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COMMON ASSESSMENT TASK

Level 2 Digital Technologies and Hangarau Matihiko 2021

91899 Present a summary of developing a digital outcome

Credits: Three

Achievement	Achievement with Merit	Achievement with Excellence
Present a summary of developing a digital outcome.	Present an in-depth summary of developing a digital outcome.	Present a comprehensive summary of developing a digital outcome.

Type your School Code and 9-digit National Student Number (NSN) into the space below. (If your NSN has 10 digits, omit the leading zero.) It should look like “123-123456789-91899”.

Answer ALL parts of the assessment task in this document.

You should aim to write **800–1500 words** in total.

Your answers should be presented in 12pt Times New Roman font, within the expanding text boxes.

The only resource you may access during this assessment is your digital outcome (including any images of this that you prepared in advance). Internet access is not permitted.

Save your finished work as a PDF file as instructed by your teacher.

By saving your work at the end of the examination, you are declaring that this work is your own. NZQA may sample your work to ensure this is the case.

Excellence

TOTAL

07

ASSESSOR'S USE ONLY

INSTRUCTIONS

The task in this assessment requires you to discuss a digital outcome you developed within the past 12 months.

You may illustrate your answers with up to THREE images:

- a single image of the digital outcome (e.g. a website; a poster; an electronic device)
- a single image of the planning process (e.g. agile development; a planning chart)
- a single image of the digital components of the outcome (e.g. the HTML / CSS for a website; the “layers” view of a poster; the code for an electronic device).

You may also quote short pieces of relevant information from the digital outcome in your answers.

Read all parts of the task before you begin.

ASSESSMENT TASK

- (a) (i) Briefly describe your digital outcome and its intended purpose or function.

The project that me and my partner, Z [REDACTED], worked on was an environmental sensor that detects values of variables in an environment. These variables were temperature, humidity, carbon dioxide levels, and carbon monoxide levels specifically. These variables are displayed on a webpage, and locally on an LCD.

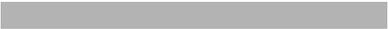
It was intended to sense a classroom environment in order to provide data to the caretaker and principal so that decisions could be made based around it. The data would show if the levels were sub-optimal. For example, our data could show that the humidity levels in the classroom were too high, in which our clients would be able to address and make changes if necessary.

The digital outcome that I specifically created were Fusion 360 files of housing that stored the sensors and circuitry. I then exported these files to a 3D printer and laser cutter. I also programmed the LCD using Arduino IDE, which we then used for the physical product to address certain requirements.

- (ii) What were the steps you followed (or milestones that you met) in the development of your digital outcome? In what ways did having these steps or milestones help you?

During the development of the digital outcome, I split the overall project into key stages, which were the main aspects of the outcome. These key stages were then split further down to tasks within key stages. This helped me because having set tasks I know I have to do means that I could focus on a small part of the outcome. Having this focus allowed me to clearly work on one thing at a time, not being confused like if I was working on several things at a time.

During these key stages, I followed an inquiry, design, development, and testing process. This means that I start off by researching everything I needed in the key stage I was working on before doing anything. This was very beneficial as it enabled me to work more efficiently. By researching and knowing everything about the software or components, I was able to work efficiently as I did not need to waste time researching mid-way through. It also meant that I did not have to guess how a component connected to another, or how to



program a certain component.

Another development process I followed was that of an 'agile development process'. This involves testing and evaluating the outcome after every task completed. This helped a lot as it allowed me to check for errors throughout development. By fixing these errors during the process, it allowed me to make a better-quality outcome, as I fixed every error that came up. This is as opposed to fixing all the errors at the end of the project, if I did that it would end badly as I would not be certain as to which aspect of the outcome contained the error. It could have been within the program, or the physical product itself. By following the agile development process, it removed the uncertainty of where the error could be. This also improved efficiency, as by not needing to search where the error is, time would not have to be wasted.

- (iii) What were the most important resources that you used to develop your digital outcome? Why were these resources so important?

Examples of types of resource are shown below.



The resources that I found to be the most important that I used to develop my digital outcome was software, planning tools, and stakeholders.

With software, I had to choose a 3D designing software that was able to create the housing for the physical product. I decided to use Fusion 360, a CAD software where I can create the 3D models and modify them with ease. This is as opposed to another CAD software such as FreeCAD or SOLIDWORKS. I used Fusion 360 as I had previous experience with it before, so I already knew how to use the software and create the models. This was very important in relation to the digital outcome as it allowed me to spend less time in this key stage. By already knowing what to do, I did not have to spend any time learning how to operate Fusion 360. Fusion 360 was also very important to do with the digital outcome as the housing had to not fall apart. I was able to make sure of this due to the 3D viewing of the models that Fusion 360 had. I was able to see close-up if there was anything wrong with the models.

The planning tool that I used was Trello, a website that enabled me to set due dates on tasks, and clearly see what tasks I needed to do, are working on, or have finished already. This resource was very important as it was able to show me if I was ahead of time, or if I was working too slow. This indicated to me if I needed to work harder and faster to be able to complete the digital outcome in time. It also allowed me to work more efficiently, as by knowing what tasks I had to do next, I would be able to prepare for it mentally and not be surprised by anything coming up.

