

EDGE HILL UNIVERSITY

CIS2304 – FUNDAMENTALS OF UXD

BSc WEB DESIGN & DEVELOPMENT

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## User-Experience Project

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## **Abstract**

This report documents a user experience project where the first steps were taken in re-designing the interface of a Virtual Learning Environment(VLE) for Edge Hill University. User testing was conducted on the current VLE at Edge Hill, this testing was carried out using the Think Aloud Protocol with a group of the university's Students. A set of modifications were proposed based on the results of this analysis, and then a selection of these are taken further. The modifications made for a specific part of the system were taken into development and a set of low-fidelity paper based prototypes were created with them. These prototypes were then put through Cognitive Walk-through evaluations with more Edge Hill students being the Evaluators. These tests found the prototypes to successfully solve a series of problems discovered from the first tests. Furthermore they also discover more improvements that could be made, giving an idea of what needs to be done in further development stages should this project have gone that far.

# **1 Introduction**

Virtual Learning Environments (VLE) have become a key part of modern day teaching practice. A VLE is defined as 'a system for delivering learning materials to students via the web' Goodall (2015). Academic Institutions can use a VLE to support the teaching of not only full time students, but also those studying part time or participating in distance learning. The systems can be accessed 24 hours a day both internally and externally, making the resources and academic materials that institutions provide widely accessible. The focus of this project will be on an off-the-shelf VLE that is in place at Edge Hill University, called Blackboard(also known as Learning Edge). The intent is to analyse the system through usability testing and propose solutions for any problems found. Therefore this project does not cover any other form of VLE, including those in place at other institutions and those of differing formats.

This user based study will consist of UX Analysis through lab based testing followed by data analysis from those tests. This data analysis will lead on to the development of a set of proposed improvements for the system. These improvements will then be put together in the form of low fidelity prototypes, which finally will be tested via cognitive walk-through to conclude their effectiveness.

## 2 UX Analysis - Identifying the Issues

### 2.1 Methodology

The initial approach for this UX analysis consisted of preliminary research on qualitative research design. The decision was made to follow an interpretation of the fixed qualitative research model outlined by Sarantakos (2005). This interpretation is constructed from 5 key steps that allow an effective plan for this type of testing. These steps are as follows:

- **Topic:** Ensuring an understanding of the research question. In this project that means understanding the concept of VLEs and particularly the Blackboard installation at Edge Hill. Being a web design student at Edge Hill there was no need for much additional research on my part.
- **Methodological construction of that topic:** What needs to be done in order to answer the research question? As part of the requirements of this project the tests were defined for us. However the actual method of running those tests remained to be determined. This is what falls into this step. For both tests it needs to be decided: what exactly will be done during the tests, where this will be done and who exactly will do it.
- **Sampling Procedure:** Finding Participants. This step consists of deciding who needs to take part in these tests. It also includes the method of recruiting them.
- **Data Collection:** Choice of data collection method. How will it be done and with what? For this step the technological choices need to be made. Additionally how will this data be organised after collection?
- **Data Analysis:** What will be done with this data? How will it be used to answer the research question? With this step the process of assigning meaning to this data will take place and from there hypothesis will be formulated.

## **2.2 Ethics**

Ethical procedure needed to be taken into account for all of the tests within this UX analysis. The research requires an ethically agreeable approach. Therefore for each test an agreement has been put together using the following 8 points. These agreements will be defined at each planning stage for the tests.

Participant Agrees:

- That their data can be used for analytical purposes. In this case the data will be used to find problems with the current blackboard installation.
- To partaking in audio/video recording during the tests. For Test 1 this will be just audio recording and no recording is required for Test 2.
- That they have read the ethics statement or had it read to them by the observer and agree to it.
- That they understand what to do if they change their mind about participating either during or after the test. This will be featured in the ethics statement.
- That they understand that all data collected during the tests will be anonymous.
- That they understand that the data collected will not be shared or used for any other study.
- That the study is focused on the interface of blackboard and not them. Therefore there will be no reward or negative effect of them taking part.
- That they will give up the amount of time required for the test. This will be defined for each of the two tests.

## **2.3 Test 1 Planning**

Before the test begins the participant will be presented with an on-screen agreement document that they will need to read and provide verbal evidence that they have done so and agree to its terms. This agreement is defined in the following. The agreement was put together using the guidelines from Sarantakos (2005) and Hartson and Pyla (2012).

### **2.3.1 Agreement**

#### **1. PURPOSE OF THE RESEARCH:**

As part of a UX Analysis project, you are invited to participate in evaluating the Blackboard installation at Edge Hill University. As a current student at the university you are expected to already be aware of the system and the kind of tasks that are accomplished using it.

#### **2. PROCEDURES:**

You will be asked to perform 2 tasks involving information retrieval using blackboard. You will perform both tests using a PC and Mobile version. The first will consist of you navigating through blackboard to a module page and then finding either the module handbook document or a drop-box where you can submit a piece of coursework. The second task will require you to navigate back to the Learning Edge homepage and from there find the page that shows you your current marks and grades for submitted work. On that page you will need to find the marks for a module and then read a feedback section from one of those submissions. An observer will be present during the test to guide you through the tasks and ask you a few questions. Before starting the test you will need to log in to the <https://go.edgehill.ac.uk/> portal and then navigate to Learning Edge. The Go Portal log in page will be opened before you start.

Your role in this test is to help us evaluate the design of the system. We are not evaluating you or your performance in any way. During the test the laptop screen will be recorded and your voice will be recorded using the provided microphone. You are required to think aloud as you go through the tasks. Meaning that you must speak clearly into the microphone what you are thinking at each stage, you must talk about what you are doing and why. Please avoid simply stating each action as you do it but instead stop between actions and explain what you

plan to do next and what you expect to happen, then after each action talk about whether or not what happened matched your expectations. The test should take no longer than 10-15 minutes.

**3. RISKS**

There are no known risks to the participants of this test.

**4. BENEFITS OF THE RESEARCH:**

Your participation in this research will provide information that may help with improving the design and functionality of Learning Edge. There has been no guarantee of any further benefits of this test. You are requested to please refrain from discussing the test with other people who may also be taking part in the research.

**5. ANONYMITY AND CONFIDENTIALITY:**

The results of the test will be kept strictly confidential. Your recorded verbal consent is required for the researchers to release any data to anyone other than those also working on the project. Your identity will not be recorded and your recordings will only be distinguished from others based on an individual subject ID number. This number will be used for follow up analysis or reports on the research.

**6. COMPENSATION:**

Your participation in this research is voluntary and unpaid.

**7. FREEDOM TO WITHDRAW**

You are free to withdraw from the test at any time for any reason.

**8. APPROVAL OF RESEARCH**

This research has been approved by the Edge Hill University Research Committee.

**9. PARTICIPANT RESPONSIBILITIES AND PERMISSION**

Please inform the observer that you have reached this section, they will then activate the microphone and start a recording. You must then read aloud the next paragraph as part of your verbal consent, this acts as an alternative to a signature. Once you have finished reading the paragraph the observer will end the recording and you can then proceed to take part in the test.

I voluntarily agree to participate in this research, and I know of no

reason I cannot participate. I have read and understand the agreement. I hereby acknowledge the above and give my voluntary consent of participation in this test. If I participate I may withdraw at any time without penalty. I agree to abide by the rules of the test.

### 2.3.2 Think Aloud Protocol

The Think Aloud protocol, as defined by Hartson and Pyla (2012) as 'a qualitative data collection technique in which user participants express verbally their thoughts about their interaction experience, including their motives, rationale, and perceptions of UX problems'. This is the protocol that is set to be used for this first test of the UX analysis.

The Think aloud method is an effective choice for this kind of research as it gives a good insight into the way the user thinks about the interface and helps us understand their expectations, strategies and likes or dislikes. This is helpful information when developing an interface. The method is generally most effective when all participants are comfortable with talking about their thoughts as they do things. However this is never the case. Hartson and Pyla (2012) explains that the think aloud protocol must accommodate for such a difference of user, while also working in the opposite direction. For those who struggle thinking aloud should be aided by the observer, or allowed to take breaks during the analysis. This can be as simple as breaking down the task into 3 steps.

1. Think about what they are going to do and why.
2. Do it.
3. Think about what has happened after the action and whether or not it matches their initial expectations.

The Think-Aloud method requires a participant who understands the system in place and the way that it is used. Having someone who matches the work role involved with the system ensures that the tasks you set for the test will not be far from what they already do. Therefore they will find it easier to provide feedback that is more UX based, as they will be able to comment on the actual design features. While having non UX trained participants can be effective it can also work well when you have some who are UX trained. They

can provide a deeper and more analytical opinion, which can be effective in reducing the workload for the observer during the post-test analysis.

