

Title

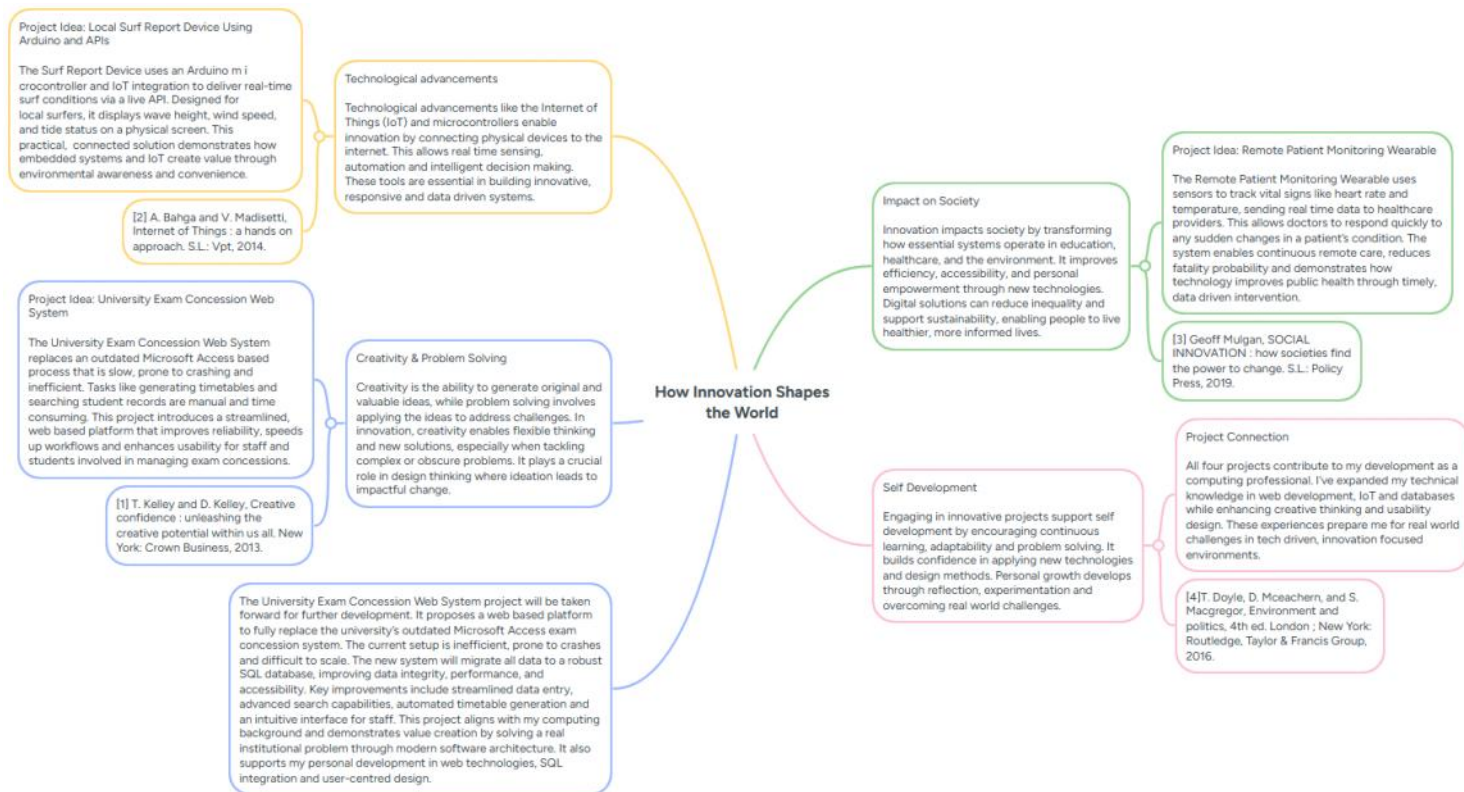
Name: Nicholas Aldous

Student Number: 2237649

Course: Computing (Software Engineering) (BSc Hons)

Task 1: Ideation & Mind Map

Question 1 & 2



Task 2: Aim & Objectives and Research Area

Question 1

Aim & Objectives

Aim:

To design and implement a secure, user friendly and scalable web based system that replaces the current Microsoft Access exam concession platform to improve efficiency, data reliability and accessibility for academic staff [5].

Objectives:

1. To analyse the existing Microsoft Access system to identify key inefficiencies and limitations in managing exam concessions.
1. To design a database driven architecture using SQL Server that supports robust data storage, advanced querying and system reporting.
1. To develop a responsive web application interface that enables staff to manage, search and generate exam concession reports effectively.
1. To conduct usability testing with end users to validate system functionality, performance and user satisfaction.
1. To ensure the new system complies with data protection standards and University IT governance policies.

