Group 8

William Ashton - 16.66%
Gurmeet Singh Banga - 16.66%
Ryan Fieldsend - 16.66%
Harrison Miller - 16.66%
Lewis Rope - 16.66%
Henry Weston - 16.66%

MuseVR

December 13, 2018

Introduction

Concept Overview

MuseVR aims to achieve a pleasurable experience for all visitors to museums all over the UK. MuseVR will bring exhibitions to life with new virtual reality cutting edge technology, allowing for a breathtaking experience into the world of the past and present. Whether it be dinosaurs stomping the earth millions of years ago, or re-living the horrors of medieval battles, MuseVR will find a way to bring it to life to give museum goers an experience they have never witnessed before. Our hope is to attract even more people to visit museums across the UK and bring in interest from all generations. MuseVR really strives to immerse the user into a world they would otherwise never have gotten chance to experience, giving users a different outlook on many times during history. The hardships of Victorian children, the vast Egyptian empires along with the pyramids they constructed or the harsh winters the vikings managed to survive year after year. Through providing this experience history becomes all that more exciting, sparking the interest in many, into the wonderful, and sometimes terrifying, past of this planet.

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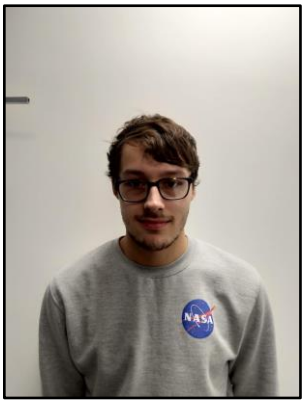
Team Biography

William Ashton - 16627870



Before studying a Computer Science degree, I completed my A-levels, one of which was Business studies. Throughout this project, I've been able to bring much needed business knowledge and insight to our project, aiding us in essential decision making. I'm very passionate about the future of virtual reality, and am dedicated to innovation in education. I'm excellent at working in a team, due to my ability to communicate and cooperate with my team members. This has been vital when distributing workload and solving problems.

Gurmeet Singh Banga - 17634845

I am a Computer Science student who has experience working with mobile phone technology for three years as a part of the technical support team at Tango Communications. Currently I am studying BSc Computer Science at the University of Lincoln. I enjoy researching new technology and cannot wait to start working with designing and implementing VR systems within Museums across Lincolnshire. I love being creative with technology and hopefully this project will enable me to express my creativity when creating virtual environments for exhibitions.

Ryan Fieldsend - 17643001

As a student studying BSc Computer Science at the University of Lincoln, I have gained computing knowledge to help with setting up the VR Systems and even programming to develop further code to make other programs to run on the headsets. Having worked in both factories and customer service, I bring vital skills in being a team member and customer service. This will help with dealing with any museum that wants to rent our service as being able to deal with the museums in a polite and friendly manner is vital to push our service.

Harrison Patrick James Miller - 17662556

I am currently a BSc Computer Science student studying at the University of Lincoln. I have a good basic knowledge in programming and I bring brilliant problem solving expertise to the team. Having worked in the Educational and Fitness industry for the past 5 years, I bring a different logical approach to address various problems that we may encounter within our project (MuseVR). Finally, working as a Personal Trainer running my own business, it helped me to develop strong: communication; leadership and management skills, bringing them to the table to assist the team when needed.

Lewis Rope - 16634749

Before studying a BSc computer science degree at the University of Lincoln, I took a GCSE in business studies which has proven to be extremely useful within the group. It's provided me with the quintessential knowledge needed to generate a good and prospering business idea revolving around a unique selling point no other product or service can provide. Alongside this working customer service for 3 years has given me vital communication and teamwork skills, to ensure everybody knows what they're doing, and that we get along with no miscommunication.

Henry Oliver Swift Weston - 17643435

I am a student at the university of lincoln studying computer science. Over the time at university I have improved skills in programming from previous experience bringing a good standard into the group also my experience in engineering. This benefits the team with my experience in

building prototypes and products. In addition to this, my previous work in the Digital Creative Industry (working on magazines, brochures and videos) will help bring a more creative approach to the team.

Market Background

The market background we are targeting is based in the Creative Industry, in which the DCSM recognises nine creative sectors, being: Advertising and Marketing; Architecture; Craft; Design: product, graphic and fashion design; Film, TV, radio and photography; IT, software and computer services; Publishing; Museums, galleries and libraries; Music, performing and visual arts. The creative sector we have decided to specifically target our service on is sector 9: Museums, galleries and libraries.