Hartson and Pyla (2012) also emphasized that no matter who you have in to take part in the test, it is key to ensure that you still filter the data retrieved as part of the analysis. The idea is that even if your participants are UX trained and have skill in analysis, they are still providing you with data, in the form of recorded comments, that you should then analyse yourself for your research. This has all been taken into consideration in the next section where the first test of this UX analysis will be planned.

### **2.3.3 Test Plan**

To start with the test planning, the participants first needed to be considered. They will be 10 or more Edge Hill University second year students. This ensures that they will all understand what blackboard is and should not struggle with using it. Additionally some of these students might be studying web design therefore they will also have some basic understanding of UX principles, this will help make the data collected more useful. The decided method of finding the problems is defined as Critical Incidents by Hartson and Pyla (2012). This is the concept of the participants stating clearly when they have come across a problem and explaining what it is. Additionally the problems with the system will be found based on the follow up analysis where comparison between the different tests may spot patterns. For the Critical Incident analysis however it does require a test subject who is comfortable with speaking aloud as they complete tasks. Some would happily do so, however others may not. They will all be encouraged to talk about what they are going to do before they actually do it and why. As well as talk about what happened after they did it and whether or not the outcome matches what they expected and if not why.

The next stage of the planning was to answer the following questions: Where? When? and How? It needed to be decide where and when the tests will take place and how will they be done.

The tests will take place in the Edge Hill University library, within one of the individual quiet rooms that are available for booking. The timing will be based on the participants, they will be asked to confirm firstly that they will partake, and secondly that they are available. They will then be given a time slot for them to come to the library. The room will be booked for 1-2 hours depending on how many participants can come on the same day. If many participants are recruited then the room will be booked on more than one day.

The room will be set up with a laptop and built in microphone. The laptop will have open the documents that the participants must read as well as the Go Portal website. Once the user has logged in to Learning Edge the observer will then open a mobile version to use for the second half of the test. The free recording software Open Broadcaster Software (OBS) will also be set up on the laptop for recording the screen and user's voice. OBS was chosen as it is a free piece of software that can effectively record the required data.

The participant will first be asked to read the agreement for the test and they will be prompted to notify the observer once they get to the verbal consent section. At this point the observer will start a recording through OBS and the participant will then read out the verbal consent paragraph. Afterwards the observer will stop the recording and then allow the user to prepare for the test. Once the participant is ready, the observer will start another recording and then allow them to start the test. For the beginning of each recording the observer will also state the subject ID number.

For the duration of the test, the observer will remain in the room with them. They will act as a guide to ensure they manage to complete the tasks, additionally they will ask the participant questions about the interface should they need to. Once the participant has completed the task the observer will end the recording and the participant can then leave.

The next section will cover the review of Think aloud tests. This will then be followed by the analysis of the data collected.

## **2.4 Test 1: Think Aloud Lab Tests**

### **2.4.1 Method Review**

The first set of lab tests were successfully completed. A total of 10 students took part which is sufficient for the aim of this research as it can give us a decent data set for analysis. The following will review the method of the tests.

The location where the tests took place was inconsistent. Due to the nature of their differing schedules it proved difficult to find a time and place where all 10 participants could attend. Therefore the tests ran over a series of 3 days. On each day the tests took place in different locations. This was taken as a possible cause of inconsistency in our data set, however it was ensured that the location did not affect the test itself. The tests were conducted using the same laptop setup using the same software. Additionally they took place in a room with only two occupants, the participant and the observer.

The initial plan was to allow the participant to go through the test with minimal input from the observer. The idea behind this was to ensure that the critical incidents and comments in the recordings were straight from the subject. However this proved to be an unreliable way of going about it. The subjects were not fully comfortable with the idea of just thinking aloud. Therefore the observer had to ask a lot more questions than planned, and the tests became a combination of a discussion and a think aloud test. While all the subjects still thought aloud as instructed they sometimes failed to do so. It was at these times where additional questions were asked by the observer in order to fully understand how they were interacting with Learning Edge. While this does stray slightly away from the think aloud protocol, it did not negatively affect the results. Looking back, the initial plan is unrealistic. It cannot be assumed that all people can act exactly the way the test requires, therefore the method must be more lenient. So long as the test is carried out with the same core ideas of the plan, i.e. with the subject thinking aloud, it makes no difference if they are more describing their actions to the observer instead. Sufficient and valid data has been collected, therefore the tests were a success.

## **2.5 Data Analysis**

For this stage of the project the test recordings needed to be converted into usable data that can be then analysed. The decided method was to go through each recording noting down the problems the participant faced along with any comments or suggestions they made.

### **2.5.1 Stage 1**

This data was collated into two separate lists, suggestions and problems/comments. A table was also produced along side the two lists which contained all 10 of the subjects and allocated them with an individually coloured marker. As each recording was analysed these markers were used to highlight which subject made the suggestion or comment or found the problem. After a few recordings the subjects started to come across the same problems or make the same comments and suggestions. For these instances another marker was added to the same entry in the lists.

This process built up a document with two lists where each element of the lists had at least one coloured marker next to it. It was found however that most of the list elements had more than one marker. This is where certain patterns in the data could be seen. This document of raw data is shown in the following.

Analysis: Stage 1 Document

Subject	LEH001	LEH002	LEH003	LEH004	LEH005	LEH006	LEH007	LEH008	LEH009	LEH010
Marker										

### Problems/Comments:

- Main Page is cluttered with content which is irrelevant most of the time. ● ● ● ● ● ○
  - Main Page is too busy. ● ● ○
  - Drop-down Menu (RHS) is main form of Navigation. ● ● ● ● ● ● ○
  - To Do Page is possibly effective feature. ● ○
  - Course List is cluttered with too much information (tutor names and all courses). ● ● ● ● ● ● ○
  - Tools Section never used ● ● ○ ● ○
  - Notifications Dashboard Content is either empty, useless or duplicated. ● ● ● ● ● ○
  - Dropbox write submission and comment box never used. ● ○ ○
  - Dropbox Comment box used sometimes. ● ○
  - Dropbox menu: Unclear what Points Possible is and in some cases it is 0. ● ○
  - INFO/CONTENT/ASSESSMENT are only links used on LHS Navigation of module pages. ● ● ● ● ● ○
  - Some modules are listed to have no marks (My Grades menu RHS dropdown) but when selected the area on the right shows the marks for each task. ● ○ ○
  - Some CW does not have grades/marks put on Blackboard ● ○
  - No indication of which CW/Tasks affect final grade. ● ○
  - Comments Received through Turnitin not from grades section, requires a lot of navigation. ○ ○ ○ ○ ○
  - Grades/Marks are not broken down into individual tasks/pieces. ○ ○
  - Drop Down box menu is useful being static through all pages. ○ ○ ○
  - Drop down menu module list is inconsistent, changing to show recent activity. ○ ○
  - Unable to use drop down menu on mobile version. ○ ○
  - Top left link goes back to GO instead of Learning Edge. ○ ○

### Suggestions:

- Mobile Friendly Interface 
  - o Would use mobile for information retrieval
    - Would view docs through the app or download to view using the phones own software. 
  - o Would not use it for submitting work. 
  - Transfer content of Dropdown (RHS) menu to main page. 
  - Text Description of CW/Task or Document viewer with pdf brief. 
  - View CW in one section e.g. marks received/due dates/ comments etc. 
  - Embedded Mail System on Homepage. 
  - Would use a Social Network feature to connect with students and staff. 
  - Use dropdown menus on main page to 'tidy-up' tile content. 
  - Implement parts of GO Portal, e.g. Enrolment Details. 
  - More Clarification on what each icon on the dropdown navigation menu does. 
  - More Consistant Navigation. 
  - Search Bar feature for searching through tasks/coursework. 

### 2.5.2 Stage 2

The next step was to process this raw data into a form that can easily be understood. This was key in ensuring that suitable solutions could then be developed from it. Therefore the top 5 'scoring' (those with the most markers) list elements were taken and put into two charts(below). Stage 3 will explain what these charts represent.

Comments / Problems



- Site is Not Mobile Friendly
- Notifications Dashboard is Ineffective
- Module Information/Content/Assessment Only Links Used
- Course List is Cluttered
- RHS Dropdown Menu is Main Method of Navigation

Suggestions



- Mobile Friendly Interface
- One Coursework Section
- Text Description or Document Download for Coursework Page
- Homepage Set-out Similar to RHS Dropdown Navigation
- Social Network Feature

### 2.5.3 Stage 3

- Problems and Comments

1. ***Site is Not Mobile Friendly:*** All 10 of the test subjects found the mobile version of Learning Edge to be almost unusable. This was due to the fact that it is in fact no different to the desktop browser version except for the change in screen size. Therefore on such a smaller screen the interface suffers. The Text is too small to read without zooming in, 3 out of the 10 subjects attempted to zoom in but only 1 of those 3 managed to do so without accidentally selecting a link. The remaining 7 subjects did not want to attempt using the mobile version assuming that it would not go well. The image below is a screenshot of the mobile interface from the test recording of subject LEH001.