Question 2

Research Philosophy

For this project, the most appropriate research philosophy is pragmatism. Pragmatism is based on the idea that research should focus on solving real world problems by applying practical solutions. It values multiple methods of knowledge generation and supports combining both quantitative and qualitative approaches where appropriate.

The aim of the project is to design a functional, efficient and user friendly system for university staff to manage exam concession requests. The solution must work in practice and meet real user requirements. A pragmatic approach supports this by allowing the research to combine technical analysis (e.g. SQL performance, form validation accuracy) with user feedback gathered through usability testing and iterative design.

Unlike positivism, which focuses solely on objective data, pragmatism recognises the value of context and the subjective experiences of the users. In this case, University staff who will be interacting with the system. This combination of practical results and user focused evaluation makes pragmatism well suited to this applied computing project, where success depends on both system performance and staff usability [6].

Question 3

Search Tools & Research Strategy

To explore current research and technical solutions related to the development of the University Exam Concession Web System, a range of digital research tools and databases will be used. These include IEEE Xplore, ACM Digital Library, Google Scholar and the UWTSD Library Portal. These databases offer access to peer reviewed papers, journals and technical reports that are

relevant to web system design, SQL integration and usability in administrative tools.

Searches will be conducted using relevant keywords and phrases such as “exam management systems”, “SQL database migration”, “staff facing web systems” and “usability in administrative software”. The Boolean operators (AND, OR, NOT) will refine results (e.g. "usability" AND "education system"). Filters will be applied to limit searches to sources published within the last five years, prioritising peer reviewed and full text content [7].

To ensure source quality, the CRAAP test will be used to focus on Currency, Relevance, Authority, Accuracy and Purpose. Preference will be given to content with sources that are well cited, written by trusted authors and align with the project’s practical goals [8].

This approach will uncover both known knowns and potential unknown knowns, enhancing the reliability and innovation of the system design.

Task 3: Research Strategies

Question 1

Strategies to Enhance Validity, Reliability, Generalisability & Ethics

To produce credible and useful research, careful attention must be given to validity, reliability, transferability and ethical considerations. These principles help ensure that findings are useful, accurate, and respectful of participants.

Validity is about making sure the research measures what it is supposed to measure. In this project, which focuses on staff satisfaction and usability of a new exam concession system, we will conduct user testing with observation followed by a short survey. This mixed method approach allows us to observe the live system and collect structured feedback on enhancements, ease of use and satisfaction [9].

Reliability will be improved through consistency in the user testing process. All participants will be asked to complete the same tasks and will be observed using the same criteria. A trial session will be used to test and refine the observation checklist and survey questions.

Given the small department size (3–5 staff members), generalisability is limited. Instead, the study will focus on transferability to generate insights that could apply to similar internal administrative systems in other departments [10].

Ethical practices will follow GDPR rules. All participants will give informed consent, remain anonymous and have the right to withdraw. No personal or sensitive data will be collected [11].

This strategy balances practical feedback collection with meaningful, credible research practice.

Question 2

Research Strategy and Pilot Data Collection

This project will use a user testing strategy combined with a short follow up survey to evaluate the usability, efficiency and staff satisfaction with the new web-based exam concession system.

Each participant will be asked to complete typical tasks using the system, such as entering a new concession request, searching for a student and generating a report. During testing, the researcher will observe users' actions, taking notes on ease of navigation, visible errors and time taken to complete tasks. This observational data offers valuable qualitative insight into system design and user interaction [12].

After completing the tasks, staff will fill out a brief Likert scale survey to reflect on their experience which will cover areas such as usability, clarity and task speed. This mixed method approach ensures that both observed behaviour and personal feedback are captured [13].

To refine the approach, a trial session will be conducted with one user. Their feedback will help revise task wording, simplify observation criteria and ensure the survey questions are clear and relevant. This trial process enhances the reliability and focus of the final data collection method.

A copy of the trial task list and trial survey is included within in the appendix section.

Question 3

Outline of Quantitative and Qualitative Analysis

Quantitative analysis involves working with numerical data to identify trends, patterns or statistical relationships. In this project, survey responses using Likert scales can be analysed using averages, frequency counts or percentages to assess user satisfaction and system usability.

Qualitative analysis focuses on non-numerical data such as open ended feedback or observed behaviours. For this project, comments made during user testing and follow up survey answers will be analysed to identify recurring usability issues or suggestions.

