

CST3140

Novel Interaction Technologies

Module Leader: Bob Fields

Term: AY 2021/2022

Duration of the module: 24 weeks

Document version: 1

Other formats available

This handbook is available in a large print format. If you would like a large print copy or have other requirements for the handbook, please contact the Disability Support Service (disability@mdx.ac.uk, +44 (0)20 8411 4945).

Disclaimer

The material in this handbook is as accurate as possible at the date of production. You will be notified of any minor changes. If there are any major changes to the module you will be consulted prior to the changes being confirmed. Please check the version number on the front page of this handbook to ensure that you are using the most accurate information.

Other documents

Your module handbook should be read and used alongside your programme handbook and the information available to all students on My Learning, including the Academic Regulations. Your programme handbook can be found on the My Learning programme page.

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1 Module Introduction

In recent years there has been a move in interactive technologies away from the desktop and traditional forms of computing, to more unusual and exotic kinds of interaction devices. Computers are now embedded in all manner of devices: mobile phones, domestic appliances, even the buildings, streets, and clothing that surrounds us. With these new ways of embedding technology in the environment come new ways of interacting.

In this module you will have an opportunity to explore and develop an understanding of a range of novel and unusual interaction technologies that allow users to interact with computing and information resources. Through a combination of lectures and hands-on experiences and exercises, you will come to understand not only novel technologies, also the way such technologies challenge the way we think about standard HCI concepts such as 'usability', 'user experience', 'evaluation and so on. Practical assignments will allow you to explore interactive technologies by constructing prototype systems using appropriate techniques, tools and programming languages.

2 The Module Team

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3 Staff Student Communication

Students may contact staff via e-mail, phone, and by making an appointment to meet in person. Staff will contact students by e-mail, the My Learning module page and in lectures and lab sessions.

The module leader may send urgent group and/or individual messages about the module to you by email, so it is important that you read your University email regularly.

In the first instance problems should be dealt with by talking to a member of the module team. You can give feedback on this module to the module leader, your Student Voice Leader, to your personal tutor, and through the end of module evaluation survey.

Our most important consideration is your health, wellbeing and safety as well as our staff and people related to the University. Remember that you – as part of #TeamMDX – can stay up-to-date with the guidance on Coronavirus at <https://unihub.mdx.ac.uk/coronavirus-covid19>.

4 Module Overview

4.1 Aims

Interactive technologies are developing continually, and new devices that offer novel ways of interacting with computer-based systems are constantly finding their way into our homes, workplaces and lives. Students on this module will encounter and study a range of innovative and emerging interaction technologies. The module affords an opportunity to become familiar with the technologies and devices themselves as well as ways of analysing their applicability for particular uses and situations, and approaches evaluating their use.

By understanding how computing devices and products are used and studying the ways that usage changes over time, students will gain a critical awareness of the processes by which interactive products gain in popularity and become successful. After completing the module, students will therefore be better equipped to anticipate and select the successful interaction technologies of the future, analyse situations of use and potential users, design using the latest interaction technology, and evaluate novel and innovative designs.

4.2 Learning outcomes

On completion of this module, the successful student will be able to:

Knowledge

- Describe the underpinning concepts and key features of a range of novel and emerging interaction technologies
- Critically assess and compare such technologies
- Provide arguments for how such technologies challenge concepts of HCI

Skills

- Analyse problem situations with regard to task, context and user needs
- Design and prototype solutions that effectively harness the potential of novel interaction devices and technologies to address specific problems
- Plan and conduct appropriate evaluations of designed artefacts, and use such evaluations in the iterative improvement of designs

4.3 Syllabus

See later Provisional Teaching Schedule in Section 6.

4.4 Learning and teaching strategy

Learning hours

Lecture 24 hours – 8%

Lab sessions 48 hours – 16%

Independent study 228 hours – 76%

4.5 Assessment scheme

Student's learning will be assessed through coursework only. Three assignments will contribute to the overall module mark as follows:

Coursework 1 Individual design and prototyping work followed by individual written 3-page project report 40%

Coursework 2 Individual design and prototyping work followed by individual written 3-page project report 40%

Coursework 3 Individual reflective 3-page report 20%

In all cases, only the submitted individual report is assessed, though other elements (including in-class presentations) will be required.