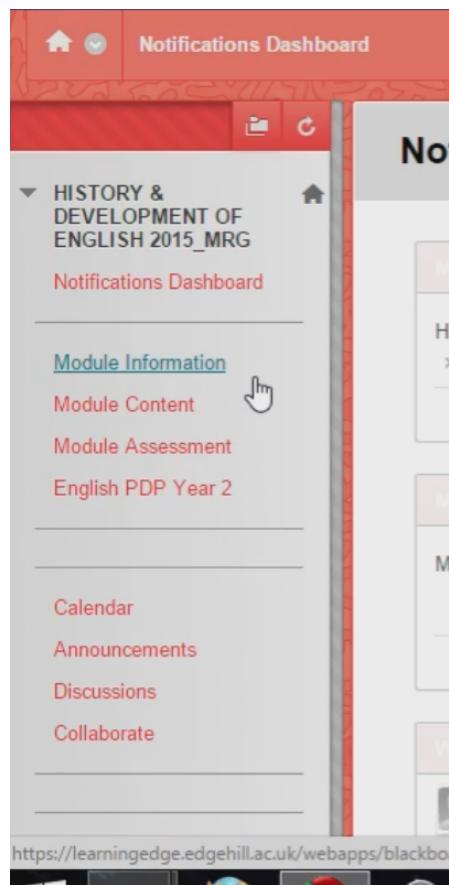
2. **Notifications Dashboard is Ineffective:** The Notifications Dashboard is the main content section of the homepage for each module. 9 out of our 10 test subjects said that they pay no attention to it. Their reasoning varied between the Dashboard being completely empty or containing information that is heavily duplicated. The remaining subject, LEH001, only disagreed slightly as one small section of the Dashboard labeled as 'To Do' has been useful for them. The rest of the content is useless just as the others stated. The Dashboard takes up a large portion of the page and with users stating that they never use or even look at it makes it clear that a change needs to be made there. Below is a screenshot from the test recording of subject LEH005.

The screenshot shows the Blackboard Notifications Dashboard for the module "RESEARCH & ANALYSIS FOR FILM & TELEVISION 2015". The dashboard is divided into several sections:

- My Announcements:** No Course or Organisation Announcements have been posted in the last 7 days.
- My Tasks:** No tasks due.
- What's New:** Last Updated: 18 November 2015 17:30. Content (7) and Courses/Organisations (1).
- To Do:** What's Due, Select Date: 18/11/2015. Today (0), Tomorrow (0), This Week (0), Future (0). Last Updated: 18 November 2015 17:30.

### **3. *Module Information/Content/Assessment Only Links Used:***

This point is also based around the homepage for each module, there is a navigation panel on the left side of it. This panel consists of 10 different links, however it was found that 9 out of 10 of our test subjects only ever used 3 of them. These 3 are the Module Information, Module Content and Module Assessment links. The 9 subjects explained that they either never thought to use the other links or had tried to do so and found no useful pages as a result. Subject LEH004 only partially disagreed as he sometimes uses the 'Announcements' link to check for any updates from tutors. With the majority of the navigation links being unused it appears that they could be better optimized. Below is a screenshot from the test recording of subject LEH004.



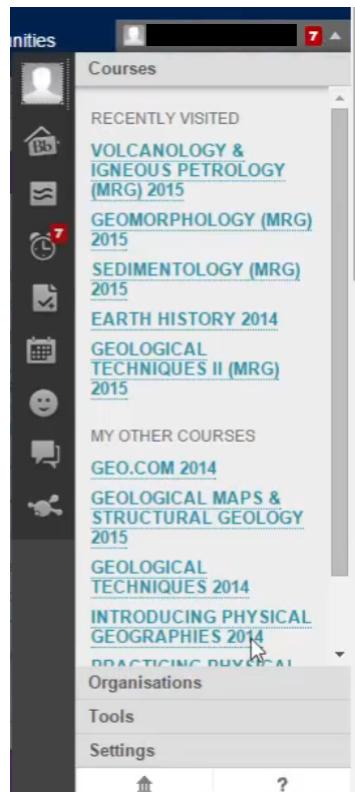
4. ***Course List is Cluttered:*** This comment refers to the Course list found on the homepage of Learning Edge. 8 out of the 10 test subjects found the list to be too busy, with far more content than they would be comfortable with. The list currently consists of each module that the user has previously studied and is currently studying. Each module is followed by a sub-list of tutor names labeled as instructors. For some modules this sub-list is very long, which significantly increases the size of each module item in the main course list. The result of this is that the user is presented with a very busy block of content running straight down the middle of the page. This makes it that bit more difficult to find the course they want. The following screenshot is from the test recording of subject LEH002.

The screenshot shows a list of courses on a Learning Edge portal. The URL in the address bar is [s/portal/execute/tabs/tabAction?tab\\_tab\\_group\\_id=\\_1\\_1](http://s/portal/execute/tabs/tabAction?tab_tab_group_id=_1_1). The page title is "Import bookmarks now...". Below the title, it says "Courses where you are: Student". The list includes the following courses:

- 2015\_MED2215: ANALYSING AUDIENCES 2015**  
Instructor: LAUREN ABBOTT; DEBBIE CHADFORD; JULIE CLIMPSON; PHILIP DRAKE; PHIL JACKSON; KEVIN THOMPSON; ELKE WEISSMANN;
- STAT\_ALL\_MEDIA\_PROGRAMMES: BBC Opportunities, Events & Festivals News**  
Instructor: CLARE HENEY;
- 2014\_MED1040\_MRG: DIGITAL PHOTOGRAPHY 2014**  
Instructor: JULIE CLIMPSON; NEILL COCKWILL; PHILIP DRAKE; PHIL JACKSON; KEVIN THOMPSON;
- 2015\_MED2209: DIGITAL SHORTS 2015**  
Instructor: LAUREN ABBOTT; DEBBIE CHADFORD; JULIE CLIMPSON; PHILIP DRAKE; ROSA FONG; CLARE HENEY; CARL HUNTER; PHIL JACKSON; KEVIN THOMPSON;
- 2015\_MED2217: FACT TO FICTION: KEY DEBATES 2015**  
Instructor: LAUREN ABBOTT; HANNAH ANDREWS; DEBBIE CHADFORD; JULIE CLIMPSON; NEILL COCKWILL; PHILIP DRAKE; OWEN EVANS; PHIL JACKSON;
- 2014\_MED1207\_MRG: MEDIA & SOCIETY 2014**  
Instructor: HANNAH ANDREWS; JULIE CLIMPSON; NEILL COCKWILL; LAURA CROSSLEY; PHILIP DRAKE; STEPHANIE GENZ; PHIL JACKSON; NESSA JOHNSTON; OZGE OZDUFEN; RUXANDRA TRANDAFIOIU;
- 2014\_MED1208\_MRG: MOVING IMAGE PRODUCTION 2014**  
Instructor: JENNY BARRETT; PERELANDRA BEEDLES; JULIE CLIMPSON; NEILL COCKWILL; PHILIP DRAKE; CLARE HENEY; PHIL JACKSON; YIANNIS KOUFONIKOS; NIGEL MAIRS; DEREK MURRAY; STEPHEN SEWTER; KEVIN THOMPSON;

At the bottom of the list, there is a link: [STAT\\_MEDIAINFORMATIONSPACE\\_MDC\\_Media](#).

5. **Dropdown Menu is Main Method of Navigation:** Learning Edge has a static 'dropdown' menu in the top right corner. It was found that for 7 out of the 10 test subjects this was the main form of navigation used. In the cases of subjects LEH005 and LEH003 when they went about undertaking the tasks they completely ignored the links within the content of the homepage and instead went straight to the drop down menu. For the others they sometimes used other links on the pages to navigate but still primarily used this menu. This proves the effectiveness of this menu and that in some cases there is wasted content within the homepage. Instead of simply looking through the Course list on the homepage for a module they went to look at a list of the same items in the dropdown menu. The difference in the two lists is the fact that within the dropdown menu it is not as busy and much easier to look through. The screenshot below is from the test recording of LEH001, it shows the dropdown menu.