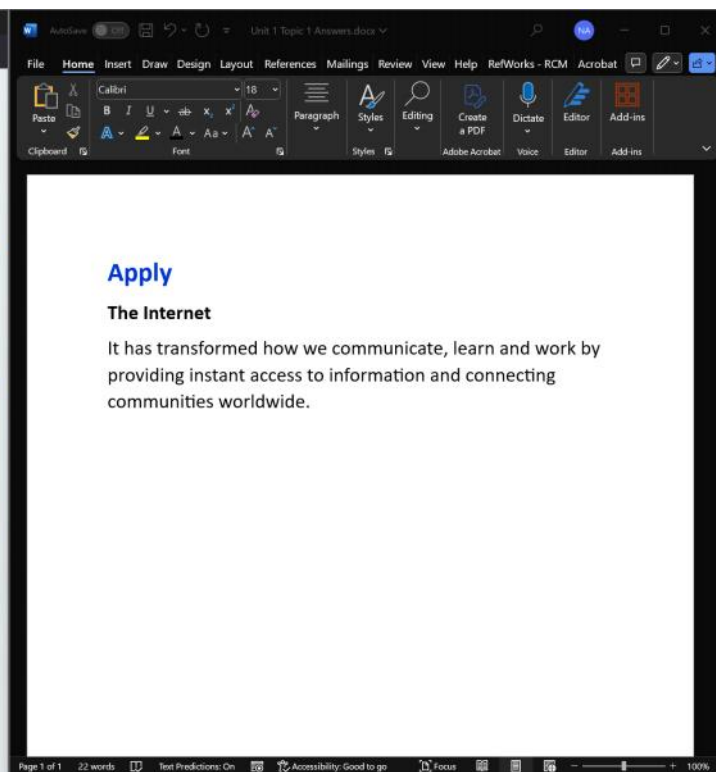
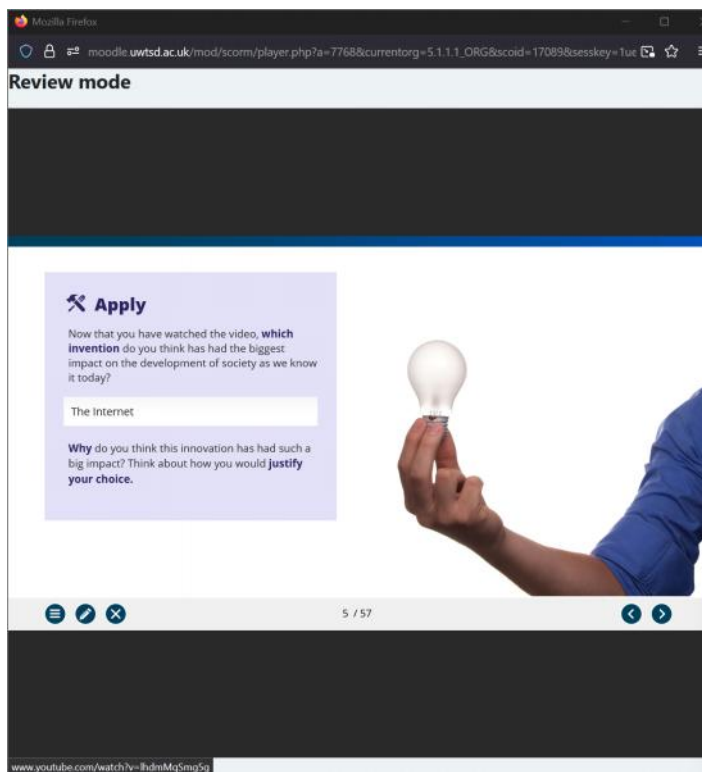
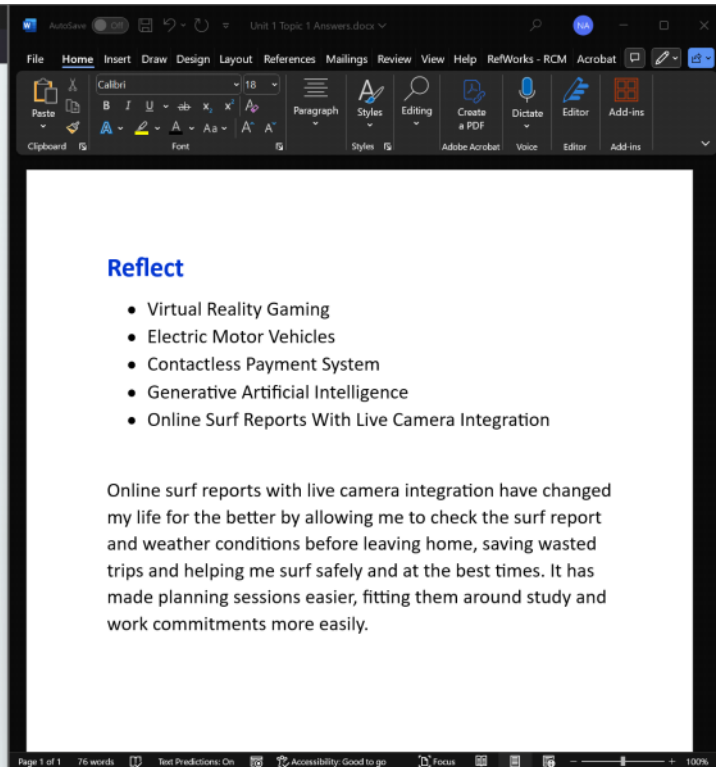
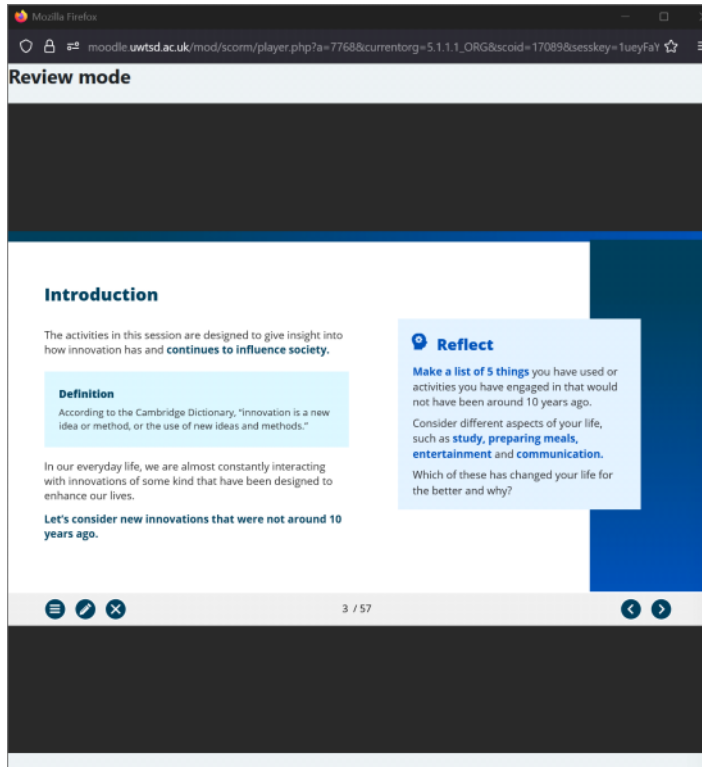
Using both methods allows for a well-rounded understanding of how users interact with the system, combining measurable satisfaction data with deeper insights into user requirements and areas for improvements [14].