The concept fills a market need by bringing museum exhibitions to the 21st Century, bringing to life the tour with virtual reality. The reason why we have targeted museums, is that our nation has seen a small dip in people attending and visiting Museums and Galleries for example across 2014/2015 we saw a peak of 50,811,456 people attending, whereas last year in the 2017/2018 year frame we saw a downfall to 47,264,853 – this is a difference of 3,546,603, which will result in a crash in finances. These statistics were taken from the government website, showing the statistical data based on monthly and annual visits of museums and galleries across the UK.

At MuseVR we believe that bring a VR service tour of exhibitions around multiple Museums around the UK, starting in Lincolnshire will bring the declining numbers back up and hopefully sub-pass our past existing record of 50.811,456 visits – this new innovation is something that we haven't yet seen in the UK. We hope that this will interest people of younger generations to attend museums more often with the intention in making history more interactive.

In the future, we intend to hit the Educational industry targeting schools and taking what was once a difficult journey to take students on a school trip, to bringing the museum to them; taking history lessons to the 21st Century, changing the old classic "classroom" to an interactive learning innovative environment.

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Implementation

Technical Challenges

Due to the nature of the project, there are going to be many technical challenges involved in the creation and rollout of the project.

One of these technical challenges would be creating the scenery for the exhibit. The reason why a potential problem is because we will have to learn how to create the scenes and how that would be put together using the appropriate software to do so. To overcome this challenge, we would need to have the correct knowledge and skills on 3D modeling, visual effects, and graphics/motion design and computer animation skills to build those scenes which will require technical training for us to do so.

Another technical challenge that we will face when having to implement our product is training the staff members of the museum/exhibit to be able to use the VR systems with their customers/clients. This could be a technical challenge because people of different ages will have a different base knowledge when it comes to using technology. This could be overcome by providing training to staff who could then pass that training onto the team that is going to be using the product.

An additional challenge that we will have to face when implementing the VR system within the exhibit/ museum would be making sure we have the appropriate space to work within. Due to health and safety reasons to use a VR, it is recommended that each individual using a VR system should have a 3m by 3m space around them to make sure that they do not hit any other people or objects. The reason why this might be a challenge when we are implementing the product is that there might not be enough space in the exhibit to implement the system.

Due to us creating a virtual reality environment we will need an application/program to run the environment on the VR devices as well as being able to edit and change that when needed. When building this, we need to make sure that the software is cross-compatible with all of the devices that we are using and also need to ensure that as technology moves we are keeping up to date with the latest standards of software to keep it compatible.

A technical challenge we may face is making sure that when the user is using the VR system, they are still aware of their environment. An example is if there were a fire within the exhibit the user would need to be alerted so that they can safely leave the environment and get to safety. This would require us to make sure that the doors on the environment that we are going to be using are emergency doors that open with a push lever.

Ensuring the virtual reality environment is realistic is a vital part of making the experience better for the user. This may be a technical challenge as we are using mobile phones and although they do have excellent graphics capabilities making sure that they do not lag after running for

hours at a time can be very difficult as phones tend to heat up after being used for a certain amount of time. The way that we can overcome this technical challenge is by changing the phones after two hours this will also allow us to recharge the phones as well thus ensuring that they do not cut out mid-use.

GB

Risk Assessment

Collision

Assessing the idea of virtual reality machines, the main risk factor that was considered was the safety of the user and ensuring they wouldn't be at any risk of danger whilst using the virtual reality headset. This was approached by designating a set location for the use of the VR machines, limiting the user from colliding with other people or any exhibits. These are enclosed areas that will limit the user from roaming too away from and causing injury to themselves or others.

Spread of disease

The risk of potentially spreading any disease will be mitigated by a member of staff sterilising the headsets themselves with sterile wipes. This is necessary as any disease passed on to someone could always be potentially life threatening and a high standard of hygiene will prevent this from happening.

Disabilities

Looking further into the user's safety, it became aware that warnings must be displayed that the use of the VR systems may cause motion sickness. Disabilities/Medical conditions are also important to consider and users should be noted that use of these machines may have a chance to cause seizures to people who generally suffer from such illnesses as well conditions that may prevent people from turning freely (such as wheelchair users) that they shouldn't put any strain on their bodies whilst trying to turn around when stationary to view what's going on behind them. To prevent this issue, the possibility of an option to limit the area that the VR headset covers, so the user would only have to look forwards to view the experience if they have difficulties turning whilst stationary.

Risk of theft/Damage

Damaged equipment is something that will cost money to replace, so to prevent the damage of the computer tower, it will be encased within a locked container, restricting people from being able to get to the equipment and the HTC headsets will be attached to the box preventing theft. To try to help prevent theft/damage to any equipment, security cameras would help minimise this risk. As well as this, the systems will be monitored by a member of staff at the museum to run the machines, so they will be supervised as well as covered by camera footage.