- **Suggestions** The second chart shows the top 5 suggestions made by the test subjects.
  1. **Mobile Friendly Interface:** Given that all 10 of the tests subjects found Learning Edge to be unusable on mobile, they all then suggested that it would be better with a mobile friendly design.
  2. **One Coursework Section:** The next most common suggestion, with 8 out of 10 test subjects making it, was the idea of having all Coursework related information together in one section. It was found that a lot of navigation was required between viewing coursework information. This included grades, task documents etc. Most subjects had to go to a different page in order to view their grades even though they were just on the page where they could view the submitted coursework. Additionally the actual instructions for the coursework was often on a different page to where they need to submit it. Having all of this information together would cut down this excess navigation.
  3. **Text Description OR Document Download for Coursework Page:** This suggestion fits into the previous one. It was seen from the tests that some coursework pages had the actual task either as a document to download or a paragraph of text to read. This was inconsistent however and in some cases there was no indication what exactly needed to be done. 7 out of the 10 subjects suggested a feature where a task document, such as a pdf, or a paragraph of text should be included as a requirement for each coursework page. They also want to be able to view the document from that page without having to download it. While this suggestion does not fully refer to the design of Learning Edge, and more to the way it is used by staff. It still links in to the idea of having one place where they can go to on the site and find all of the coursework they need to do and within that find out what exactly needs to be done for each of them.

4. ***Homepage Set-out Similar to Dropdown Menu:*** Following from the analysis of the problems it is clear that the homepage of Learning Edge is not optimized. This brought about a common suggestion among the test subjects. 7 out the 10 said the homepage would be better off being designed more like the dropdown menu situated in the top right corner. Given that for many this was the main form of navigation, having it transferred to the homepage would prove more effective. A complete duplication of the menu however would not work, but if the homepage was redesigned to the style of the menu then it would suit their suggestion.
5. ***Social network Feature:*** A slightly less common suggestion made was the implementation of a social network side to Learning Edge. 4 out of 10 test subjects said they would use such a feature to communicate with other students and staff should they choose to be involved. While this suggestion has merit in the idea of ensuring decent communication between students and staff, it arguably strays away from what Learning Edge has been built to achieve. It is possible, through Learning Edge, for students to communicate with each other through the linked email accounts. Additionally there are links from Learning Edge that go to various existing social networking sites. Therefore a social network feature would not make much of a change. 2 of the other subjects, LEH007 and LEH010, actively disagreed with the idea. They felt that they would not use such a feature given that there are already external sites and systems that they can use specifically as a social network.

## 3 Finding Solutions

The next step was to take the information gathered from the UX analysis and use it to put together a set of improvements for the system. The following will list all but one of these, the remaining improvement will be taken further to a development stage where prototypes will be created for it and a second set of tests will be carried out to discover the effectiveness of it. Before devising these modifications, some research was conducted into design perspectives. These perspectives can be very helpful in guiding a design team when working on a project. Hartson and Pyla (2012) refer to design perspectives as 'filters through which we view design'. They then go on to discuss the 'Interaction Perspective', which represents how a user engages with the product. It applies a filter, which focuses design on how the user manipulates the interface through cognitive and physical actions. This perspective has been used when producing these solutions to ensure that they improve the user interaction of Learning Edge.

### 3.1 The Solutions

This set of 3 solutions has been devised based on the two top 5 lists drawn together during the analysis phase. Each solution will either address a single problem or solve multiple issues.

**1. Mobile Version:** Clearly one of the biggest discoveries from the testing is that Learning Edge is not mobile friendly. Therefore a mobile version of the entire site would sufficiently solve the problem. However, a mobile version would not necessarily require the full functionality of its desktop counterpart. It is unlikely that a student would wish to upload work or download resources from their phone, the platform is not optimized for this sort of task. Therefore such functions would not be needed. A student is more likely to use Learning Edge on their phone for the following tasks:

- Find and view resources, e.g. lecture slides or Coursework Task documents.
- Check dates for deadlines.
- Check their timetable.

- Check for new announcements.

This list includes the answers given during the Think Aloud Tests when the subjects were asked what they would use a mobile version for, if it was easy to access. The general pattern that can be seen is that they would use it to for information retrieval. The list does not represent the opinion of all of the subjects, as one disagreed stating that they would not use Learning Edge on their phone. This was subject LEH003, who went on to explaining that they would just prefer to use their computer.

Despite this it is clear that the general consensus is that a mobile version of Learning Edge would be useful. The following are two key points that should be taken in to consideration when designing a mobile version of Learning Edge.

- (a) **A consistent navigational structure and layout from the desktop version.** Basically as long as the mobile version is similar to the desktop version it should be relatively easy for students to quickly learn how to use it. The basic navigation conventions for the web, as covered by Krug (2014) (2014 p.65), are clearly followed by the current version of Learning Edge. With the primary navigation panel being at the top and the 'local navigation' for each page being to the left. Therefore it is key that this is effectively transferred to the mobile site. This ensures that it remains usable comparatively to all other sites on the web, but also to its desktop counterpart.
- (b) **Prioritize Functionality.** While it was discussed previously that the mobile version of Learning Edge would not need to have all the same features as the desktop version. This does not mean that it will have less functionality. Krug (2014) (2014) explains that while the initial theory is that mobile applications should be developed to accommodate people who are 'on the go', this is not the case. He goes on to say that "People are just as likely to be using their mobile devices while sitting on the couch at home, and they want (and expect) to do everything."(p.148). While yes the mobile version would be used 'on the go', it cannot be designed just for that use case. It needs to be just as functional as the desktop version, while of course being usable on a much smaller

screen. This is where the prioritization is needed.

The idea behind this is that all of the pages that a user may want while 'on the go' are easily accessible straight away. While any other pages can be accessed with a few taps. So an example would be having a homepage that has recent announcements and resource uploads from tutors. This would allow a student who is on their way to a lecture check if their tutor has made any announcements or uploaded any materials such as the lecture slides. That way they can stay up-to-date. If they wanted to find the lecture slides or another resource that had been uploaded a long time ago they can navigate to the appropriate page with a few taps.

The interface for the mobile version could be designed based upon the Dropdown menu from the desktop version. This feature was found to be the most popular form of navigation around the site. By doing this a developer would:

- Produce a familiar interface that will not cause an excessive cognitive load on the user when first using it.
- Save time not having to create a brand new design by re-using a feature that is already a success in the current version.

2. **Revamped Homepage:** (Redish, 2012, p. 102) made a statement that quite nicely summarizes the problem with the Learning Edge homepage. 'Think "information," not "document"'. She goes on to say 'They don't want the handbook; they want the answer to a question. They want usable, manageable pieces'. The homepage of Learning Edge is far less useful than it should be. It has a large amount of content that is often completely ignored by users because it appears 'cluttered' or 'too busy'. The page consists of a set of tiles of content. Some of which can be customized to the users liking. For example as previously mentioned the Course List on the homepage is seen to be overflowing with content, this can actually be changed with the current version of Learning Edge. If the user 'hovers' over the tile, a small cog icon appears in the top corner. If clicked on, this will then take them to a page that allows them to pick which courses are shown on the list, and what information should be shown with them. This actually solves

the problem and makes the list much easier to understand. However this proves the downfall with the page design. As it is unclear to a user that they can do this, and instead they continue to 'muddle through' finding their own way around the site. The suggested improvement for this is one of two things. Either set out the content in a more user friendly way, focusing more on providing manageable pieces of information. Or make it much clearer that the page can be customized. Either way the page will become much more useful for the students.

## 3.2 Solution Development

The following solution was chosen to take into further development. This section will outline the key factors of the improvement and how it will then be put to the test through evaluation of low fidelity prototypes.

### 3. Module Pages:

It was decided that the focus of the improvements for this project would be on the module pages of Learning Edge. These pages involve the notifications dashboard(*see pg. 15*) as well as the pages which allow students to view tasks, content and other information about the chosen module. A key example of how the module page required improvement is the way in which tasks are currently dealt with. When students complete a task they usually submit a document through Learning Edge. Once it has been marked they can view their grade/mark for it along with some feedback, that is so long as it is the chosen method by the tutor. Sometimes an online review tool called Turnitin is used. Turnitin is helpful in grading essays and reports with an originality checking feature, however if a user is viewing their grade for a piece of work that has been submitted using it. They cannot view the feedback unless they navigate back into the module page, then the assessment page, then get to the page where they originally submitted the work, which then presents them with the Turnitin review. To summarize it was found that there was no single place where students could look at the tasks they have done/need to do along with the marks and feedback they have received. This seemed unnecessary, therefore one of the main changes was the addition of a single section that provides all of the required information for coursework and tasks(*see Suggestion 2 pg. 19*). The rest of the changes generally cut down navigation, and make the pages more space efficient. The module pages were found to have a lot of wasted content, (*see Problems 2 & 3 pg. 15-16*).

The following will describe the changes made for the new designs:  
These changes will then be illustrated as part of the prototyping stage.

