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Examination Answer Book

24 Pages

Instructions to candidates

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2. Enter your name in the space provided to the right and seal to hide your name.
3. The answers must be **legibly** written. The Examiners can either ignore illegible script or have it typed and the expense of typing charged to the candidate.
4. Write your answers in ink.
5. Begin each answer on a fresh page. Do all rough work in the answer book and cross it through.
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1	Student Number	204814
2	Title of Examination Paper	M3X8648 Usability Engineering
3	Module Code	M3X8648
4	Date and Time of Examination	8/5/2018 1:29
5	Examination Venue	
6	Seat Number	A7

7	Number of Answer Books handed in	
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List the numbers of the questions you have attempted	Office Use
1A	20
1B	10
2A	21
2B	9
3A	17
3B	11
1A	20
1B	11
2A	21
2B	9
3A	18
3B	11
Total	88

59%
90
60%

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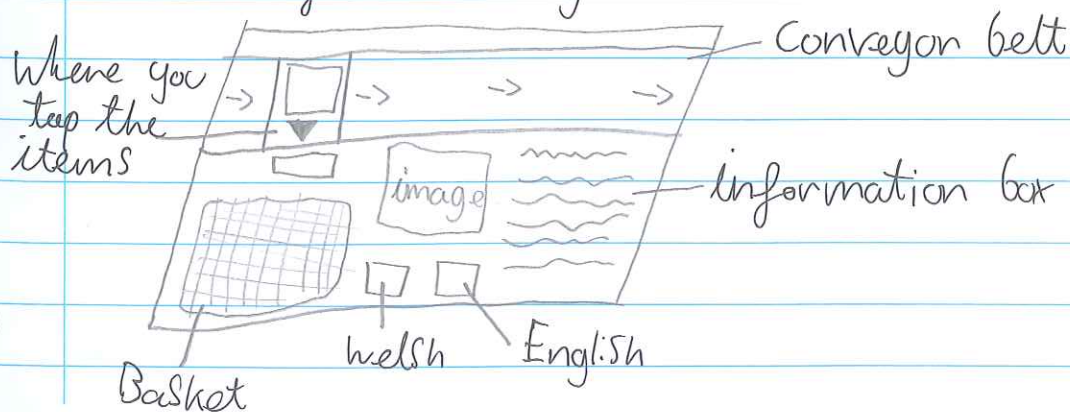
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Question 1

a) Super Market projection display

The Super market projection display is a long table with 4 projectors above it. The projectors project an image of a moving conveyor belt, basket and information box. The display also has sensors that detect whether the user is tapping any part of the projection, this is so the display can be interactive. The sensor give the display touch screen like functionality, for example you can tap items on the conveyor belt to bring them into the basket where it will display information to you in an information box, it also has a Cymraeg and English language button that change the language of the information in the information box. The whole conveyor belt is on a 4 cycle timer where it change the items for example for one of the sets is the co-op when it started and another is a department store. Good things about the display is that it cannot be broken by the users because it a projection. A problem with this though is that you have to tactile feedback, or sound feedback when you drag or tap an item.