Fire Safety

In the event of a fire or any other means of evacuation, the equipment will need to shut down and alarm the user that it is no longer safe to be in the building and they must leave. This can even be performed by limiting the volume at which the headset will be able to go to making it easier to hear a fire alarm over the headphones and an on-screen display telling the user that they must leave the building due to an emergency situation.

Hazard	Who's at risk	Risk rating	Control measures
Collision with other people	Participants and staff	8	We will section off a specific area for where they're able to use the VR safely. Additionally we will provide a health and safety check and demonstrate how to use the equipment.
Spread of disease and infection	Participants and staff	3	We will provide antibacterial wipes for the participants and staff members using the equipment to wipe down their face prior to use. Additionally we will wipe down the hand devices prior to use. At the end of the day we will thoroughly clean the devices as an end of day procedure.
Back pain and unorthodox movements	Participants and staff	9	We will provide user friendly software for all people with different individual needs, for example with someone who's physically impaired they'll have a modified software to suit their needs. Additionally with staff, we will provide regular breaks and seating arrangements for our staff members.
Electrical equipment setting on fire	Participants, staff and members of public	4	We will get regular PAT testing of our electrical equipment, as well as thoroughly check out equipment at the start of the day and at the end of the day for any frayed cables and damage to the equipment.

Tripping over wires	Participants, staff and members of public	4	We will organise our wiring safely by using cable ramps to cover wires. In addition to this we will warn people verbally regarding the cables.
Assault on someone	Participants, staff and members of public	3	We will be well aware of the museums security policy.
Fire within the museum	Participants, staff and members of public	4	We will be aware of all the museums fire safety policy, as well as knowing where all the fire exits and meeting points are.

	Likelihood					
Con		1 Remote	2 Unlikely	3 Possible	4 Likely	5 Almost Certain
	1 Insignificant	1	2	3	4	5
	2 Need First Aid	2	4	6	8	10
	3 Doctor Attention	3	6	9	12	15
	4 Hospitalisation	4	8	12	16	20
	5 Critical	5	10	15	20	25