- **New Homepage:**

1. **Removed Notifications Dashboard:** This is the biggest change made to the homepage. The Notifications dashboard was found to be only partially useful at the best of times. Therefore the best seen improvement was to remove it. This change does not remove any of the functionality of this page, as everything a user would want to do can still be done thanks to the other changes made.
2. **Improved Announcements Section:** This section has essentially been taken from the old notifications dashboard. Of all of the content this was the one that sometimes was not empty. It has been placed in the top left of the main content section, this is to ensure that it is the first thing the user sees so that there attention is drawn to any important announcements. This will display the 4 most recent announcements, however if there are more it will state that at the bottom of the section to tell the user to click on the 'View All' link to see the full list.
3. **Relocated Module Information:** In the current version of Learning Edge the 'Module Information' is an individual page that usually provides simply the module handbook and sometimes the details of tutors. This seemed like a waste of time for the user to have to navigate to that page just to view a small selection of content. Therefore it was seen best to remove the page and instead create a 'Module Information' section alongside the aforementioned 'Announcements' section. This means that users can now, straight from the homepage, open up or download the module handbook as well as view the details of tutors(e.g. email addresses).
4. **Maintained LHS Navigation:** The new design includes the same Navigation menu on the left side of the page. This was already well positioned but due to the other changes being made there was no need to include all of the previous links. Therefore the 3 Module links 'Information', 'Assessment' and 'Content' have been removed.

5. **Work and Content Links:** These two links appear on the page as large buttons with graphic icons accompanying them. The Work link will take the user to the newly developed Work page, which extends from the currently used 'Assessment' Page. The Content link will take the user to the same menu style as currently being used for the 'Content' pages. These two will be discussed in more depth further down this list.
  6. **Overall grade Link:** This change consists of the addition of a link labeled as 'View Overall Grade', this will take a user to a page that allows them to view their overall grade for the course, showing how they are doing in each module, but an added feature is that it will automatically expand the current module from the list to show a sub-list of all work completed for it. This will outline to the students which piece of work counts towards their grade and what grade/mark they have got for it. This page has not been designed or included in the prototypes as it will resemble the Work page which will now be discussed.
- **Work Page:** The new 'Work' page has been introduced to bring together all coursework/task related features into one place. This page is split into two main sections, To Do and Grades. Each of these two will be described in more detail below.
    1. **To Do Section:** The 'To Do' section will show the user all of the tasks that they have been set and not yet completed. Each task is listed with the task name, date set, date due and then a button labeled 'View Task'. The list can be sorted via the links at the top right of the section, the tasks can either be sorted by the Date they were set or the Date they are due. The 'View Task' button will take the user to the individual task page for the one they selected.
    2. **Grades Section:** The 'Grades' section will show the user all of the tasks that they have completed for the module. The tasks are listed along with the overall mark/grade that they have received for it. As with the 'To Do' page there is a 'view task' button below each one, this button will take them to the individual task review page. The task list can also be sorted, either by submission date or by the mark received.

3. **Individual Task To DO Page:** When the user chooses to view one of the tasks that they are yet to complete, they will be taken to this page. The page will provide them with the instructions for the task, this will be either a textual description or an uploaded document that can be viewed in a new tab of their browser. The due date and date that the task was set will be included. From this page a user can upload their work in the same method they use now, and then once satisfied with their work they can click 'submit'. The page will also have a 'submission' section. This will allow the user to view any files that they have uploaded as well as the submission status of the task. The submission status will change to 'submitted' to make it clear that they have completed the task.
  4. **Individual Task Review Page:** This page will contain feedback and a submission review for any tasks that the user has completed. It will include the due date and the date it was submitted, as well as the grade received for the task. The main section of this page however is for feedback. Where tutors can write textual feedback with a set of comments etc.
- **Content Page:** This page did not require much change from the original design. The folder system currently in place was found in the tests to be very effective and users have not come across any problems with it. Therefore this page will just be implemented simply to fit into the new design changes.

These modifications will now be further developed into paper prototypes.

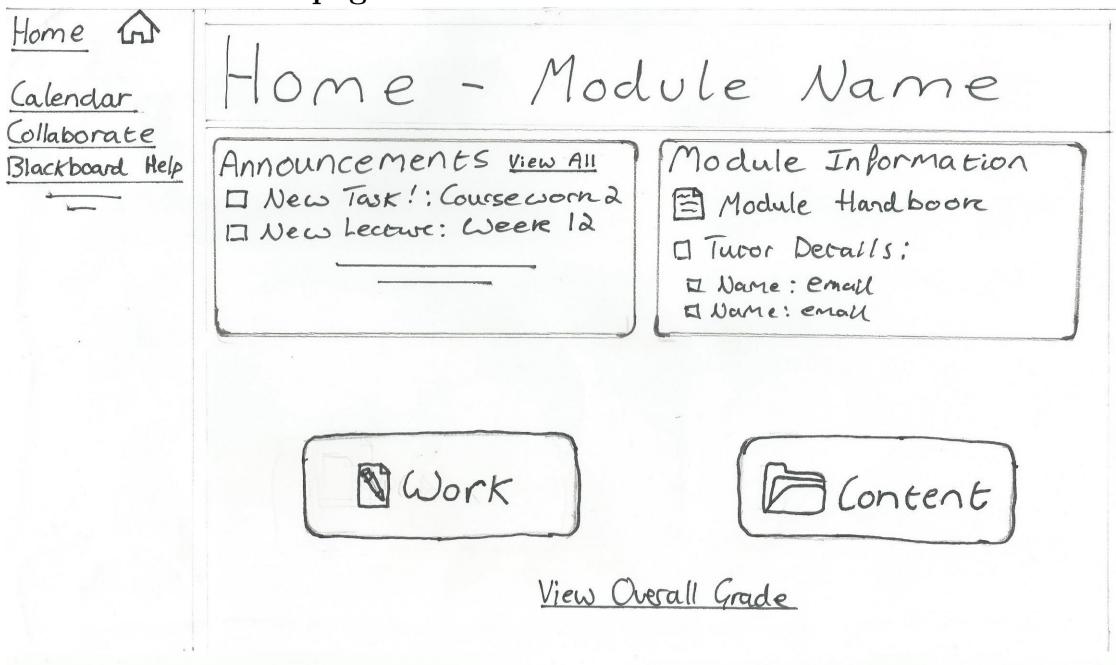
### **3.2.1 Prototyping**

This stage consists of creating paper based low fidelity prototypes of Learning Edge which show the design changes discussed previously. Due to the designs being of a low fidelity, they do not require any technical drawing or any special or attractive design. With this type of prototypes the focus is on showing how the new features and layout will work. Hartson and Pyla (2012) describe low fidelity prototypes as 'appropriate when design details have not been decided or when they are likely to change'. Making them ideal for this project where the aim is to test out modifications that may not be successful.

Additionally because the next stage of development involves a cognitive walk-through test the designs needed to be made dynamic. Where a test participants actions can be illustrated using different pieces of paper overlapping the designs. User tasks involving the designs had to be theorized to suit multiple student users who study different courses and use Learning Edge in different ways. That way, whoever is chosen to take part in the tests can use and understand the prototypes. It was seen that the best way to accommodate the different users was to keep the tasks based on things all of the users should do at some point during their student life. E.g. searching for lecture materials, submitting coursework and reviewing coursework.

The low fidelity prototypes will now be shown in the following. Each design will be accompanied with a description giving an idea of how it was put together and why. To help show the designs in this report they have been edited to put the different pages(which are actually separate pieces of paper) on top of the Homepage image.

## 1. Module Homepage



This design is for the main landing page for each module. The main idea behind this design was to make better use of the space and cut down the amount of navigation the user would have to do in order to find what they want. The biggest change made is the removal of the notifications dashboard, this has been replaced with a much more clean cut layout with two main tiles 'Announcements' and 'Module Information'. There are also two new main links 'Work' and 'Content'. To the left is the same style of navigation, however this is more of an auxiliary navigation menu as it only has the links that most users don't use. With an exception of the 'Home' button of course. This navigation menu will remain static to allow the user to use the links from whichever page they are currently on. There is also a link at the bottom called 'View Overall Grade'. This link will take the user to a page showing their overall grade for the course allowing them to see how each task within each module affects it.

The 'Announcements' section will contain the latest updates released from tutors within the past 7 days. However only the latest 4 will be shown in this section, if more are available they can be viewed after clicking 'View All.' These announcements work the same as the cur-

rent system in place, as tutors can send out announcement messages as well as notifications that resources or feedback has been uploaded. The 'Module Information' section will contain the equivalent of the previously used page. I.e. the Module handbook document, along with contact details of tutors. The addition of this section was key in cutting down needless navigation as now a user can find this information right on the homepage.

The two main links 'Work' and 'Content' will take a user to the Work page and Content page respectively. The design of these pages will be discussed further on. These two buttons replace the links originally found in the Left side navigation menu. Instead of using 'Module Assessment' the 'Work' link has been used to collectively represent all work and tasks that are undertaken as part of studying the module. This will prevent any confusion based on the difference between in class tasks and coursework tasks. (Krug, 2014, p. 43-44) covers the concept of ensuring clear signposting of an interface to avoid confusion between multiple links. This idea was incorporated with the new 'Work' button. The original 'Module Assessment' link could be interpreted as only leading to coursework related content, and not general seminar tasks, however in some cases it would lead a user to both of these. This left users unsure at first glance where they needed to go, it was only after regular use that they found the best way to get to what they wanted. The new design should clarify where they need to go for any work related content straight from the homepage. Whether it is Coursework or just weekly tasks, a user knows that it is work that they need to do. Therefore the button clearly labeled 'Work' should come to their attention straight away.

