Mixed Reality Technologies Coursework Specification (Provisional)

Version 1 – 27th January 2025

Overview

The overall goal of the coursework is to research, ideate, prototype test and reflect on an example mixed reality experience and to document and critically reflect on this. This experience will be an performance designed to engage users with a particular setting – a chosen physical place in which the experience will take place and for which it has been specifically designed. You may choose a technical approach based on *locative media*, *augmented reality* or *virtual reality*.

The coursework is submitted at the end of the module, but you will get formative feedback on your design part-way through the course:

- **Part 1** (no marks): show your design to the teaching team and receive verbal feedback on the idea and approach (more later).
- **Part 2** (worth 100% of the total module mark): Submit a **video** of no more than 10 minutes duration which fully documents your design, design reasoning, implementation, evaluation and reflections. This should **include a section that shows your prototype in action**.

The key concepts, methods and technologies required to achieve this will be introduced in lectures and supporting lab sessions.

The brief

The brief is to create a mixed reality interactive performance to engage visitors in a creative way with a chosen setting. By 'setting', we mean a particular physical site at a specific location, or the generalisation of that setting - so for example you might design a performance for the A32 lab, or you might design a performance to be delivered in computer labs, similarly, you might design a performance specifically for Wollaton Hall, or one to be enjoyed in natural history museums, you may even design a performance to be consumed in bedrooms, whichever setting you choose you **MUST** make use of the characteristics of that setting in your design.

By interactive performance, we mean that there should be some aspect of human performance in your experience. This could be storytelling, theatre, animation, music, a light show, physical puppeteering or any other form you like. It must however be **interactive**. That means that it has to be affected by the users choices in some way. This could take the form of a game between audience and performer, or the performance being distributed around a space, or users being able to manipulate aspects of the performance – or even become performers themselves. It's up to your imagination to show us what you've got. The performance must be created specifically for this experience, so you **must not use performances for which you do not have the rights.**

Your performance should combine elements of entertainment with a deep understanding of the space and what is unique about it. The core idea is to use mixed reality to combine digital content with some form of physical experience. This might involve locative media, augmented reality or virtual reality. Your experience should clearly relate to and draw on your setting. You are free to choose whichever setting and technology you like. It is also acceptable to adopt a 'virtual setting' approach in which you

deliver your experience in a virtual recreation of the setting, perhaps targeting remote visitors, but you do need to consider how this extends beyond pure VR to include elements of mixed reality. The most important aspect of this design is that it tightly connects the place in which the performance is happening to the virtual content – even if you're not physically present in the place represented in a virtual reality. So for example, I can't go to the moon, and if I want to make a performance that takes place on the moon – how can I use my real world setting as part of the experience (perhaps it must be played while sitting on a swing to simulate zero gravity).

You will need to:

- **Research** the setting including visiting it in person.
- **Ideate** an appropriate experience design using the mixed reality deck of ideation cards that will be introduced in labs.
- **Prototype** the core of your design as a testable low-fi prototype, either using one of the authoring tools that we introduce in labs (and that don't require coding on your part) or using other platforms of technologies of your choice if you prefer to code your own system.
- **Test** your prototype with real users, writing up how you did this, and the lessons learned.
- **Reflect**: critically reflect on and explain how your design, prototyping and testing address relevant HCI concepts that were covered in lectures.

Your design should:

- Clearly demonstrate how a mixed reality technology can connect digital content to an appropriate physical experience.
- Take the form of an entertaining interactive performance, though this can be lightweight in nature. Specifically, we are not anticipating that you will produce traditional videogame designs (e.g., with multiple levels, extensive artificial intelligence, complex rules and characters), or professional level digital concerts, but rather are looking for relatively simple proof of concept prototypes sufficient to demonstrate and test out key design ideas.
- Be connected to specific setting in terms of theme and content.
- Clearly demonstrate and reflect on the application of 'HCI challenges' as covered in lectures.

Generative AI

You **may** use generative AI for asset creation in your prototype, for example to generate sound files or textures/models etc. You **may** also use generative AI to support programming your prototype. If you do this, you **must** clearly report it in your video.

You **may not** use generative AI to generate your video, or to generate text for your video.

Choosing a technology and lab support

We ask you to choose one of three technologies on which to base your design and prototype: locative media, virtual reality or augmented reality.

We will run four weeks of taster sessions that provide you with the tools and techniques required to complete the coursework including:

- an introduction to how to use the Mixed Reality ideation cards
- an introduction to virtual reality authoring tools
- an introduction to augmented reality authoring tools
- an introduction to studying people using mixed reality

We will also introduce you to the Virtual and Immersive Production Studio on Kings Meadow Campus and set aside a week where you may come in and use the systems and tools available there to capture performances in various ways – though you may use any system you like to do this – you do not need to come to the studio.