Bibliography

- [1] T. Kelley and D. Kelley, *Creative confidence : unleashing the creative potential within us all*. New York: Crown Business, 2013.
- [2] A. Bahga and V. Madiseti, *Internet of Things : a hands on approach*. S.L.: Vpt, 2014.
- [3] Geoff Mulgan, *SOCIAL INNOVATION : how societies find the power to change*. S.L.: Policy Press, 2019.
- [4] T. Doyle, D. Meachern, and S. Macgregor, *Environment and politics*, 4th ed. London ; New York: Routledge, Taylor & Francis Group, 2016.
- [5] R. S. Pressman and B. R. Maxim, *Software engineering : a practitioner's approach*. New York, Ny: McGraw-Hill Education, 2015.
- [6] M. Saunders, P. Lewis, and A. Thornhill, *Research Methods for Business Students*, 8th ed. United Kingdom : Pearson, 2019.
- [7] A. Booth, A. Sutton, and D. Papaioannou, *Systematic Approaches to a Successful Literature Review.*, 2nd ed. Sage Publications, 2016.
- [8] S. Abrams, L. Delf, R. Drummond, and K. Kelly, "The CRAAP Test," *open.oregonstate.education*, Oct. 2022, Available: <https://open.oregonstate.education/goodargument/chapter/craap-test/>
- [9] R. F. Devellis, *Scale Development : Theory and Applications*, 4th ed. SAGE Publications, 2016.
- [10] A. Bryman, *Social Research Methods*, 5th ed. Oxford: Oxford University Press, 2016.
- [11] European Commission, "Data protection," *commission.europa.eu*, 2024. https://commission.europa.eu/law/law-topic/data-protection_en
- [12] J. Nielsen, *Usability Engineering*. Amsterdam: Morgan Kaufmann, 1993.
- [13] J. W. Creswell, *Research Design : qualitative, quantitative, and Mixed Methods Approaches*. Thousand Oaks, California: Sage Publications, Inc, 2018.
- [14] GeeksforGeeks, "Difference Between Qualitative and Quantitative Data," *GeeksforGeeks*, Nov. 28, 2021. <https://www.geeksforgeeks.org/maths/difference-between-qualitative-and-quantitative-data/>