## **2. Content Page: File System**

The next two design images shown will illustrate how the content pages will look as a user is navigating through them to find the resources they want. Of all of the designs these are the ones with the least specific changes. This is because the current installation of blackboard has this same folder directory style file system, it was kept because it was found to be an effective feature. Users had no problems with this section and they found it familiar and easy to use. This is because it resembles the way they would navigate directories looking for files on their own computers. This project is focused on improving blackboard, therefore the parts that already function effectively for users require no redevelopment.

Two designs were created in order to represent how the user can scroll down the page listing the folders in order to view more. This is why for the first image the folders for weeks 1 - 7 are visible while in the second there is weeks 8 - 12. This feature ensures the flexibility of the page allowing any amount of directories in the list.

Additionally, for each of the sub-pages that open from the main 'Content' and 'Work'(shown further on) pages. There will be a cross symbol in a clear circle shown in the top right corner. Clicking on this icon will take the user back to previous page, whether that is the main page or the previous sub-page. This feature was added to allow easy navigation back from where the user is. The design is based on the generic cross found in the top corners of any standard interface that represents a button that closes the current page.

Home 

Calendar

Collaborate

Blackboard Help

## Content - Module Name

 Week 1

 Week 2

 Week 3

 Week 4

 Week 5

 Week 6

 Week 7

Home 

Calendar

Collaborate

Blackboard Help

## Content - Module Name

 Week 8

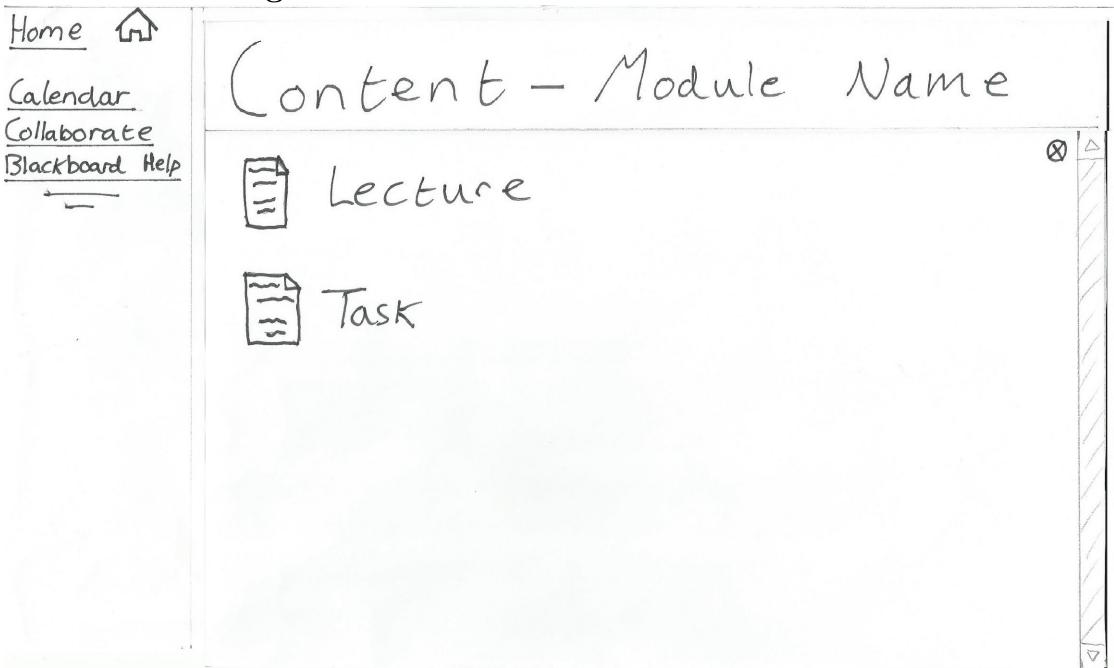
 Week 9

 Week 10

 Week 11

 Week 12

### 3. Content Page: Resources



This final design for the Content page shows how it would look when actual resources are listed instead of more folder directories. Just as before this is very much like the current design. Users can click on a resource and it will either download onto their computer or it will open in their browser in a new tab(if it is a readable document). This has been maintained from the current installation for the same reason as with the rest of the content pages. It works and will maintain some familiarity for the user.

#### 4. Work Page

The diagram illustrates a 'Work - Module Name' page. At the top left, there are navigation links: Home (with a house icon), Calendar, Collaborate, and Blackboard Help. The main title 'Work - Module Name' is centered above two main sections: 'To Do' and 'Grades'. The 'To Do' section contains two items, each with a checkbox, a 'Module Name' link, and a 'View Task' button. The first item is 'Course Work 2' (Set: 10/11/15, Due: 11/01/16). The second item is 'Task Name' (Set: 10/11/15, Due: 10/11/16). The 'Grades' section lists two items, each with a checked checkbox, a 'Module Name' link, and a 'View Task' button. The first item is 'Course Work 1' (Grade: 75%). The second item is 'Task Name' (Grade: 80%).

Now for a much bigger change, the work page. This page has been created to pull together all work related content from Learning Edge into one area. This will cut down the navigation required and the cognitive load on a user when they are trying to find a particular piece of work. The page consists of two sections, 'To Do' and 'Grades'. Both of these sections can take a user to other pages, which will be discussed further in the next two sections. The 'To Do' section will cover all tasks that have been set for the module, whether they are coursework or seminar tasks. They are listed each with a 'View Task' button allowing the user to view the individual task pages. As shown in the design they are listed with two dates, when the task was set and when it is due. The list can be sorted based on those dates to help a student prioritize their work. The 'Grades' section will list all of the work the user has done for the module. Each piece of work is listed with a grade that can also be used for sorting. Again these tasks can be selected via the 'View Task' button in order to view a summary of it. This new design splits the work page into two clear sides, work to do and work that has been done, therefore a user should know easily which section to look at based on what they are looking for.

## 5. Work Page: Task To Do

Work - Module Name

Coursework 2

-Module Name-

**Instructions** [View Document](#)

See task document.  
E-mail me if you have any  
questions!

Date Set: 10/12/15

Date Due: 11/01/16

**Upload**

**Submit**

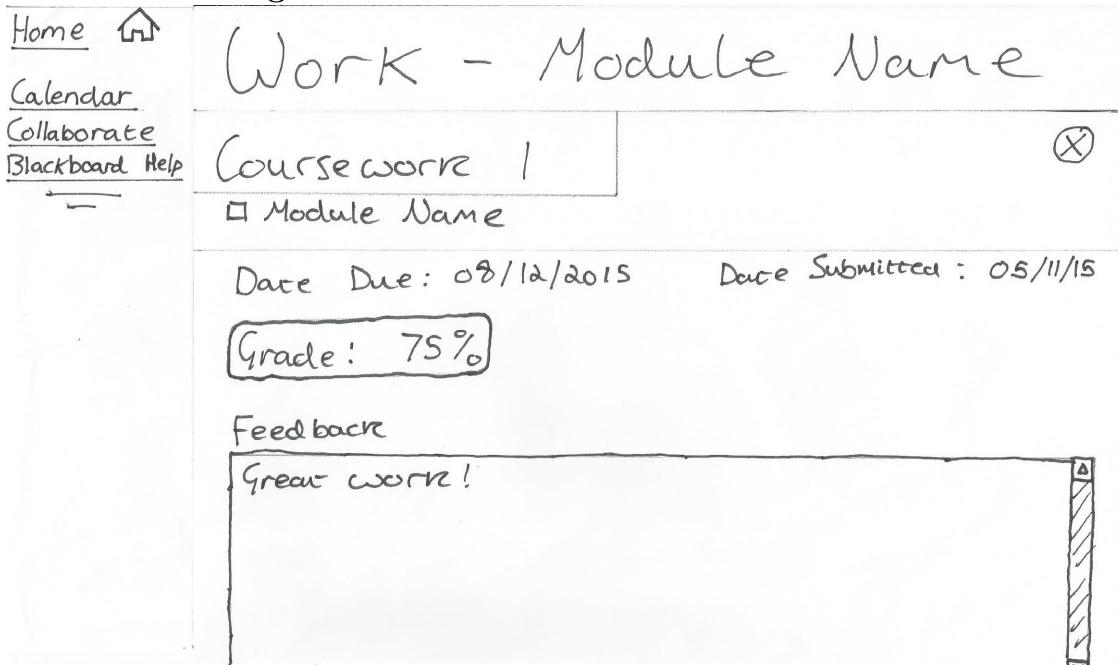
Submission:  
- Nothing uploaded yet! -

Status  
**Not Submitted**

When a user selects to view one of the tasks listed within the 'To Do' section. They will be presented with this page. It will show all the information they would need for the selected task. Firstly the task instructions and the relevant dates are provided at the top. The 'Instructions' section will either contain a text description written by a tutor or will have an instructions document uploaded to be viewed via the 'View Document' link. If the instructions come in the latter form the document will either be opened in a new tab of the browser, or if it is not a directly readable file it will be downloaded for the user to access. The two dates included are the date the task was set and the date the task is due. This will ensure a user understands when they received the task and when they have to complete it by. The inclusion of both of these dates together was decided because combined they give a student an idea of how long they have(or have had) to do the task. Knowing this will help them with timekeeping and prioritizing their work. The rest of the page is focused on task submission. There are two main buttons in the middle, one being 'Upload' and the other being 'Submit'. Once a user has completed part of or all of the task, they can click on 'Upload' and then select a file(or multiple files) from their