Core Text

Sharp, Rogers and Preece. (2016) *Interaction Design: Beyond Human Computer Interaction*. 5th Edition. John Wiley and Sons. Available as an e-book through MyUniHub.

Additional texts

Conference proceedings (e.g. CHI and DIS) available through ACM digital library along with other online resources will be introduced as necessary throughout the module. If you are going to read one additional book on the module topic, then we recommend: Bill Moggridge (2007) *Designing Interactions*. MIT Press. <http://www.designinginteractions.com/>

The module will be supplemented by many papers, articles and online resources, and references to these will be included in the lecture materials.

4.6 Research Ethics

Some of the coursework assignments for this module will require you to collect data about users, their requirements, and how they use interactive systems that you create. In order to collect such data responsible way, what you do must comply with ethical standards and University policy.

This module has a set of pre-approved of ethical protocols which you are required to follow as part of carrying out any research involving human participants, human data, animals/animal products, precious artefacts, materials or data systems.

Details of the ethical protocols you must follow - what you can and cannot do as part of the coursework - will be discussed in lab sessions.

If you submit a project that includes data gathered from or about people outside of the ethical protocols approved this may be treated as academic misconduct and could lead to fail grade being awarded. This means only collecting data types and using data gathering methods as outlined by your module tutor.

Research ethics approval seeks to ensure all work is designed and undertaken according to certain principles of ethical research. These include:

1. Primary concern must be given to the safety, welfare and dignity of participants, researchers, colleagues, the environment and the wider community
2. Consideration of risks should be undertaken before research commences with the aim of minimising risks to those involved - i.e. human participants or animal subjects, colleagues, the environment and the wider community, as well as actual or potential risks to those directly or indirectly affected by the research.
3. Informed consent should be freely given by participants, and by a trained person when collecting or analysing human tissue (details on accessing and completing online training for gaining informed consent for HTA purposes can be found below in Section 8).
4. Respect for the privacy, confidentiality and anonymity of participants
5. Consideration of the rights of people who may be vulnerable (by virtue of perceived or actual differences in their social status, ethnic origin, gender, mental capacities, or other such characteristics) who may be less competent or able to refuse to give consent to participate

6. Researchers have a responsibility to the general public and to their profession; as such they should balance the anticipated benefits of their research against potential harm, misuse or abuse which must be avoided
7. Researchers must demonstrate the highest standards of ethical conduct and research integrity. They must work within the limits of their skills, training and experience, and refrain from exploitation, dishonesty, plagiarism, infringement of intellectual property rights and the fabrication of research results. They should declare any actual or potential conflicts of interest, and where necessary take steps to resolve them.
8. When using human tissues for research, Human Tissue Act and Human Tissue Authority (HTA) requirements must be met. Please contact the relevant designated person (DP) in your department or the HTA Designated Individual (DI) (Dr Lucy Ghali - L.Ghali@mdx.ac.uk). Further information is provided below in the section: "Human Tissue Authority Information", see 'Governance Structure" document and SOPs etc.
9. Research should not involve any illegal activity, and researchers must comply with all relevant laws

For more information about ethics go to the Middlesex Online Research Ethics (MORE) system which has information and guidance to help you meet the highest standards of ethical research using this link: <https://MOREform.mdx.ac.uk>

Information and further guidance on how to complete a research ethics application form (e.g., video guides and templates) can be found on the MORE MyLearning site*: <http://mdx.mrooms.net/enrol/index.php?id=12277> (Log in required) *Middlesex University Definition of Research document can be located on this site.

5 Making the most of this module

The module team are here to help and support you achieve your goals. One of the key elements to successfully completing this module is engaging with all of the learning opportunities we offer as well and working with your peers to support one another.

Participation and engagement

This module is designed as a combination of contact sessions and independent study. This means you must attend all the allocated sessions and you must work on your own outside them. Students are expected to take an active part in all learning sessions; lectures, lab sessions, practical classes, seminars and workshops.

Student attendance is monitored during labs and lectures, and unexplained absences followed up via e-mail. If for any reason you are unable to attend a session you must inform the module leader.

To make the most of this module please complete the following every week

- Attend all sessions.

- Read through the notes making a note of any points you need to discuss with your tutor.
- Complete the set activities before the next session, making a note of any points you need to discuss with your tutor.
- Make progress with the coursework assignments sooner rather than later.
- Complete further reading from the core text online.