Sketch of the System

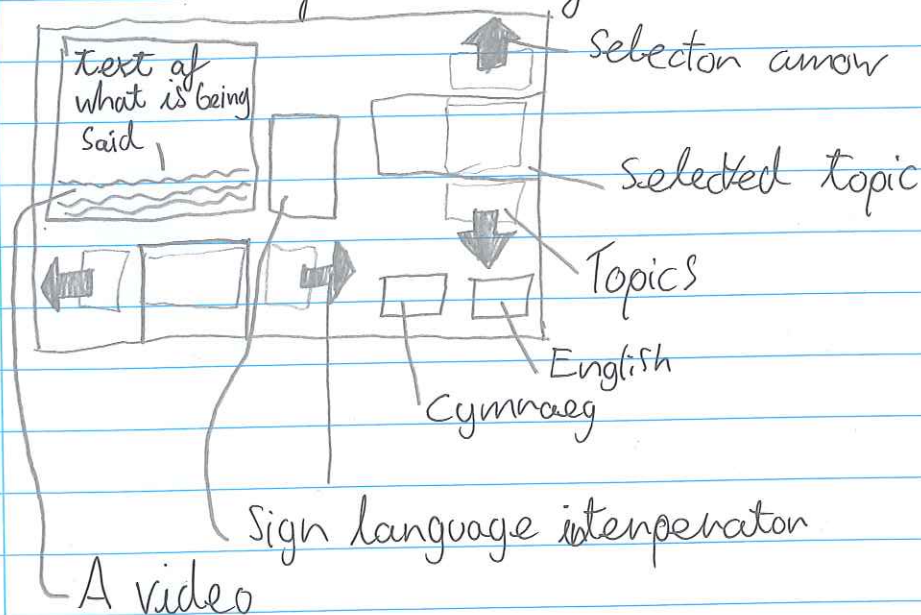


Good description

Future technologies display

This display is a touch screen display that has information about future technologies that can be selected using two sets of menus that are controlled by an up and a down arrow. When you select a topic sound gets played behind you which will give you information about the topic you have chosen. You can control the language using two buttons on the screen that say "English" and "Cymraeg". An on screen interpreter is also on the screen, he will sign language any information that is being played. The display has no help screens and the response times on the display are bad which makes it feel clunky to use.

A Sketch of the System



A comparison of the two displays

Overall I think that the Supermarket projector display is the superior display

because it implements the use of metaphors. Its familiar Supermarket checkout theme makes the displays learnability very good. The future technologies display uses a bland interface that has two identical topic and sub topic selectors which might confuse users. They both incorporate vision, hearing and touch which makes them very engaging and will help users take in the information. When it comes to affordance both of the displays do implement it in their own ways, with the Super both of them have squares with depth to them for the language selector buttons. The future technologies display use arrows to make the menu go up and down to select a topic which will be very familiar to the all users.

6) Recommendations on improving the future technologies display

The main recommendation I would make for the display is to overhaul the menu design so that it's clear on what is a main topic and what is a sub topic. Improving the hardware to make the display run smoother would also be a good addition. Adding in more metaphors for the display would also be good so the learnability of the display is overall improved. Following a Heuristics and usability guidelines would also improve the display for example adding in braille on the display and also adding in a

help menu for people who can not figure out how to use the display. Giving the display haptic feedback would greatly improve the user experience because the user will know when they have clicked something.

Question Two

a) Recommended interface evaluation strategy

Most of the displays in the Museum are interfaces that input and output so using Heuristic Evaluation by Jakob Nielsen and Rolf Molich because it very suited to evaluate interfaces.

The purpose of a heuristic is to be a guideline for designers so that they can design interfaces correctly and are making sure they are including everything they need. They can also be used as a set of rules to question decisions that have already been made. It usually done on an early design of an interface but also can be used on fully functioning systems, storyboards or prototypes. Several people should evaluate the heuristic of a interface so that all usability problems are found and then fixed. The evaluators will use a scale of 1 to 4 of severity of any problems that they find.

The 10 Heuristics

1. Visibility of System Status - This will make

Sure the user knows what is going on at all times.

2. Match between System and the real world - The system should be the user's language and use concepts that will be familiar to the users

3. User Control and freedom - Support undo and redo for mistakes

4. Consistency and Standards - element should do what is expected of them by their labels

5. Error prevention - Make having an error difficult for the users

6. Recognition - Make everything clearly visible so the user does not have to remember what something does

7. Flexibility and efficiency of use - have acceleration features for expert users

8. Aesthetic and minimalist - only relevant information and interface elements

9. Help users with errors - Make errors recoverable

10. Help and documentation - help screens and fully documented

Heuristics is good because you do not need real users to find problems. It also allows the evaluators to specifically focus on finding issues

6) Recommendation for a AR display

Cognitive walkthrough by Polson et al because it's the most used method for evaluating AR systems. The

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Walkthrough is a review of all the steps in an action. The purpose of it is to find any flaws or areas of improvement in an action's sequence. Usability problems are found by going through the task bit by bit and evaluating each step.

The four requirements of a Cognitive walkthrough -

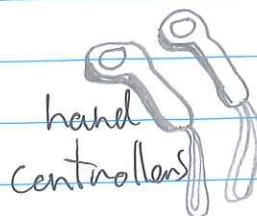
1. A system or a prototype system
2. A description of a task the users need to do
3. A list of the needed actions
4. A description of the users level of knowledge about the system

Cognitive walkthrough is very good at gauging how easy a system is to learn.