computer. Each file they have uploaded will be listed in the section below the buttons labeled 'Submission'. Each file will be shown along with the date that it was uploaded, this could help a user be sure that the files are up to date. Should they decide to do more work and then re-upload a file, they will be able to check the date of upload to be sure they have updated it. The purpose of this 'Submission' section is to allow a user to review what they have done so far, primarily what they have uploaded. That way they can see clearly if there are any missing files that still need uploading, or at least be certain that they are submitting the correct file. Once they are satisfied with what they have uploaded they can then click on 'Submit' and this will then send the uploaded files to the submission system. Once complete the 'Status' shown in the bottom right of the page will change to 'Submitted' giving the user a clear indication that they have successfully submitted their task.

## 6. Content Page Continued



The final design, shown above, illustrates the page a user would be presented with if they wanted to view a task summary from the 'Grades' section of the work page. The page will provide a task review, at the top it will show two dates. These are when the task was due and when it was submitted. Although arguably they are not as important, they have been included because some students would like to see the comparison between the two dates, those who want to avoid submitting work last minute will be able to see if they have managed to do so for previous tasks. This gives them a chance to find ways of improving their work method if they have not. The main piece of information shown at the top however, is the grade that the user has received for the piece of work. The rest of the page is dedicated to the feedback section. This is where a tutor will type up their feedback and comments about the task, hopefully for a student to view and then use them to improve their work.

With the designs now created the next step was to go on to testing them.

### **3.2.2 Test 2 Planning**

This section will now cover the second set of tests conducted as part of this project. The aim of the tests was to find out how effective the new modifications were. The tests will involve the low fidelity prototypes discussed in the previous section.

### **3.2.3 Cognitive Walk-through Test Planning**

The first stage of this test planning involved initial research into the cognitive walk-through method. This second set of tests will not be as rigorous as the think aloud tests, this is because they are to be treated as an evaluative discussion between a user and the designer.

The cognitive walk-through method is defined by Usabilitybok.org (2015) as 'a usability evaluation method in which one or more evaluators work through a series of tasks and ask a set of questions from the perspective of the user'. This enforces the decided approach. Bligard and Osvalder (2013) extends on this by telling us that the method 'focuses on simplicity in learning, especially through exploratory learning'. From this it is clear that for the designs produced as part of this project, the evaluation should consist of a user-designer discussion involving a cognitive walkthrough test undertaken using the low fidelity prototypes.

The test evaluators will be taken from the same sample as the first set of tests, they will be Edge Hill students. This means that the chosen experts are the users themselves, which will be beneficial. The decided number of participants for these tests was 5, this was derived from an article by Nielsen (2012). The article concludes that in most cases a total of 5 participants is sufficient to get enough data for effective evaluation. Nielsen also discussed how in some cases of course more than 5 would be needed, but those cases involved testing on a much larger scale than this project. Therefore the number chosen was the optimum 5.

The tests will be undertaken with one or more evaluators (with a maximum of 3), this will differ based on simply the timings of when they can be available to do the tests. With the evaluation being a general discussion, 2 or 3 evaluators can look at and use the prototype at the same time and still provide decent feedback and comments to the observer.

The tests themselves will be carried out according to the following steps:

1. Observer will hand the evaluator(s) the paper prototype and a Task

document.

2. The evaluator(s) will then be asked to go about completing the tasks using the prototype
  - As they go about completing the tasks the observer will adapt the prototype to their actions. During this process if the evaluator(s) makes any comments or finds a problem the observer will note them down as critical incidents.
3. After the evaluator(s) have completed(or at least attempted) the tasks the observer will then ask them a few questions about the design.

Within the list above it is mentioned that the observer will be noting down critical incidents, this extends from the discussion as part of the test 1 planning(*see 2.3.3 pg.8*). Following the ethical considerations of this project an agreement has been put together, just like the first set of tests.

### **3.2.4 Agreement**

#### **1. PURPOSE OF THE RESEARCH:**

As part of a UX Analysis project, you are invited to participate in evaluating some prototype designs for the Blackboard installation at Edge Hill. As a current student at the university you are expected to already be aware of the system and the kind of tasks that are accomplished using it.

#### **2. PROCEDURES:**

You will be asked to perform a series of tasks, which are defined on the provided task document, using the paper prototypes. As you go through the test please feel free to discuss with the observer and any other evaluators what you think about the designs, including any specific parts you interact with while attempting to complete the tasks.

Your role in this test is to help us evaluate the design of the system. We are not evaluating you or your performance in any way. The test should take no longer than 15-20 minutes.

#### **3. RISKS**

There are no known risks to the participants of this test.

**4. BENEFITS OF THE RESEARCH:**

Your participation in this research will provide information that may help with improving the design and functionality of Learning Edge. There has been no guarantee of any further benefits of this test.

**5. ANONYMITY AND CONFIDENTIALITY:**

The results of the test will be kept strictly confidential. Your signed consent is required for the researchers to release any data to anyone other than those also working on the project. Your identity will not be recorded and your opinion will only be distinguished from others based on an individual subject ID number. This number will be used for follow up analysis or reports on the research.

**6. COMPENSATION:**

Your participation in this research is voluntary and unpaid.

**7. FREEDOM TO WITHDRAW**

You are free to withdraw from the test at any time for any reason.

**8. APPROVAL OF RESEARCH**

This research has been approved by the Edge Hill University Research Committee.

**9. PARTICIPANT RESPONSIBILITIES AND PERMISSION**

Please ensure you read the following paragraph and then sign and date at the bottom of this document.

I voluntarily agree to participate in this research, and I know of no reason I cannot participate. I have read and understand the agreement. I hereby acknowledge the above and give my voluntary consent of participation in this test. If I participate I may withdraw at any time without penalty. I agree to abide by the rules of the test.

Name: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

At this point the second set of tests are now ready to be undertaken, the following section will review the tests and go on to discuss the results of the evaluation.

### **3.3 Test 2: Cognitive Walk-through**

#### **3.3.1 Method Review**

The evaluation of the new prototypes was carried out successfully, 5 people from the same sample as the first tests took part as planned. These 5 evaluators did the tests individually, the original plan took into account a possible situation of multiple evaluators taking part together. In the end however this was not the case which was beneficial. It allowed focused interaction between the prototype and the evaluator, as well as between the evaluator and the observer. As described in the plan these evaluations were approached as discussions, with the evaluator speaking freely to the observer about what they found when looking at the prototypes. This worked effectively as it allowed the observer to build up a list of 'pros and cons' that they had discovered. Having such a list was useful for the data analysis stage covered in the next section.

While this second set of tests was successful, looking back, it could have been more productive for this project. However the main reason for this is because of the limitations tied into using low fidelity prototypes. If the prototypes had been of a higher fidelity the evaluation would have provided more data to work with. With this in mind, clearly the next step would be to create high fidelity prototypes taking into account the findings of this first evaluation. Then the objective would be to repeat the evaluation to then discover any other changes that may be needed that only high fidelity prototypes would show. This would take the project much closer to creating a brand new design for Learning Edge, however that is not the main goal of this project.

## **3.4 Data Analysis**

During the evaluation the observer took notes, listing down the positive as well as the negative points the evaluators came up with when looking at the prototypes. The decided way to analyse this data was to go through each of the lists individually, for each negative point a solution will be suggested in the final improvement list. The analysis will then be concluded to decide how effective the designs were. This method is only efficient because there were only 5 evaluators. If more had been involved then the chosen method would have been similar to the one with the first tests. The following will go through the findings from subjects LEH011 to LEH015 and then list the improvements that would need to be made based on them.

### **3.4.1 Cognitive Walk-through: LEH011**

Positive:

- Work and Content buttons make it much clearer where I need to go.
- All of the pages look much more organised and easy to look at.
- Submission state is good because it makes it clear to me that I have submitted.
- The key dates on the Work pages are very clear stand out, especially important on the Work 'To Do' page.
- Same folder system for content, familiar and easy to use.