The module team is committed to support you and your fellow students whilst you undertake this module. In order for you to get the most out of sessions you need to come prepared and ready to contribute. Please ensure that any work set by the team has been completed before workshops. After each class please review what has been covered and make a note of anything you would like clarification on.

It is important that you are respectful and supportive to your fellow students and tutors. Adopting this approach will create a positive atmosphere within sessions and is something you can use in your professional life.

To access some of the rooms and specialist space used for this module you will need your University ID card. Please remember that your University ID should be carried with you always.

Lateness policy

Please ensure you are on time to sessions as tutors will start sessions promptly. Please note that if you are more than 10 minutes late you will not be permitted to join the session.

Mobile phones

All mobile phones must be switched to silent during sessions unless directed by your tutor to do otherwise. Calls and texts cannot be made or received during sessions unless agreed with the tutor prior to the session starting. If you are observed using your mobile phone you can be asked to leave the session.

6 Module overview and provisional learning schedule

Week	Lecture Topic	Lab Activity
1	Module Introduction	Introduction to Design Sketching
2	Interaction Design: knowing the user	Exploring AR
3	Virtual Reality	Coursework 1 Introduction
4	Augmented Reality 1	
5	Augmented Reality 2	
6	Augmented Reality and Unity	
7	Tangible User Interfaces	
8	Tangible User Interfaces	
9	Haptic Interaction 1	
10	Persuasive Technology	
11	Wearable Computing	
	Christmas vacation	
12		
13	Voice Interaction 1	Coursework 1 Submission & Demo
14	Voice Interaction 2	Coursework 2 Introduction
15	Ubiquitous Computing 1	
16	Ubiquitous Computing 2	
17	Proxemic Interaction	
18	Human Interaction with AI	
19	Interaction Design: Evaluation 1	
20	Interaction Design: Evaluation 2	
21		
22	Reality-based Interaction	Coursework 2 Submission & Demo
23	Easter vacation	Coursework 3 Submission
24		

Assessment

7 Coursework 1

7.1 Deadline

Report hand-in date: end of Learning Week 13.

7.2 Mode of working

This assignment is *individual work*: whatever you report in your write-up must be exclusively your own work. You may find it helpful to discuss ideas with others, give and receive feedback, share insights, and so on, but the work must, in the end, be an individual effort.

7.3 The Brief

You will **research, design and prototype** an Augmented Reality Experience that can be used by visitors to a museum, art gallery, or other exhibition, to enhance their visiting experience.

There are several ways that AR can be used in a museum or similar situation, for example, AR can be used to: identify an artefact and add additional information about it; highlight significant details; show original context; reveal hidden details or missing elements; discover related artefacts, and so on.

Task 1: Research

The starting point for your work is to carry out research by *visiting a range museums and galleries*.

Try to identify the kinds of artefacts present, the ways objects may be collected together into exhibits that tell a story, usually with the addition of other materials - text, video and other information. Look carefully at the people as well as the things: are there patterns in peoples' behaviour? what kinds of things do they look at? how do they view them? how do they move from one object to another? how do they find other information? and so on. You may spot 'problems' that suggest the need for 'solutions' that may involve AR. For instance, visitors may routinely have problems with navigating around the museum or finding specific artefacts or information.

Research into *existing products and investigations* conducted by others, and described in the literature will also be useful. Many videos and other descriptions can be found online illustrating some of the ways that museums have tried to use AR to enhance the visitor experience. For example, the British Museum has learned some lessons about implementing AR apps (Davis, 2013). Your design should try and apply AR in appropriate ways to achieve different effects for the museum / gallery visitor. It is expected that the app you create will

augment several museum objects, and will demonstrate several different ways of adding AR content.

Outcome: identify a museum and objects or exhibits in that museum that will be a focus for your design work.

Task 2: Design

Before creating a prototype, it is important to explore design possibilities, and typically this can be done by creating sketches or making simple mock-ups that capture your design ideas quickly and cheaply. Capturing design ideas in this way allows us to explore more ideas and variations early in the process, allowing us to be more confident that our design is likely to be effective before we start committing resources to creating a working prototype.

Outcome: Clearly documented and explained design for an AR app.