The stakeholders were another resource that proved significantly beneficial for me. This is because by gaining stakeholder feedback, I was able to fix any errors that came up through



stakeholder user testing, or making any modifications to the digital outcome that they saw fit. If the stakeholders did not like something about the design of the models for example, I was able to fix and address this. This allowed me to make a better outcome, as if the stakeholders were satisfied with the outcome, it meant that most likely the client would be satisfied with the outcome.

- (b) (i) Who were the end-users of your digital outcome? What special requirements did they have, and how did these requirements influence your decision-making during the development process?

The end-users of the digital outcome were the principal and caretaker of the school.

One requirement was that they had were that the data had to be easily readable and presented in a way that could easily be seen. This influenced my decision making during the development process as I had to make sure that the data they had could be easily seen. The way that I addressed this was by making the decision to use an LCD for the physical outcome. I decided to program it in a way that the variables of the sensors being used could be easily understandable. I did this by programming the LCD to have the words, 'TEMP:', 'HUMI:', 'CO2:', and 'CO:' displayed on the LCD and having the variable's values beside their respected words. Through stakeholder testing, I verified that this was an effective decision to address the requirement.

Another requirement that I needed to meet was that the physical product had to not be tampered with by students. The way that this influenced my decision making was that I had to make the housing models in Fusion 360 not be stand-out. I had to change the model's colour to be a basic colour palette such as black or dark grey. I also had to make the housing shape be a basic shape such as a rectangular prism.

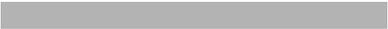
- (ii) Explain how you were influenced by TWO of the following factors during the development process, and the effect each had on your digital outcome:
- aesthetics
 - usability
 - functionality.

Factor (1) – Usability.

Usability means the ease of access in which the outcome can be used by the end-user and ease of using the outcome. The effect that this had on my digital outcome is that I had to make sure that the housing models that I made were able to be easily used by the end-user. I addressed this by using stakeholder testing, in which I saw if the housing was placed down in a location properly. This is because the housing had to be placed in a certain way where air flow could be around the sensors. I realised that the stakeholders did not know which way to place down the physical product. This led me to change the model of the housing in Fusion 360. I decided to change the housing to be a lighter grey colour for the bottom, in which that side would be placed on the ground. After further stakeholder testing, I found out that this worked as intended.

Factor (2) – Functionality.

Functionality means that the digital outcome had to meet the requirements set out. This means that the sensors had to be sensing the correct values, and it had to be displayed correctly on the LCD. This effected my digital outcome as I had to test and evaluate whether the digital outcome I created met the functionality requirements. I tested if the LCD was displaying the correct values by utilising a serial monitor on the Arduino IDE. A serial monitor is a built-in display with the Arduino programming software. If the values displayed



on the serial monitor matched up with the values on the LCD, I could confidently say that it met the requirement.

- (c) (i) In what ways was the development process successful? You might consider:
- whether the end-users were satisfied with the digital outcome
 - things you learned during the process.

The development process was successful as the stakeholders and end-users were satisfied with the digital outcome. I knew this by getting feedback on the housing models and for the locally displayed parameters on the LCD. By knowing that they were satisfied with the outcome, I knew that the development process was successful as it had met their needs.

Another way I knew the development process was successful is that I had learned certain things during the process. The first time I had gained stakeholder feedback allowed me to realise the importance and benefit of stakeholders. I learnt that I should use them more often as they allowed me to see certain errors with the outcome, as well as helping me fix usability and functionality concerns I had.

- (ii) In what ways could the digital outcome have been improved? What would you have had to do differently during the development process to make this improvement?

One improvement I could have made was by using an online software that was cloud-based, where I could store my code. This would have improved the development process as the code I created for the LCD was only stored locally when using Arduino IDE. This meant that I was not able to work on it at home on another device unless I shared it back forth. This constant sharing meant that I always had to take time at the start of every lesson to share the code from my own computer to the school computer. By utilising a cloud-based software like Github, I could have easily worked on it at home on any device without the need for sharing. This would have improved efficiency. This also meant that the risk of forgetting to share it would be gone, and I would not need to remember to share it constantly.

Another improvement I could have made was by using the animation and rendering tools in Fusion 360. This is because these tools would have been able to simulate what the outcome would have looked like in real life. By first using these tools to show the models to my stakeholders, it would have made it easier and more efficient to modify it afterwards. All I had to do was show the stakeholders my models on the computer, or share a photo of the rendering, and it would have been a better representation of the aesthetics of the outcome.

Excellence Exemplar 2021

Subject	Level 2 Digital Technologies	Standard	91899	Total score	07
Q	Grade score	Annotation			
-	E7	The candidate's response includes a very good level of detail of the digital component and the physical outcome, as well as the specific parts of the outcome they developed as part of a group. While the evaluation of decisions made is lacking in specific detail, it is supported by suggestions for improvements linked to both the development process and its outcome.			