in consultation with either the module convenor or your assessment supervisor.

If there is no identified procedure to manage these ethical issues then, provided the module convenor permits it, you will need to submit an application to the TFTV Ethics Committee for review using the Research Ethics Clearance Form. But, please note that some modules do NOT permit students to submit individual applications to the Ethics Committee.

Box 2B: Further Details Complete this box if you answered "Yes" to any question in Box 2A AND there is an identified procedure to manage the ethical risks in this situation.
Provide details of the nature of the ethical risks that you identified by answering YES to questions in Box 2A and describe the process that you will follow to minimise the risks.

Please complete Section 3: Data Protection

SECTION 3: DATA PROTECTION

In order to comply with the General Data Protection Regulation (GDPR) you MUST adhere to the data usage and storage principles described in Box 3A: Checklist of Data Protection Questions.

Box 3A: Checklist of Data Protection Questions **ALL** students must complete this box		**YES**	**NO**
1	Will you guarantee that you will inform all people whose personal and/or special category data that you are using: • What data you will be collecting and why; • How you will be storing the data; • The legal basis under which you are storing the data; • When/if/how the data will be destroyed? Please note that using a GDPR Compliant Project Information Sheet will ensure you meet these requirements.	X	
2	Will you guarantee that **IF** you use a portable device to collect electronic data you will transfer that data to your University Google Drive account or University Filestore as soon as possible after the interview **AND** delete it from your personal device?	X	
3	Will you guarantee that the data will **ONLY** be accessible to the project team **AND** that **IF** the project team extends beyond the University of York that you have consulted the University's IP and Legal team to ensure appropriate data protection safeguards are in place?	X	
4	Will you guarantee that you will **ONLY** use Google Forms OR Qualtrics to host online surveys that collect personal and/or special category data?	X	
5	Will you guarantee that you are collecting the **MINIMUM** amount of data necessary for the intended project?	X	
6	Will you guarantee that **IF** you are storing or accessing data from **OUTSIDE** the European Economic Area (EEA) you will access the data through your University of York Google Account connected to the University of York Virtual Private Network (VPN)?	X	
7	Will you guarantee to destroy all physical **AND** electronic data **EITHER** after your module marks have been ratified by the Board of Examiners **OR** 10 years after last requested access?	X	

8	**IF** storing electronic data for 10 years after last requested access, will you guarantee to **EITHER** use a University Google Drive account **OR** an approved data repository service to store the data?	X	
9	Have you screened your project against the Data Protection Impact Assessment (DPIA) screening questions **AND** if required conducted a DPIA and submitted a copy to the Data Protection Officer for review?	X	

Before submission of your assessment work, you must complete Section 4: Student Agreement. This completed Checklist must be included as an Appendix to your assessment report, together with examples of your Project Information Sheets and Informed Consent Forms.

SECTION 4: STUDENT AGREEMENT

Box 4A: Student Agreement **ALL students must complete this box.**		**YES**	**NO**	**N/A**
1	I confirm that the work conducted for the above project has met all the statements as expressed in this Research Ethics Checklist.	X		
2	I confirm that the work conducted for the above project was guided by the University's ethical rules and regulations.	X		
3	I have included example Project Information Sheets and Informed Consent Forms as Appendices to my report, if applicable.	X		
4	I confirm that I have adhered to the TFTV requirements for storing personal and special category data compliant with the General Data Protection Regulation (GDPR). Note that GDPR compliance guidance can be found on the TFTV Ethics VLE site.	X		
5	I confirm that, if applicable, all payments made to personnel in relation to this project have complied with financial regulations.	X		
Student Name (or Exam Number for Anonymous Submission)		Y3856950		
Date		17/07/2019		

Appendix 8 - world map

The animated map was sourced here:

https://www.youtube.com/watch?v=UwWWuttntio

Appendix 9 - letter spacing script

http://forum.unity3d.com/threads/adjustable-character-spacing-free-script.288277/