Task 3: Prototype

You will create running prototype version of your design idea as a native mobile app. Use an Augmented Reality development tool (such as Unity + Vuforia) or using an SDK library such as ARToolkit (<http://artoolkit.org>) or Vuforia.

Outcome: Prototype AR app running on a mobile device.

7.4 Deliverables

This assignment will require one assessed deliverable: an individual written report, in which you will describe your understanding of the project. You will also need to make your AR app available.

In addition, there will be two points where each team will present the state of their work. These are not graded, but are opportunities for feedback. However, they are compulsory, and those who do not present will be penalised.

7.5 Timescales

Module week	Activity
3	Coursework introduction. Plan for museum visits.
4-6	Research users and context Develop design concept
7	Presentation: Design Concept - required but not assessed. 5 minutes max. Feedback from tutor and peers
8-12	Design refinement, prototyping and feedback
13	Demonstration of the AR Prototype
13	Deadline for individual reports

7.6 Presentations

In Week 7, you will present your early design idea to the group, to gain comments and formative feedback. In week 13, you will demonstrate your running prototype. Presentations should last no more than 5 minutes. Presentations will not be graded as they are a vehicle for feedback. However, failure to present will result in a penalty of 10% of the marks for this coursework.

If illness or similar circumstances prevent you from attending the presentation, you must contact your tutor or module leader as soon as possible, and, where possible, provide some form of evidence.

7.7 Individual Report

In the report you will describe the work done, and demonstrate your knowledge and understanding of the process of developing design and prototype. Reports should be strictly no more than 3 pages in length including pictures and references. The structure and content of the report will be discussed in class, but a suggested structure is as follows:

Introduction (brief)

Research which museums did you visit? What were you looking for? What information did you collect, and how did you analyse it? What did you discover? How did this influence your design ideas?

Design concept Explain the overall design idea: what museum objects are augmented? how and why? key user interactions, relevance to the objectives of this assignment? Include sketches, diagrams, etc., to give a clear explanation. What different forms of AR will be used?

Prototype What does the prototype do? How did you turn the concept into a running prototype? What decisions and compromises were made? How was the design idea modified or improved? Include key screen shots or photographs.

Conclusion Your evaluation of the process and product, highlighting what you have learned.

7.7.1 Format and submission

Submit your report through the link that will be available on MyUniHub.

Use the CHI Proceedings Format. A template for this format can be found at <https://chi2018.acm.org/chi-proceedings-format/>. If you are unsure what the formatted papers should look like, then read some papers from the CHI conference. Unless it is especially interesting, code should not be included in the body of the report.

7.7.2 Provisional Report Marking Criteria

Note: In order to gain high marks in any category, work must be of a truly exceptional standard, demonstrating not only skill, knowledge and clear understanding, but also insight

and innovativeness!

Overall, this assignment is worth 40% of the module mark. The content of the report and the work it describes will be marked according to the following criteria.

	0-3	3	4	5-7
Research	No plausible evidence of research done or museums visited.	Museum visit appears to have been made; findings may be vague or their relation to design unclear.	Clear findings, based on observation, guiding design.	Method or approach described that yields insightful observations with a clear link to design. Backed up by references to literature.
Design description	Hard to follow, not clear what the design is.	Simple design idea; description of use must be clear. Makes sensible use of AR.	Use of AR clear, demonstrating a good understanding of the AR concept. With appropriate sketches / diagrams. Reasonable justification given in terms of the museum experience.	Excellent justification (probably by reference to museum observations or other data) for good design choices. Backed up with appropriate references.
Design Originality		Like many others: simple overlays.	New take on familiar ideas - variety of overlays, used creatively.	Highly original, inventive response to the problem; novel and appropriate interactions.
Prototype quality	Little evidence that prototype works or implements the concept	Seems to implement design idea - using Unity or similar (with sensible justification for other technology choices)	Good implementation; Thought given to appearance. Probably some use of scripting in Unity, or a native app developed from scratch.	Clear thinking about physical interaction as well as interaction with on-screen objects; more complex overlays.
Use and understanding of AR	No evidence of AR being used	Little thought given effective application of AR.	Sensible & appropriate augmentation of multiple objects; shows understanding of different overlay types. Understanding of AR concept; augmentation of museum artefacts, not just pictures of them.	Innovative and insightful use of overlays and interactions.