Negative:

- Unable to view the submitted coursework from the task summary page.
- Cannot contact tutor from any of the work pages, would be good to have a way of sending them a message with any questions straight from there.

### **3.4.2 Cognitive Walk-through: LEH012**

Positive:

- Looks much cleaner than the notifications dashboard.
- Good to have quick access to module information.
- Announcements are clearer and look like they would be more helpful.
- Work and Content buttons stand out and it is clear where they will take me.
- It is great now that I can find all the information I need about my work in one place.
- Submission status is a good feature, now I know when I have definitely submitted.

Negative:

- It is unclear how the submission section of the work page works, can I submit without uploading? or will it tell me that I have to have something there?
- I could not tell straight away how to view the task document uploaded by my tutor.
- The links on the left side are no use to me they would be better placed to give more space for the content I want to see.

### **3.4.3 Cognitive Walk-through: LEH013**

Positive:

- Looks tidier
- Clear that I can find my work by clicking on the work button.
- Clear that I can find lectures and resources if I click on the content button because that is the same as the current site.
- More useful submission page.
- Good that the content is set out the same, already know how to get around so won't have any problems.

Negative:

- It does not have a section for work that has been submitted but not yet marked, where would that be?
- Would be better if I could ask the tutor questions from the work pages instead of going back to the information section.
- It does not show me the document I have submitted.
- I'd like to see the date the task was set in the grades page as well.

### **3.4.4 Cognitive Walk-through: LEH014**

Positive:

- Whole thing is easier to understand and get around.
- The individual sections on pages are distinguishable.
- The work pages are good because they cover everything I need.
- The submission page is good giving me more indication of where I am at with my work.
- Has a lot of familiar features like the announcements which helps because i have already learned from previous experience what sort of things should be where.

Negative:

- I cannot view the documents I have uploaded for submission, I would like to do that for final checks before sending it.

### **3.4.5 Cognitive Walk-through: LEH015**

Positive:

- Less cluttered than the dashboard, its 'much easier on the eye'.
- No wasted space or useless sections.
- The two work and content buttons are easy to see and understand.
- Good that I can see all of my grades listed for the module, this will help me keep track of my progress.

Negative:

- I cannot view my submitted documents.
- It would be good if I could just download the resources I find straight away, I rarely view them using my browser.

### 3.4.6 Improvements

List all of the improvements that would solve the negatives.

1. Feature allowing user to view the work they have submitted in the grades section.
  - Based on the how well received the added section to the To Do page was (with the files and submission status), this improvement consists of adding a similar section to the Grades page for an individual task. This section will list each of the files that were submitted just as before, but now instead they can be clicked on to either be downloaded and viewed or opened as a document in a new tab of the user's browser. This improvement solves one of the problems found by subjects **LEH011**, **LEH013**, **LEH014** and **LEH015** (*See 3.4.1 pg.42 and 3.4.3 - 5 pg.44 - 46*).
2. Ability to contact a tutor from any of the work pages. LEH011/LEH013
  - Both subjects **LEH011** and **LEH013** (*See 3.4.1 pg.42 and 3.4.3 pg.44*), commented on how they would like to be able to ask tutors questions about the task they are looking at straight from that page. This improvement will be one of 2 possibilities, one which will fit with the current mailing setup of Learning Edge, and another that would be suitable if the mailing system was subject to change.  
The first solution, which incorporates how Learning Edge currently uses an external e-mail system, will simply be the implementation of a link on to the work pages. This link will take the user to the external e-mail site where they can then compose a message to send to their tutor. This solution however will have the least impact. This is because so long as the main design of Learning Edge is no different to the current build, there will already be a 'Mail' link at the top of the page no matter where the user is on the site. This link would take them to the same place, so arguably a new duplicate link is not needed. The only real argument for this new link is that with being on the page itself and not 'tucked away' at the top a user is more likely to see that asking their tutor is an option while they are looking at a task.

The second solution involves introducing a new messaging system between tutors and students. Where from a task page a student can send a message straight to the tutor responsible for it, the tutor will be notified through Learning Edge and can then send a reply. This system will consist of a set of 'conversations' being created between a tutor and their students for each individual task they are questioned about. That way they can track which task is being asked about, as well as maintain professional communication through a system more convenient for the student. Arguably it would be better to just retain the current system but this solution can be considered simply on the basis on improving a student's experience with Learning Edge.

3. Make it clear how the submission system works. LEH012

- Make submit button 'grayed out' until at least one file has been uploaded, add text hints to submission list, as shown in design saying 'nothing uploaded yet!' etc.

4. Make it clearer where and how a task document can be viewed. LEH012

- Subject **LEH012** (See **3.4.2** pg.43) found it unclear how the submission of a task works with this new design. To them they were unsure if there was a maximum number of files that can be uploaded, as well as whether or not they can just click 'submit' without uploading anything accidentally. While these questions were answered during the evaluation and would have been with trial and error of a working version, it was clear that some form of prompt or help text was needed just to clarify what a user can do. Therefore this improvement is the addition of the following text to the top of the submission section (below the 'upload' and 'submit' buttons):

***"Click 'Upload' and select the files you wish to submit, then click 'Submit'."***

In addition to this the 'Submit' button will be faded and deactivated while the submission box has no files uploaded, once a

file has been added it will change to different colour and will be clickable.

5. Added option to download a document straight away instead of viewing it in browser first.

- This improvement is based on how subject **LEH015**(See 3.4.5 pg.46) stated that they rarely wish to view documents from Learning Edge in their browser. Instead they download them to view on their computer. With the new design you can download the documents which open in a new tab just as with the current version of Learning Edge. However this change will mean that it is no longer required to open it first. A link will be added next to each resource file that will provide a direct download regardless of the files format.

6. Add date task was set to Grades page.

- This improvement is self-explanatory, the Date for when a Task was set will be added to the review of it as part of the Grades page. This will be for the preference of some users.

#### Notes:

Two of the negative points taken from the evaluations are not covered in the list of improvements. The first of these was from subject **LEH012**(See 3.4.2 pg.43), who commented on the inclusion of the links on the left hand side of the designs. While it is valid that generally these links are not used, the aim of this project was to improve Learning Edge and not to strip away some of its functions. This is why the links remained on the new design.

The second of these points was from subject **LEH013**(See 3.4.3 pg.44) who asked where on the work pages would a task go if it has been submitted but not yet marked. This was answered during the evaluation by the observer, but to cover it in this analysis this is the answer. While waiting for a grade to be given a task will appear in the grades section listed with the grade box containing the word 'Pending' or a symbol which represents that. This will make it clear that the user has submitted the work but their tutor is yet to mark it, and not make them question if they have actually submitted. Once a grade has been added by the tutor the task listing will update to show that.

With the data analysis complete and a new set of improvements listed, the next step is to review the evaluation and conclude the effectiveness of these prototypes. This will be included with a full conclusion of the project as a whole.

## 4 Conclusion

Overall the prototypes created for this project were successful. The aim of this project was to solve some of the problems with Learning Edge, and the new designs did so. The first testing stage achieved the goal of discovering the average user experience with Learning Edge. From that a series of issues were uncovered to create a set of targets for the re-design and prototyping. It is clear that those targets were met after the final evaluation, the evaluators had positive reactions to the changes made. However as expected the designs were not perfect. At this stage, particularly with the use of low fidelity prototypes, they were never going to become the ideal designs that could then be taken on to implementation. Instead they now provide a perfect starting block for development of a design that could realistically be used. The first key steps of a development process have been taken in this project, but no more.

The initial approach for this project was to conduct thorough research into the subject, i.e. Virtual Learning Environments and the way they are currently used. This was to ensure an understanding before delving into the analysis of Learning Edge. Additionally, further research was used to help structure and plan the first set of lab tests. The Think Aloud Protocol was extensively researched into to ensure that it was utilized effectively for the first test stage. These tests provided the project with a significant amount of data, data that was analysed to take on to the stage of developing solutions for a select few of the problems found. The method of analysis took the raw data collected and formed more manageable information that was then used for the prototyping stage.

After proposing a series of modifications that would solve the key problems found with Learning Edge, the changes for the module pages were chosen to further develop. This development went into much more detail than the other solutions, as this was necessary to progress on to the prototyping. The low-fidelity prototypes were created with new designs that applied the module page changes. The method of creating the prototypes was focused on

the next testing stage. They were created as paper based illustrations that allow interaction with a user, these successfully provided the format for the Cognitive Walk-through Evaluation.

The evaluation stage was the point where it was derived that the modifications made were effective. The group of evaluators, all students at Edge Hill just like with the first user tests, found the modifications to be great improvements from the current build. The positive reception the ideas received clearly tells us that the work from this project took positive steps towards developing a new and improved Learning Edge.

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