Low Risk

Medium Risk

High Risk

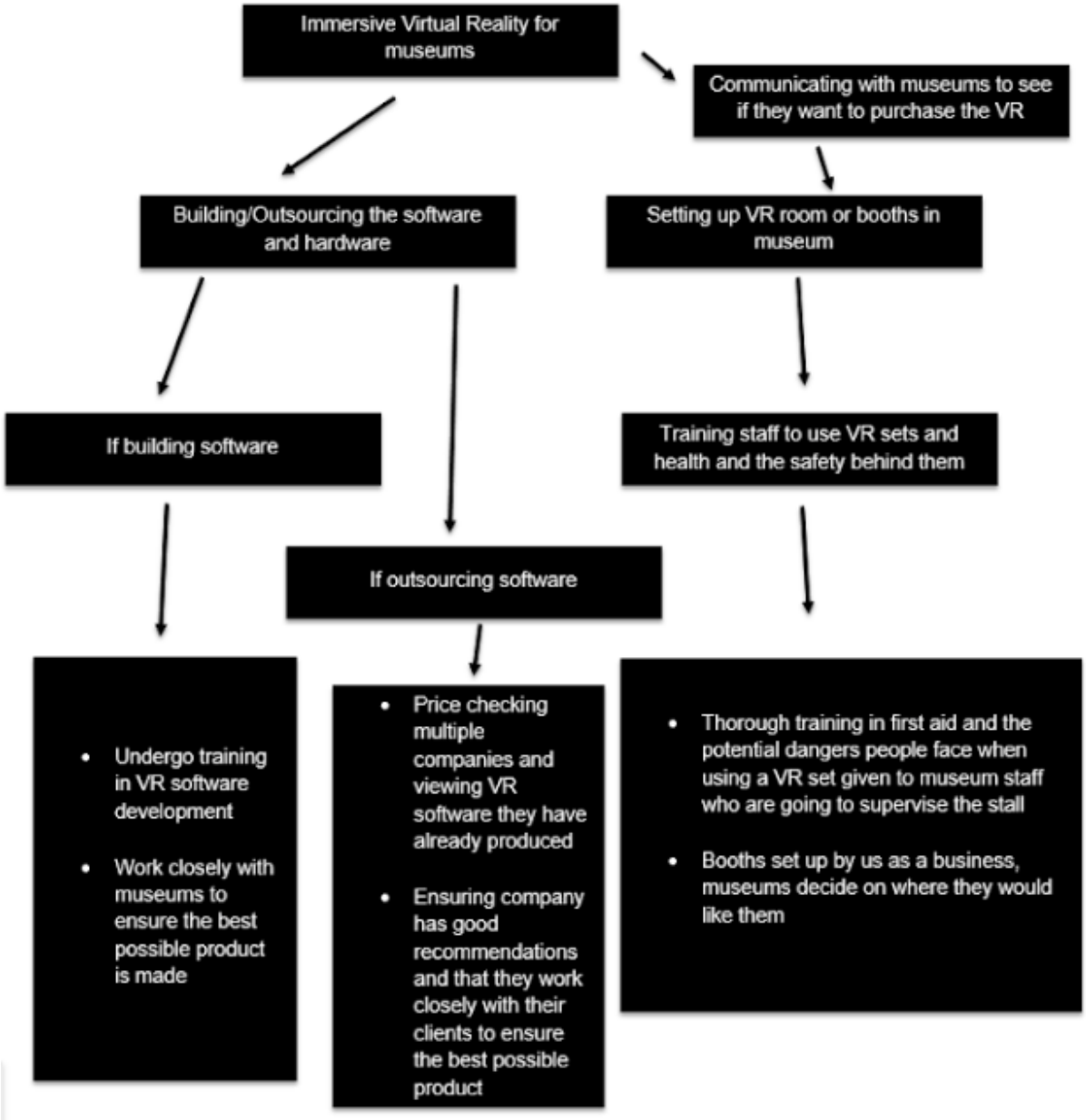
SWOT Analysis

Strengths - Unique Idea - Fills the market needs - Innovative - Brings more interaction to museums - Makes history much more enjoyable - Gives people easy access to VR - Brings education to the 21st century - Pop up stalls gives the ability to run the business from anywhere	Weaknesses - Costing - Maintenance - Moving locations - Each museum has different exhibitions - People may lose interest if not developed further upon
Opportunities - May bring people to museums - May be able to expand further to other educational means such as schools - Could help push VR and help the technology grow - Run the VR systems in other public areas without limitations of a museum theme.	Threat - Easy for competitors to copy the idea - Prone to robbery due to high costing tech - People may lose interest if not developed further upon

RF & HM

Delivery Plan

Work Breakdown Structure:



This work breakdown structure covers how we are going to breakdown the whole delivery of our business plan. There are 2 different paths which our delivery takes. One is working with the museums to give them the VR, to make sure they have a suitable place to put it and to work with the staff that are going to supervise the use of all the VR, to ensure they are trained enough to make it fully functional and aware of the health and safety risks proposed when working with VR sets. The other path is building/outsourcing the software to ensure they most cost effective VR headsets and software is purchased keeping in mind quality and price at the same time, so that we aren't spending too much but aren't missing out in a lot of quality by doing so, as we need the experience to be the best it can be, to increase museum visitor numbers. Another potential path not discussed is buying the VR hardware, however this is extremely similar to buying the software, we just need to make sure its good quality and within a reasonable price range.

Decision matrix:

We have decided to implement a decision matrix to help us find the right hardware and software for our VR. This will help us in deciding which factors we should prioirtise to make sure we get the perfect software and hardware of its purpose. This matrix compares many important qualities of both against each other to see which comes out on top, this then heavily influences where we look to get to best VR sets and software.

Software development matrix:

	A (cost)	B (Quality)	C (reviews from previous customers)	D (Experience of developers)	E (Time software can be developed in)
A (cost)					
B (Quality)	B1				
C (reviews from previous customers)	C1	B1			
D (Experience of developers)	A2	B3	C2		
E (Time software can be developed in)	A2	B2	C1	D1	

Conclusion of software development decision matrix

- A or cost scored 4 points
- B or quality scored 7 points
- C or reviews from previous customers scored 4 points
- D or experience of developers scored 1 points
- E or time software can be developed in scored 0 points

To conclude the most important aspect of the software is its quality, after that there is a tie between reviews from previous customers, or the cost of the software itself. Normally cost would be a very big issue and we would strive to find the lowest prices possible. But reviews tend to either be really good or bad, as people write them due to being extremely happy or frustrated with what they have purchased. Because the majority of our money would be spent on the software it's very important we get it right. Businesses can control everything they say about their own products as they are the ones trying to sell it, however reviews are among some of the best ways to check how well a business really makes their product as you know the majority are non-biased and fair, and due to the weighting this software carries in terms of price, we really wouldn't want to get this purchase wrong.