An additional 5 marks are available for the quality of the report.

	0-2	3	4	5
Presentation of report	Hard to understand; may have many errors of expression. Lacking detail.	Well structured and organised, appropriate use of pictures. Within page limit.	Good writing, Properly formatted , using appropriate references.	Excellent writing. Clear and relevant referencing

References

Ben Davis. The British Museum: Five lessons in augmented reality, 2013. URL <https://econsultancy.com/blog/63929-the-british-museum-five-lessons-in-augmented-reality/>. Visited Jan 2016.

8 Coursework 2

Provisional: this description will be updated with more detail, particularly about the marking scheme.

8.1 Deadline

Report hand-in date: end of Learning Week 23.

8.2 Mode of working

This assignment is individual work: whatever you report in your write-up must be exclusively your own work. However, an excellent way to learn and develop ideas is through discussion with others, and you are encouraged to discuss what you are doing with others in the group, to give and receive feedback and comments. In online lab sessions, the class will be divided into smaller breakout where it will be possible to discuss the work and share ideas, and the tutor will be present to offer feedback.

8.3 The Brief

You will **design, prototype and evaluate** a Voice-based User Interface that is designed to support Computer Science students access information and services relevant to their studies and to university life.

This could take many forms, but is likely to have some important features:

- The user can control the system by *voice input*. The language of commands that a user is able to use may be complex and presents a design challenge in its own right.
- The response to user commands may take a variety of forms, through *synthesised speech, visual output*, or some combination of the two.

Design

Before creating a prototype, it is important to explore design possibilities, and typically this can be done by creating sketches or making simple mock-ups that capture your design ideas quickly and cheaply. Capturing design ideas in this way allows us to explore more ideas and variations early in the process, allowing us to be more confident that our design is likely to be effective before we start committing resources to creating a working prototype.

The design description should include a specification of the language expected by the system as input (i.e. what words and phrases are understood), and the dialogues that the system can engage in (i.e. the sequences of input and output).

Prototype

You will create a running prototype of your voice-based interactive system. Several technology platforms can be used to create the, but a recommended one is the *Web Speech API*, a Javascript framework for developing user interfaces based on voice input and synthesised speech output. See https://developer.mozilla.org/en-US/docs/Web/API/Web_Speech_API.

Evaluation

You will conduct an evaluation of your prototype There are many ways of evaluating a prototype design, and the detailed choice of what to do is largely up to each individual to decide. However, some constraints and suggestions are:

- The evaluation must involve at least two sample users interacting with the prototype. Ideally, users should be independent of the design team and should be representative of the intended user group. However, given the current restricted situation, it will make sense to conduct the evaluation online, using members of this module as sample users.
- The most useful data is likely to be gained by observing users while they are interacting, looking for indications of problems and difficulties, as well as successful features.
- Asking questions like 'did you like the system?', 'how did you find the interaction?', 'would you buy a product like this?', or asking for general feedback, etc. is likely to be of no real value, and will gain poor marks.
- The aim of evaluation is largely to identify problems and spot opportunities for improving the design. So any evaluation that simply concludes that the design is good, is probably a weak and flawed evaluation, and will gain poor marks.

You should plan how the evaluation will be conducted, and how data will be collected and analysed, in order to generate findings about the design and ideas about how it can be improved.

Note For more information on the School's Research Ethics procedures that are applicable in any situation where human participants are used in trials, tests and experiments, see http://www.eis.mdx.ac.uk/research/groups/Alert/Ethics_Research/index.html, especially the Self Assessment process, and the associated Forms C and D.

8.4 Timescales

Module week	Activity
14	Coursework introduction. Begin work on design concept Consider users, context and requirements: what will the design do for users?
18	Develop design concept Presentation: Design Concept - required but not assessed. Each individual informally presents their idea - 5 minutes max. Feedback from tutors and peers Design refinement, prototyping and feedback Prototyping and feedback Evaluation
23	Demonstration of the Voice Interaction Prototype
23	Deadline for individual reports

8.5 Demonstration

Students must present their work at two points in the process. The first is an opportunity to present the early design idea to the tutors and the group, to gain comments and formative feedback. In week 23, each student will demonstrate their running prototype. Presentations should last no more than 5 minutes. Presentations will not be graded as they are a vehicle for feedback. However, failure to present at either of the opportunities will result in a penalty of 10% of the marks for this coursework.