Appendix

Screenshots of The Answers When Completing Unit 1 topic 1 Questions on Moodle



Review mode

Is innovation changing things for the better?

Deaths from natural disasters actually fell to **less than half** over the last 100 years.

In 1900, roughly half a million people died a year from natural disasters such as floods, fires, earthquakes and droughts.

When polled, **only 12%** of the Swedish public chose option C, that deaths from natural disasters had fallen to less than half.

50% agreed with option A, believing that the rate had more than doubled.

C. Decreased to less than half

13 / 57

Unit 1 Topic 1 Answers.docx

Is innovation changing things for the better?

1. C. Decreased to less than half

Page 1 of 1 14 words Text Predictions: On Accessibility: Good to go Focus 100%

Review mode

Is innovation changing things for the better?

Across the world, **women aged 30 have spent 7 years in education.**

While we haven't achieved gender equity, the overall average is much closer than many people realise. In fact, when polled, only 24% of the USA public chose option A. **52% chose option B**, that women had spent 5 years in school.

Hans Rosling argues that "when you answer, you answer according to the worst places, and there you are right, but you miss the majority."

Do you agree with that?

A. 7 years

15 / 57

Unit 1 Topic 1 Answers.docx

Is innovation changing things for the better?

1. C. Decreased to less than half
2. A. 7 Years

Page 1 of 1 18 words Text Predictions: On Accessibility: Good to go Focus 100%

Review mode

Is innovation changing things for the better?

In fact, the percentage of people living in extreme poverty almost halved.

This data was collected in 2014, and more recent data shows that this percentage has fallen even further.

In 1990, 35.9% of the global population lived in extreme poverty. **In 2017, it was only 9.3%.** Although this still means nearly 1 in 10 people live in extreme poverty, this has fallen from over 1 in 3 people in 30 years.

C. Almost halved

As you can see here, many aspects of life have been improved by **modern innovation**.

In general, we are doing much better than in the 'good old days', with higher quality of life and improved access to resources.

These three questions were posed by **Hans Rosling** in a **2014 TED Talk**. In the next activity, we will look at more of his work to see if innovation is really changing things for the better.

17 / 57

Unit 1 Topic 1 Answers.docx

Is innovation changing things for the better?

1. C. Deceased to less than half
2. A. 7 Years
3. C. Almost halved

Page 1 of 1 22 words Text Predictions: On Accessibility: Good to go Focus 100%

Review mode



Apply

Do you still agree that this invention has had the **biggest impact** on the development of society?

The Internet

What **beneficial** effects has it had on humankind? **Justify** your response in a **forum post**.

21 / 57

Unit 1 Topic 1 Answers.docx

Apply

Yes, I still agree the Internet has had one of the biggest impacts on society because it connects people instantly and makes information accessible across the World. It has helped humankind by improving education, communication and access to essential services. Helping to make life more convenient and opening up new opportunities.

Page 1 of 1 52 words Text Predictions: On Accessibility: Good to go Focus 100%

Review mode

What is the fourth Industrial Revolution?

Revolution	Year	Information
	1 1784	Steam, water, mechanical production equipment
	2 1870	Division of labour, electricity, mass production
	3 1969	Electronics, information technology, automated production
	4 ?	Cyber-physical systems

Reflect

As you can see, the characteristics of each industrial revolution have **changed a lot over time**.

Now you have seen an overview of the fourth industrial revolution, we will look at some of the new technologies that will potentially change our way of living.

26 / 57

www.youtube.com/watch?v=lldmMqSmg5g

Unit 1 Topic 1 Answers.docx

What is the fourth Industrial Revolution?

Answers are shown within the slide

Page 1 of 1 12 words Text Predictions: On Accessibility: Good to go Focus

Review mode



Apply

Of the technologies listed by the **World Economic Forum**, which, if any, do you think will have the biggest impact in your discipline area in the next 3-5 years.

Justify your answer on the forum with reference to evidence.