Hardware VR matrix:

	A (cost)	B (Quality)	C (reviews from previous customers)	D (Portability)	E (Ease of use)
A (cost)					
B (Quality)	B1				
C (reviews from previous customers)	A2	B1			
D (Portability)	A3	B3	D1		
E (Ease of use)	A2	B2	E1	E2	

Conclusion of hardware VR matrix

- A or cost scored 7 points
- B or quality scored 7 points
- C or reviews from previous customers scored 0 points
- D or portability scored 1 point
- E or ease of use scored 3 points

To conclude the most important aspects of the hardware we're paying for is the cost and quality, with a tied first place at 7 points each. This is no surprise as we don't have an infinite amount of money to spend and we need to make sure the VR is as breathtaking as possible, we'd get the highest quality VR we could if money wasn't a problem, but we have to be careful with it and cut back where we can, but keeping in mind the quality throughout. Reviews from customers aren't a worry on this one as we can test the VR itself, what is more important is how easy it is to port about as we have to take it over to the museums and how easy it is to use. Because the general public will be making use of it we don't need to be over complicated with lots of fancy options, as long as it does its purpose that's all we need from it and this means it will take less time to train museum staff in running and getting to grips with the VR sets so that they can supervise the booths when we aren't there.

General delivery plan:

When creating a delivery plan for MuseVR the first thing we needed to work out was what resources we had, and where we were going to use them, prioritising more important aspects of our service and therefore spending more of our limited resources on them.

MuseVR runs off of virtual reality headsets, out sourcing these headsets would be one of the first and most important things we need to do, as access to these allows us to set up in museums to give people a virtual reality experience. Along with this we would need to either create or outsource the software itself to run on the headsets, as this would have to be specific to the exhibition itself, this would therefore range from museum to museum as they can be on the history of different things.

Due to the software taking a long time to outsource or create ourselves, the first thing we would need to do is speak to museums to see if they are willing to purchase our services, then the software development would go underway, communication back and forth between the museum and the developers would be paramount to ensure the most realistic and high quality VR software is developed to make sure the user is as immersed and impressed as possible, whilst still being historically accurate.

The museums would need to be given a rough estimate of a date of which the VR and software made for it would be done. This carries the risk that if the developers run into problems when developing the software and the date needs to be pushed backwards the museums may be left without a service they were expecting to receive. The solution to this potential problem is discussed in the contingency plans below.

One problem we could run into here is the cost of the software. The software could take anywhere between 3-6 months to produce and around £50,000 to make. This means we could only afford a couple pieces of software but would most likely only purchase one, provide this to the museum to trial how successful VR is at bringing new people to visit and work from there. Ideally with the income this produces we could purchase training to learn ourselves how to develop VR software, then meaning future software would be a lot more cost effective as we aren't paying for the service of it being created, allowing the team to work closely with museums to provide high quality and historically accurate VR software at a much lower price. The referencing for all prices is discussed in the costings section of the document with the relevant links provided.

The software developed would be for RAF museums as these are prominent around Lincolnshire due to its history. This would mean we would only need one piece of software

covering several sections of the RAF's history and this could be distributed around multiple museums along with the headsets allowing us to trial it multiple times.

VR stalls would have to be made in the museums away from the actual exhibitions themselves, this is so they aren't ruined for others by people walking around with the VR on potentially getting in the way of the viewing and reading already provided to users who visit the museum. The museum would be responsible on creating a safe space or room to place the stalls and members of staff would have to be trained by us on how to turn on the VR and getting people comfortable with using it, along with taking care of those using it to ensure health and safety is as high as it can be as accidents can happen when people are immersed in a different world.

In the future we could slowly distribute more and more VR software out to different museums which study different times throughout history and expand from there. Working closely with museums to ensure the software is as realistic, breathtaking and historically accurate as possible.

MuseVR Gantt chart

Time in months	1	2	3	4	5	6	7	8	9	10	11	12
Communicating with museums on purchasing service												
Acquiring VR sets												
Developing VR software												
Distributing VR sets												
Training Museum staff on working with VR sets and health and safety												

Contingency plans:

There are many problems we could run into when implementing MuseVR we have developed a risk assessment based on the issues we could easily run into when delivering our project. This contingency plan covers all the risks that we could face when we are delivering the product.

One risk that is very possible is the software taking longer than expected to develop. Typically companies believe they could develop specific VR software in around 3 – 6 months depending on the size or how complicated the VR is to develop. To combat this issue we have given developing the VR software 8 months on our Gantt chart which is over the expected time needed. This should hopefully counter an unexpected issues we might run into when the software is being developed, so we can make sure we get the VR to the museum on time.

Another risk is the VR having issues the museum staff aren't equipped to deal with. To counter this we will leave the manuals for the VR sets with the staff, so that they can read key points into what may be happening and going wrong, so hopefully they can sort the issue. However if they cannot we will leave them a company number to ring, and one of us can go down to assist them with the problem they are facing. If it still can't be sorted then the number of the VR producer will be saved and called to ring a technician to find the root of the problem.