If illness or similar circumstances prevent you from attending the presentation, you must contact your tutor or module leader as soon as possible, and, where possible, provide some form of evidence.

8.6 Individual Report

The report gives each individual an opportunity to demonstrate their knowledge and understanding of the process of developing and evaluating the game, and their own contribution to the team's effort. Reports should be strictly no more than 3 pages in length. The structure and content of the report will be discussed in class, nad is largely up to you, but a suggested structure is as follows:

Design concept Explain the overall design concept: objectives (what functions or services will the design deliver to users), key user interactions, relevance to the objectives of this assignment? As part of the design idea, define the utterances that the system will accept as input, the output it will produce, and the dialogues it will engage in. Include sketches, diagrams, etc., to give a clear explanation.

Prototype How did you turn the concept into a running prototype? What decisions and compromises were made? How was the concept modified or improved? Include key screen shots or photographs.

Evaluation Method Clear and detailed description of the process you used to carry out the evaluation?

Evaluation Findings What did the evaluation discover? A clear and detailed description of problems identified and possible solutions.

8.6.1 Format and submission

Submit your report through the link that will be available on MyUniHub. Use the CHI Proceedings Format. A template for this format can be found at <https://chi2018.acm.org/chi-proceedings-format/>. If you are unsure what the formatted papers should look, then read some papers from the CHI conference.

Unless it is especially interesting, code should not be included in the body of the report, but each individual must submit their prototype as a separate zip file (e.g. containing the entire project).

8.6.2 Provisional Report Marking Criteria

Note: In order to gain high marks in any category, work must be of a truly exceptional standard, demonstrating not only skill, knowledge and clear understanding, but also insight and innovativeness!

Overall, this assignment is worth 40% of the module mark. The content of the report and the work it describes will be marked according to the following criteria.

Excellent work will probably be worth 7-8 marks for most categories. To attract higher marks than this, work must be truly exceptional, and is likely to be very unusual - well beyond most excellent work.

Design description	0-3 Design vague, incomplete. Design purpose maybe unclear. Design may not relate to CW specification - e.g. may involve some generic VUI elements, unrelated to target users (CS students) or their activities.	4, 5, 6 Purpose clearly explained. Sensible design clearly expressed in detail – using intents, utterances, etc (or similar approach). Should address more than a single intent / task utterance. Simple dialogue patterns – e.g. request-response/error. Appropriate combination of voice / visual output.	7, 8 Excellent and innovative design; addresses a number of different intent/slot/utterance combinations. Dialogues described e.g., for repair, slot filling, etc. Justified, e.g. by reference to guidelines or literature.	9, 10 Truly exceptional and innovative design concept – clearly expressed using suitable notations and backed up with reference to literature.
Prototype	Not clear that a working prototype was made. Partial prototype, unrelated to design.	Well constructed prototype that clearly implements key elements of the design idea	Excellent prototype that clearly implements significant elements of a sophisticated design idea.	Exceptional prototype and prototyping process
Evaluation	No Real method described, findings vague and unconvincing.	Clear method description; Sensible, well-presented findings that identify specific issues. Conducted in a remote, COVID-safe way.	Excellent: Clear identification of insightful evaluation method that goes beyond simple usability. Appropriate to VUI evaluation. Explained with reference to literature etc. Insightful findings leading, presented with appropriate detail, to a critical reflection of the design design and VUI technology .	Exceptional and innovative process; sophisticated findings.
Presentation	Hard to follow, poorly organised, no clear separation between design/ prototype/ evaluation method / findings. Exceeds page limit.	Well structured and organized, appropriate use of pictures / diagrams. Strictly within page limit.	Excellent writing. Clear and relevant referencing. Properly formatted, using appropriate references.	Outstanding writing and presentation.