29 / 57

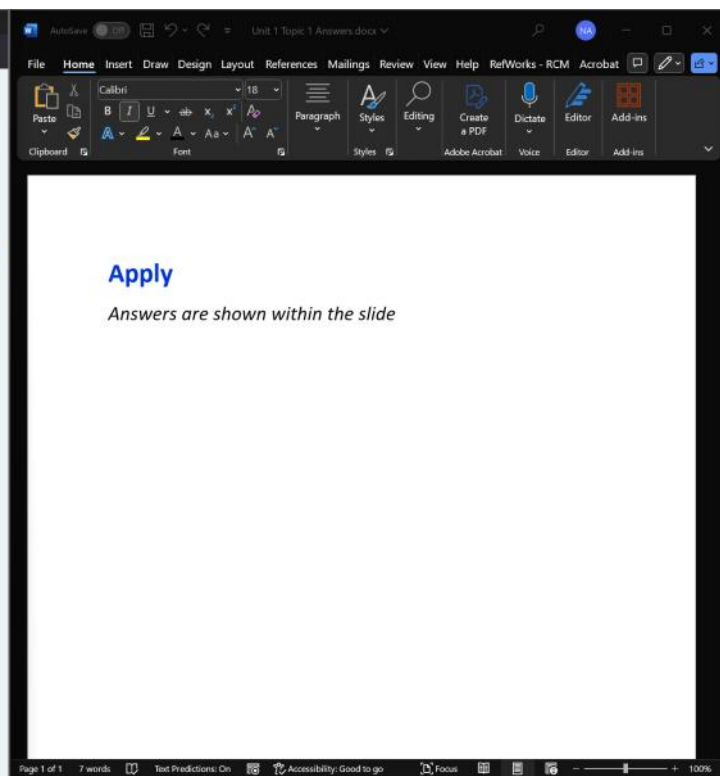
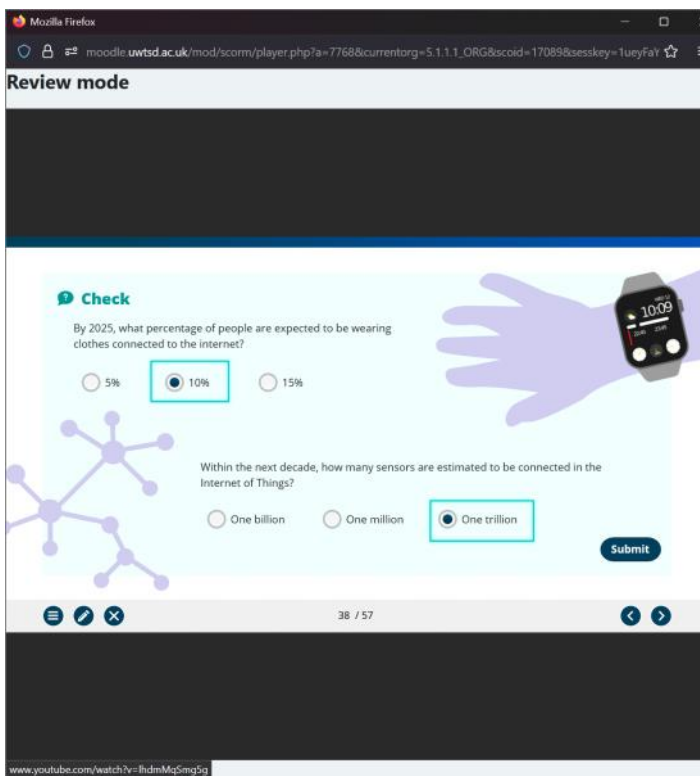
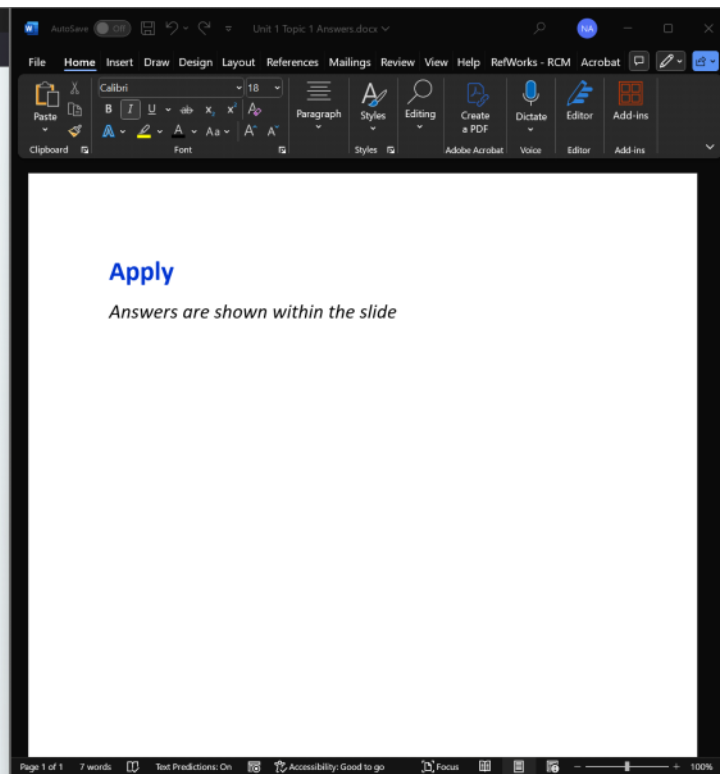
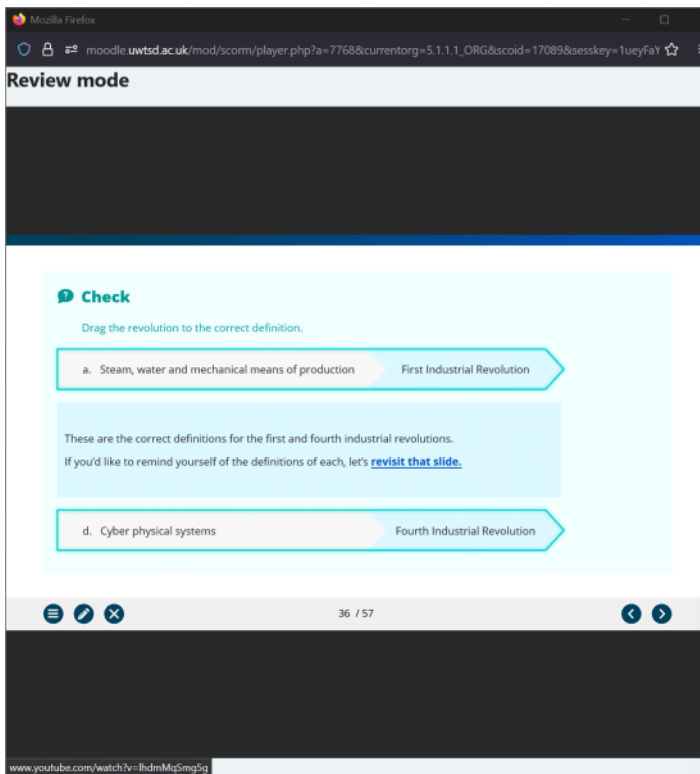
www.youtube.com/watch?v=lldmMqSmg5g