These will provide you with everything that you need to get started on the coursework, however you will need to do your own research to move beyond the basic instructions provided. You are welcome to use other tools and platforms if you prefer though these will not be supported by labs.

In order to help us organise labs, including lab assistants and equipment, we require you to give us an expression of interest as to your chosen technology after the taster sessions. These expressions of interest are not assessed, and they are not binding – you can change your mind later. They will be of great help to us ensuring the smooth running of the module.

Additional requirements

The coursework is an **individual** coursework. The video must be your own work, and the work reported in it must be your own work, including the research, ideation, prototyping, testing and critical reflection. Any exceptions to this must be clearly identified and acknowledged:

- Some of the supporting lab sessions involve group activities, although this is not formally assessed. You can build on the ideas and experience that you develop as a result of this group work, but this must be clearly identified and acknowledged in your submission.
- You can make use of pre-existing (e.g. found) images, text, 3D models, and other media within your application, but these must be clearly identified and acknowledged in your submission.
- You may include quotations or figures from papers and web sites but these must be clearly identified and acknowledged in your submission (with a full citation).
- You can give and receive technical assistance but must not do substantial development or coding for someone else or allow someone else to do so for you.
- You can discuss your concept and prototype with others but must do the bulk of the work yourself (including thinking through the project concept).
- You can make use of existing code libraries, code samples and code fragments within your prototype but these must be clearly identified and acknowledged.

The core elements of your prototype experience must be playable and testable. **However it is NOT required that *every* part of the concept or design is fully implemented**. The prototype need only be sufficient to test the core mixed reality interactions that your experience relies on.

Critical thinking is required throughout, e.g. justifications for decisions, evidence for judgements, realistic assessment of strengths, weaknesses, relationship to prior work.

Please note that this is primarily a design exercise and that the technical complexity of the system (software) is NOT the sole criteria for our evaluation of your coursework. Indeed, it is quite possible to realise a prototype using the tools that we introduce in labs without writing any code. A key criterion in our evaluation of your coursework is balance. Thus, criteria such as appropriateness, quality of design, quality of evaluation and critical reflection are very important. You can get an excellent mark using our authoring tools while providing extensive evaluation, just as you *could* gain

an excellent mark through developing a technically sophisticated system. Note: technical difficulties are NOT normally considered to be an extenuating circumstance.

The module convenors reserve the right to require you to do a live demonstration of your prototype and to explain how it was realised and the evaluation that you have performed. It is an academic offense to deliberately mislead the viewer of your report, for example by claiming or implying that the prototype is more functional than is in fact the case.

Marking Scheme

The following tables show the weightings of the different sections of the coursework

Area	Weight	Comments
RESEARCH: Quality of the background research into the setting	15%	Evidence of how you researched the setting and how the knowledge gained influenced your design.
IDEATION: Quality of the design concept and evidence of use of ideation cards	15%	Including novelty, creativity and appropriateness of the design alongside an explanation of the ideation process using the mixed reality game ideation cards.
PROTOTYPE: Quality of the prototype as documented	30%	Technical documentation of your prototype, including video documentation of up to two minutes duration.
TESTING: Quality of evaluation	10%	A discussion of how you evaluated your prototype and an analysis of lessons learned.
REFLECTION: Quality of the critical reflection on HCI challenges	15%	An analysis of how your design, prototyping and evaluation were informed by or illustrate the key HCI design challenges that were covered in lectures.
PRESENTATION: Quality of communication	15%	How clearly you have communicated your idea through your video presentation.

Mid module feedback

You will be given the opportunity to receive one-to-one feedback on your design from midway through the module. You will be able to sign up for a slot with one of the teaching team - comprised of convenors Gisela, Paul and Steve and our Teaching Support team. This will take the form of a 10 minute session. Several of the lecture and lab slots in the second half of the module are given over to these feedback sessions. You should have your design ready to discuss bringing any support materials you may wish.

Deadlines for coursework hand in and feedback are as follows

The deadlines are as follows (including those for the initial expressions of interest that are not formally assessed).

Deliverable	Due	Via
Expression of interest	Friday 20th February	Online signup form
Coursework submission	Friday 1st May 2024 15:00 UK time	Moodle
Coursework feedback	Friday 30th May 2024	Moodle

Grace period and penalties

We will follow the standard School policy for late submissions, including any Grace Period.

Plagiarism or other academic offenses will be dealt with using the standard University procedures[1], and may result in a mark of zero for the entire assessment.

[1] https://www.nottingham.ac.uk/academicservices/qualitymanual/assessmentandawards/academic-misconduct.aspx