9 Coursework 3

9.1 Deadline

Report hand-in date for this individual assignment: Friday Week 26 (2 weeks after week 24)

9.2 Background

Over the course of this module you have met a range of novel interaction technologies including

- Tangible User Interfaces
- Ubiquitous computing
- Augmented Reality
- Haptic interaction
- Proxemic Interaction

In the first two coursework assignments you created solutions to two distinct problem scenarios:

- An interactive educational activity
- Digital technology to enhance the experience of museum exhibits

9.3 The Assignment

For this assignment you will:

- Summarise each of the technology areas listed above that were covered in the module. Demonstrate that you can define what each technology is, and identify its strengths, weaknesses and key characteristics.
- Make a systematic comparison between the technologies. As part of the basis for your comparison, assess how each technology addresses the needs of each of the two design scenarios addressed identified above. To do this, you may describe design ideas in cases where a technology is particularly appropriate for one of the design problems.
- A sophisticated discussion may identify design concepts that utilise several technologies together, highlighting their complementary strengths and advantages.
- Another useful way of making comparisons is to use a model or defined set of criteria that can provide a basis for comparison.

- You should not simply repeat design ideas from the previous two courseworks. Nor should you focus only on the technologies that were central to the earlier assignments.

Excellent answers will demonstrate reading around the topic and will show a greater knowledge and depth of understanding that can be gained from the lecture notes alone. As well as using literature, it is important that you use your own words to summarise technologies, discuss the comparisons, and articulate the way the technologies address the needs of the two design scenarios. So no copied or quoted material should be used, though the proper use of citations and references is important. The use of sketches and diagrams to explain your design ideas is strongly encouraged.

9.3.1 Format and submission

Submit your report, up to 3 pages in length, through the link that will be available on MyUniHub. Use the *CHI Proceedings Format*. A template for this format can be found at <https://chi2018.acm.org/chi-proceedings-format/> – click the link *Microsoft Word Template for Papers*. If you are unsure what the formatted papers should look, then read some papers from the CHI conference.

9.3.2 Provisional Report Marking Criteria

Coursework 3 will count for 20% of the overall module mark. Note: In order to gain high marks in any category, work must be of a truly exceptional standard, demonstrating not only skill, knowledge and clear understanding, but also insight and innovativeness!

	0-2	2-3	4
Technology summaries	Summaries incomplete or fail to demonstrate any real understanding..	Accurate summaries of the main points of each of the technologies, using no quotations or copied material.	Shows deep understanding using excellent illustrative examples. Goes beyond descriptions in the course.
Comparisons	No real comparison attempted.	Clear comparison - but possibly simple in the way it lists arbitrary points of comparison between pairs of technologies.	Uses a systematic framework of criteria for comparison. Well presented (e.g. as a table). May refer to theoretical underpinning of method.
Use of literature	No references used; only web sources.	Some key material cited and used knowledgeably. May not go beyond references in the course notes. Citations and references used properly.	Excellent use of references that shows understanding and use of literature beyond that mentioned in the course.
Use of design examples as illustration	Few or ill-thought out design ideas; may be difficult to understand. May just repeat CW1 and 2.	Clear design suggestions that illustrate some of the technologies and highlight specific differences.	Excellent design suggestions, well presented, that highlight important differences / similarities.
Presentation of report	Hard to follow; poorly written and structured.	Well structured & written; some references; Properly formatted ; clear and easy to read using appropriate pictures / diagrams. Within page limit.	Excellent writing. Clear structure. Relevant referencing.

References

Ben Davis. The British Museum: Five lessons in augmented reality, 2013. URL <https://econsultancy.com/blog/63929-the-british-museum-five-lessons-in-augmented-reality/>. Visited Jan 2016.

10 Feedback on your assignments

Feedback will normally be provided within 15 working days of the published assessment component submission date.

Overall module grade

Each coursework assignment will be marked to produce a score out of 40, 40 and 20 marks respectively for courseworks 1, 2, and 3. The total module mark will be the sum of these, and will be converted to a 20-point grade using the scale below.

Classification	Grade	Percentages	
First class	1	80	100
	2	77	79
	3	73	76
	4	70	72
Upper second class	5	68	69
	6	65	67
	7	63	64
	8	60	62
Lower second class	9	58	59
	10	55	57
	11	53	54
	12	50	52
Third	13	48	49
	14	45	47
	15	43	44
	16	40	42
Compensatable fail	17	38	39
	18	35	37
Uncompensatable fail	19	0	34

Assessment process

The following diagram provides an overview of the marking process for your module assessment. Details of the programme external examiner can be found in the programme handbook.