Question 3

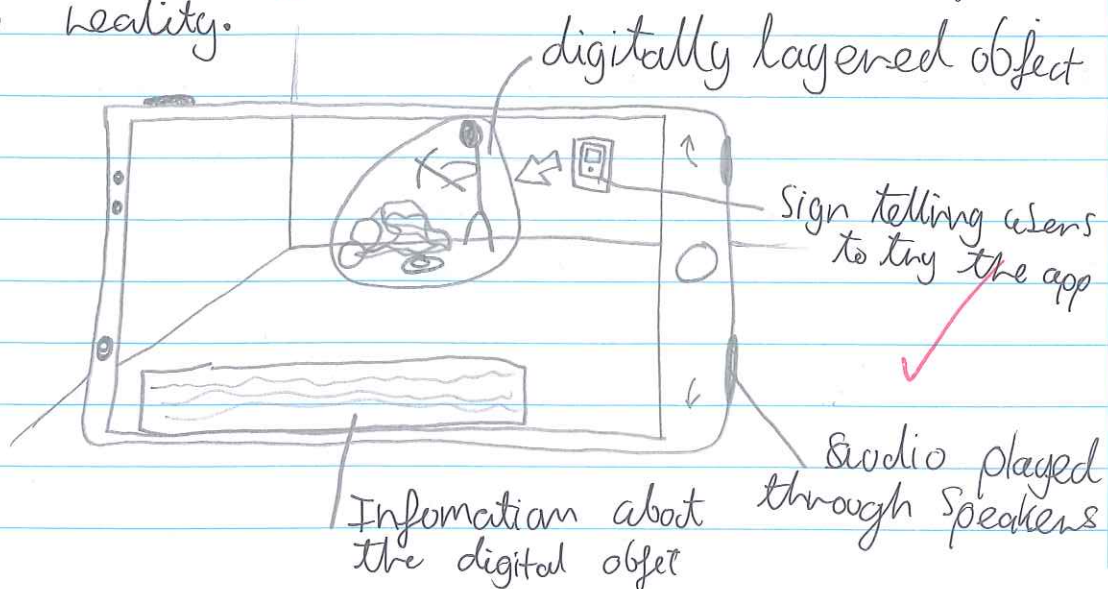
a) VR System

A VR system I would suggest would use a VR headset, headphones and hand controllers to fully immerse the user in a virtual mine. The use of VR would let the user experience the sights, sounds and actions that had to be done in a mine.



The System would use technology like the HTC Vive to allow the user to move around and look around the mine. It will also allow the to interact with the virtual world.

- a2) A AR System that I would suggest is a phone application that will utilize the phones camera to sense when the phone is being pointed at something. when the phone is pointed at some preplaced nodes in the Museum the app will show a digital object layered on top of the image of reality on the phone screen. Virtual people telling the users information through their phones would be the main goal. The hardware needs would be a phone and nodes that could be detected by the phone around the museum. The software needs would be digital assets that could be rendered over the real world on the users phone. The System would use technology that has been used before such as in the mobile app Pokemon Go, where objects are layer onto reality.



- 6) Sutherland 1965, "Don't think of that thing as a Screen, think of it as a window, a window through which one looks into a virtual world. The challenge of computer is to make that virtual world look real, Sound real, move and respond to interaction in real time, and even feel real". VR and AR Systems these days are very good at looking, sounding and responding real due to the advancement in computing power and graphics. VR these days is not on a screen but in a headset that makes the virtual reality look real for example video games or simulations for training or educational purposes. AR is less demanding than VR so layering incredibly high detailed objects into reality is achievable. ~~the~~ The vision of Sutherland and Brooks is very close to be fulfilled because of all the advancements talked about.

Differences in the purposes VR and AR displays

- Both of them will use digital assets but the VR display will be completely made up of digital assets in the form of a virtual world
- The VR display will fully immerse the user in the world while the AR display will just layer information over reality.
- The VR system will take some setup each time its used and also require the user to put on all the hardware peripherals for it to work
- The AR display will incorporate

real world objects with the digital ones to blend the digital layer with reality.

- The AR System will require the users to download and install an app on their phones to function.
 - AR display might only run on devices with certain hardware which will be able to render the 3D objects.
 - The VR display will need a space allocated to it, so ~~peo~~ because people will be oblivious to what around them when they are in the virtual world.
 - The VR display will need supervision while everyone can use the AR display freely.
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