Finally the software itself bugging out could be a very big problem. If the software was to glitch then the experience for the user would be ruined. To combat this we will test the software ourselves to make sure all runs fine and well before distributing out to the museums. We will keep in contact with the software developers to ensure that if any future problems occur or the software needs updating, they are only a phone call away to ensure that the solution can be found as quickly as possible.

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Costings

To be able to delivery this service we would need to pay staff for the operation of the VR systems while at the museums. To allow operation of ten VR headsets two staff members are needed. This would include a member of staff that also has a full UK driving licence to drive the van with all the equipment in. Cost of having two members of staff from 9-5 would be £160. Staff would require in-house training on the software covering basic operation of the software and troubleshooting delivered by one of us. We would be working two days a week each taking pay of £8,320 a year. The initial software will be outsourced with a budget of £30,000 for 3-6 month turn around to allow delivery of the service to museums within the first year. After this the software will be extended with in-house development from our team.

For this project to work we would need warehouse space to store equipment as well as office space for the company to function from. The space would need to be located near or inside

lincoln and the best place for technology companies to be based would be at the Boole Technology Centre for £1340 p/m for 83m^2 of floor space. This space would allow our group of six members to work from as well as storing the initial equipment with renting more space when needed. To furnish this office out with desks/storage I estimate around £1500 excluding any tech needed. The computers that we would require need to be VR ready for any software we created in-house to be tested within the office. We will need six of these computers at £2,415.60 per machine for development plus six Logitech K120 keyboards at £14.99 per one; six Iiyama XB2483HSU monitors at £180.97 per one; and six Logitech M100 mice at £9.99 per one. Each workspace costing £2,621.55. A first aid box will also need to be in the office at £39.80 (ex. VAT).

To allow us to deliver this service to museums within the lincolnshire area we will need transport from our office to different locations. We can do this by renting a van for the day when setting up at a museum which is cheaper than buying a van and maintaining it for once or twice a week use. The cost of a van varies on the size but starts at around £40 a day for a medium size van from Lincoln vehicle hire. The van is needed to transfer all the equipment over to the museum from our office space. This consists of barriers for VR sections, VR headsets, PC's, standing desk, extension leads, cable protectors.

To begin delivering this service to museums and their customers effectively we would have ten VR setups with two employees delivering the service. The cost of each PC with VIVE is £2,447.60 which eleven of them are needed, one of them to overview the other ten which is operated by one of the employees if needed. With this pc a Iiyama XB2483HSU monitor at £180.97; a Logitech K120 keyboard at £14.99; a Logitech M100 mouse at £9.99; and a adjustable laptop stand with mouse shelf by gear4music at £29.99. Each area of VR will be surrounded by four universal range polished chrome barrier posts with black retractable webbing at £98.75 for a pair (ex. VAT) giving a maximum of forty needed for this setup at £465.00 (ex. VAT) for ten so £1,860.00 (ex. VAT) for all forty. The floor covered in coba europe touch lock pvc interlocking floor tiles black 500x500mm (4 pack) at £39.99 needing four per VR section giving a total of forty at the price of £1,599.60. Extension leads will be needed incase plug sockets are unreachable by the short PC plug, Masterplug MCT1010/4BL 10amp 4 socket 10m cassette reel will give enough reach at £11.54 each needing four of these. Cables will need to be covered with plastic safety protectors (cable ramp 2 channels 215.00.505 250x900mm) at £91.08 each needing around twenty of them for any area at £1,293.60 for all of them at bulk discount price (£64.68 each).

Insurance Type	Price per year	Provider
Employer liability insurance	£43.00	Hiscox
Professional indemnity insurance	£100.00	Hiscox
Cyber and data risk insurance	£94.80	Digital Risks
Building and contents insurance	£111.96	Digital Risks
Public liability insurance	£55.00	Hiscox

	Price per year	Provider
Web hosting	£12	1&1
Broadband	£384.00	Virgin media - voom fibre
Business rates	83m^2 * £117.5 = £9,752.50 rateable value £9,752.50*£0.48 = £4,681.20	Government website - VAO
Payment gateway	£250.80	Sage pay

Expense	Price	Quantity	Total (first year cost)
Employees	£80 a day	2 employees 4 days a week	£33,280.00
Team members	£80 a day	6 team members 2 days a week	£49,920.00
Office space	£1,340 per month	1 office space	£16,080
Office furnishes	£1,500	1 office space	£1,500
VR ready pc with headset	£2,415.60	6 team members 11 setups	£41,035.20