Unit 1 Topic 1 Answers.docx

Apply

I think that the Internet of Things (IoT) will have the biggest impact over the next 3-5 years because connecting devices and sensors enables real-time data collection and smarter decision making in areas like environmental monitoring and smart healthcare, driving greater efficiency and innovation (McKinsey Global Institute, 2022).

Page 1 of 1 49 words Text Predictions: On Accessibility: Good to go Focus



Review mode

50 / 57

www.youtube.com/watch?v=8cdmMq5mg5g

Unit 1 Topic 1 Answers.docx

File Home Insert Draw Design Layout References Mailings Review View Help RefWorks - RCM Acrobat

Apply

When my father encouraged me to build a water-cooled gaming computer, it developed my personality to be more creative by teaching me to experiment, solve problems in new ways and trust my ideas, which has made me more confident in taking on new challenges and expressing my creativity.

Creativity is important in computing because developing software often involves designing new solutions to user problems and building efficient, user-friendly systems, such as creating interfaces or solving bugs in innovative ways.

Page 1 of 1 80 words Text Predictions: On Accessibility: Good to go Focus

Review mode

57 / 57

www.youtube.com/watch?v=8cdmMq5mg5g

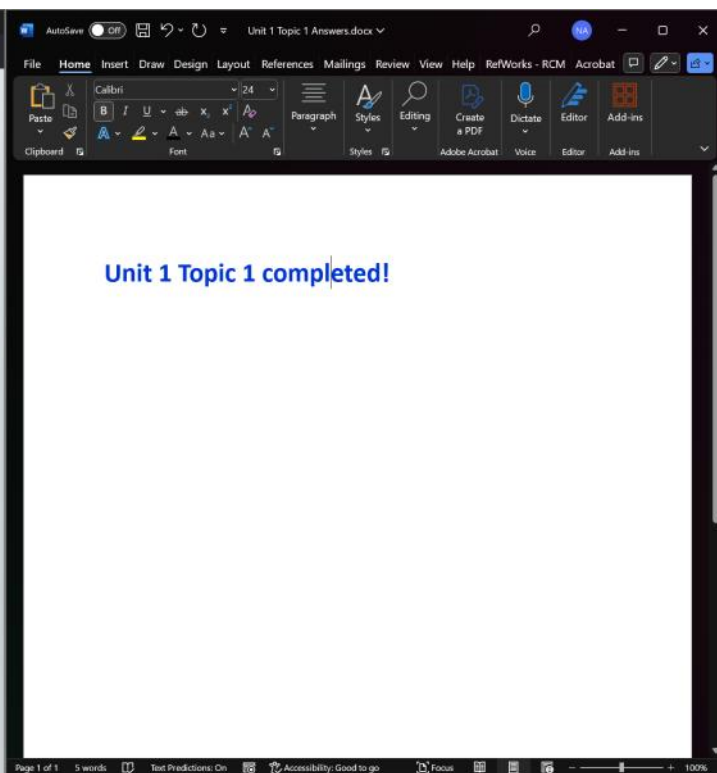
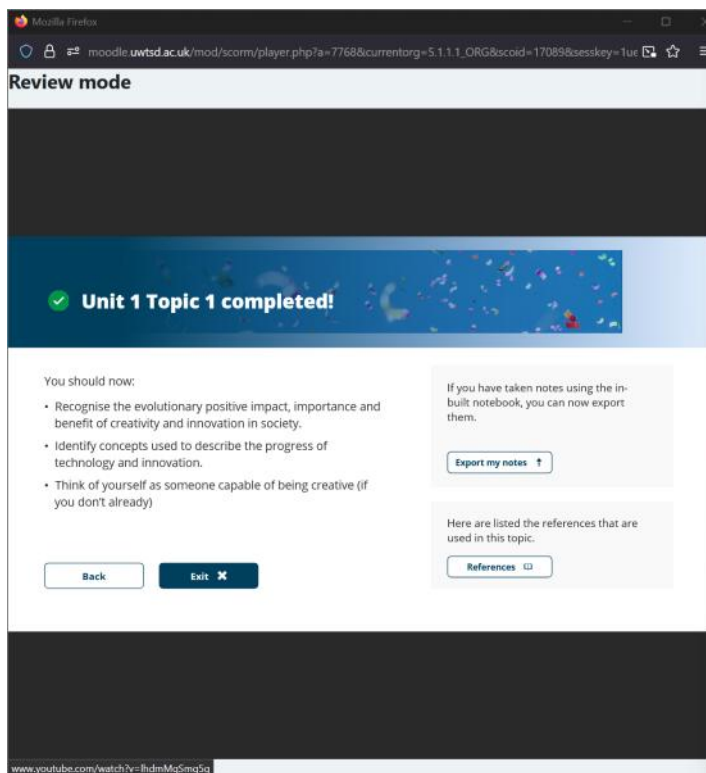
Unit 1 Topic 1 Answers.docx

File Home Insert Draw Design Layout References Mailings Review View Help RefWorks - RCM Acrobat

Before you go...

- ✓
- ✓
- ✓
- ✓
- ✓
- ✓

Page 1 of 1 9 words Text Predictions: On Accessibility: Good to go Focus



Trial Task List

Objective

To evaluate usability, clarity and efficiency of the exam concession system functions.

Instructions

You will be asked to complete a series of tasks using the web-based exam concession system.

Please complete each task as naturally as possible. Your actions will be observed for research purposes, but no personal data will be recorded.

Task No.	Task Description	Completed
1.	Log into the system using a staff test account	
2.	Add a new exam concession record for a student	
3.	Search for an existing student by student number	
4.	Edit an existing record (e.g. update exam concession type)	
5.	Generate and export a concession timetable for one student	
6.	Log out of the system	

Trial Task Survey Questions

Please complete the following short survey based on your experience using the system. Your responses will help us improve its usability and overall functionality. For each question, circle a number from 1 to 5, where 1 = Strongly Disagree and 5 = Strongly Agree.

Quest. No.	Question	Answer
1.	The system was easy to use.	1 2 3 4 5
2.	I was able to complete tasks without needing help.	1 2 3 4 5
3.	The layout and navigation of the system were clear.	1 2 3 4 5
4.	I found the response time of the system acceptable.	1 2 3 4 5
5.	I would feel confident using this system regularly.	1 2 3 4 5
6.	I experienced no issues or bugs while completing tasks.	1 2 3 4 5

Do you have any suggestions to improve the usability or functionality of the system?