Logitech keyboard	£14.99	6 team members 1 setup	£104.93
Monitor	£180.97	6 team members 1 setup	£1,266.79
Mice	£9.99	6 team members 1 setup	£69.93
First aid box	£39.80 + VAT	1 office space	£47.76
Van hire	£40 a day	2 times a week	£4,160
Standing desk	£29.99	1 setup	£29.99
Barriers	-	-	£2,232.00
Floor matting	£39.99	40 packs	£1,599.60
Extension leads	£11.54	4	£46.16
Cable Ramps	£91.08	20 at £64.68	£1,293.60
Insurance	£43.00 - £111.96	£43.00 * 1 £100.00 * 1 £94.80 * 1 £111.96 * 1 £55.00 * 1	£404.76
Web hosting	£1	12 months	£12
Broadband	£32	12 months	£384.00
Business rates	-	-	£4,681.20
Payment gateway	£20.90	12 months	£250.80
Software budget	-	3-6 months	£30,000
TOTAL			£188,400.72

Due Diligence

Legal

MuseVR follows the standards of many laws that governs Computing and its products and services. The general laws that our business complies with is the Data Protection Act (2018) following the General Data Protection Regulations ratified by the EU in April 2016; the Company also follows the: Copyright, Design and Patents Act (1988); Consumer Protection Act (1987) and the Computer Misuse Act (1990). More specifically to the use of our product, we have to comply with the Health and Safety at Work Act (1974), Equality Act (2010) and ensure that the customers using the product are sufficiently safeguarded to a high level of care.

Data Protection Act (2018)

MuseVR follows this new law by protecting all the personal data of the customer using the product. This involves anything that can be used directly or indirectly to identify that original, thus implying that we store all their data privately on a secure server with top of the range security, whilst keeping the IP address and location private and protected of that individual, while they use the product in the museum.

Complying by this we provide sufficient safeguarding of our customers as their data is encrypted sufficiently and we are given consent to email the customers for feedback – this is how we legally comply by the new GDPR ratifications stated by the EU from April 2016.

Copyright, Design and Patents Act (1988)

MuseVR follows this law by holding our own copyrights for our service, which is a unique venture for the digital market sector. We don’t use any other owned material which means we don’t have to be granted any permission to use our created material, nor do we have to obtain a licence. As we are outsourcing the development of the software, and we have made a special order for this, it belongs to us intellectually.

Consumer Protection Act (1987)

MuseVR follows this law by protecting our consumer, being the museum who have purchased our service, complying with the rights when they’re using our service.

Computer Misuse Act (1990)

MuseVR follows this law by the product not obtaining unauthorised access to any other

computer material; not obtaining unauthorised access with any intent to commit, nor facilitating any other offenses and not modifying any computer material without sufficient authorisation.

Health and Safety at Work Act (1974)

MuseVR follows this law by following procedures to efficiently set up safely with the workstation/space organised in such a way to minimise health and safety risks and hazards. Additionally there will be sufficient training, information and guidance for those who are operating the area and using the systems. The area will be set out properly and the computer workstations will be set up properly. Finally we will develop a sufficient risk assessment for the product and develop control measures which will prevent any hazards occurring.

This will be regulated by the HSE.

Equality Act 2014

MuseVR follows this law by sufficiently making the product usability and accessible for all people with different disabilities and individual needs, ranging from: physical impairments; visual impairments and audial impairments. For example: for a person with physical impairments such as a physical handicap – e.g. in a wheelchair, they'll be able to interact with the product by wearing the VR headset with an automated interaction with the software; for a person with visual impairments – e.g. colour blind, there will be a colorblind mode which will invert the colours, making it visible for them to see; for a person with audial impairments – e.g. deaf, there will be a pre-recorded person performing sign language, as well as readable subtitles for whatever audio is stated, with the options of audio description.

Ethical

Ethics reflect the philosophy of business. They refer to the moral rights and wrongs of any decision a business makes. It is a value judgement that may differ in importance and meaning between different stakeholders. Shareholders will always desire a good return on investment, but businesses have social responsibility to work to an ethical standard, and this may require certain compromises. People are increasingly more aware of business ethics and as a result, external pressure is created for businesses, whether it be directly from customers, or perhaps pressure groups. It is an extremely important factor of a successful business model.

Association for Computer Machinery

The Association for Computing Machinery (ACM) is the world's largest computing association, bringing together computing educators, researchers, and professionals to inspire dialogue and address the field's challenges. The ACM Code of Ethics and Professional Conduct is designed to guide the ethical conduct of all computing professionals, serving as a basis for remediation when violations occur.

ACM Code 1.6 states "Respect privacy." Technology enables seamless collection of data from users, and though it may seem there is little data we could acquire from our users, it is absolutely vital that we're understanding of the rights and responsibilities associated within the collection and use of personal information. This code goes hand in hand with the Data Protection Act 2018; it is the UK's implementation of the General Data Protection Regulation (GDPR). The more we merge into a virtual world, the more of ourselves we're giving away. There is a possibility of user's unique movement signatures being tracked, read, and exploited by predatory entities. As developers, we shall not utilise the data in any malicious ways, and it will be kept no longer than necessary.

British Computing Society

The British Computing Society (BCS), the Chartered Institute for IT, is an organisation committed to championing the global IT profession and the interests of individuals, engaged in that profession, for the benefit of all. The Code of Conduct sets out the professional standards required by BCS as a condition of membership.

There are four main parts to the BCS code of conduct. The most relevant one to this project is Public Interest. In both the environment of our exhibits, and the virtual environment in which people will enter - it is extremely important to have due regard for public health, privacy, security and wellbeing of people. In virtual reality, there can be issues of sensory vulnerability. This goes hand in hand with the Health and Safety at Work Act; this law involves procedures to minimise health and safety risks/hazards. We've taken steps to protect users from others and the surrounding environment, whilst they're wearing the MuseVR accessories. There would be a large space available for the exhibit to avoid accidents involving visitors, or other exhibits. It is vital that the user feels safe, therefore there would be a trained member of staff supervising at all times. It is important that the experience doesn't have any psychological effects on users; there is a pertinent worry that VR might be swift to expose psychiatric vulnerabilities in some users. Our simulations will avoid extreme scenarios which could potentially be distressing.

Another important area enforced by the BCS, is Professional Competence and Integrity. Under

this code, we will ensure any staff members in use of MuseVR are trained to a high standard. This will aid in preventing any failures or errors in the software, while also providing support and involvement to visitors. They will be taught how to operate the software, as well as checking the equipment on a regular basis. From an educational point of view, we will always respect and value alternative viewpoints and, seek, accept and offer honest criticisms of work. As a business and as professionals of IT, it is also our responsibility to develop our knowledge, skills and competence on a continuing, and most importantly - maintaining awareness of procedures, and standards relevant in our field.

Computer Ethics Institute

The Computer Ethics Institute (CEI) is a nonprofit public policy organisation focused on the issues of advancing information technology within ethical frameworks. They enforce a particularly short code of ethics, known as The Ten Commandments of Computer Ethics.

In this framework, is a particularly crucial commandment to us: “Thou shalt not use a computer to bear false witness.” Our main focus is education, and so it is vital that our simulations are accurate and profoundly researched. Of course it is important the system is fun and interactive, but not at the compromise of accuracy. Users such as children, can be impressionable so it is our responsibility not to feed them misinformation. Inaccurate information could also be disrespectful and insensitive to certain parties or organisations. We found that Commandment Ten discourages exactly this too.

In our development of this project, we’ve always taken Commandment Nine into consideration, when making decisions and solving problems. “Thou shalt think about the social consequences of the program you are writing or the system you are designing.” Virtual reality is still new territory, and there are social consequences of the technology, as well as the content presented. Our system will engage with users in a positive way, offering new and interactive ways of learning. This is something we will push in all developments of our project.

Commandment Eight condemns the act of claiming ownership on a work which is the output of someone else’s intellect. This goes hand in hand with the Copyright, Designs and Patents Act 1988. Under UK law, copyright is an intangible property right. We will use original code throughout our project, and any art as well as sources of information will always be credited correctly, if given permission for. It is completely unethical to propagate work in one’s own name.

The entirety of all of the ethical frameworks link hand in hand with the Computer Misuse Act 1990, preventing MuseVR from breaking any laws from this act, as the short ethical code are

based on: not obtaining any unauthorised access to any computer based material; not obtaining authorised access with any intent to commit, nor facilitate any other offenses and to not modify any computer material without authorisation.

Relationship between Law and Ethics

Legal and ethical conduct work cooperatively to govern products and services within the Computing industry. As we have explored the various legislations, acts and ethical codes of conduct that are based around our product, we are able to make a comment to say that they overlap and support one another. We're able to see this with the various ethical codes (see above) linking with various laws. An example of this is with the CEI referring to the Copyright, Design and Patents Act 1988 and the Computer Misuse Act 1990.

We find that that they very much build upon each other, as well as overlapping, to prevent any loopholes which can be exploited. Together, they effectively cement the foundations of what a product or service should be built upon based in the digital creative industry.

WA & HM

Summary

In conclusion, MuseVR is an exciting new venture for us, for which we are very passionate about. We hope to completely reinvigorate museums, inspiring people of all ages and backgrounds. Our technology can create a new and interactive experience for those wanting to learn, bringing remnants of past and present to life. If successful with our project, we would work endlessly on educating young minds with only the most accurate, most interesting pieces of history. Thank you for your consideration of MuseVR.

WA

Video

https://www.youtube.com/watch?v=J-4NDZ3HHPU&feature=youtu.be

HW + HM

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