

UE_Assignment1

by Michael David Wakelyn

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Assignment:
University Online Resource Prototyping

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1. Introduction

"The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect." – **Tim Berners-Lee, W3C director and inventor of the World Wide Web** [1]

The above quotation by Sir Tim Berners-Lee is profound. As the creator of arguably the biggest enabler of technological advancement in recent times, Sir Tim is well placed to offer insight into how it can be used and why it is important to consider the user, or more specifically **usability** when creating a digital system. As quoted by Jakob Nielsen, "Usability is a quality attribute that assesses how easy user interfaces are to use" [2].

In today's tech-heavy world, access to digital systems that aid in communication, workload management, entertainment and many other areas is essential. Seldom does one purchase an item not accompanied by digitally accessible instructions or pointers to a social media presence. Even simple items are accompanied by a Quick Response (QR) code, scannable with a phone camera to provide quick access to usage instructions and a website displaying the manufacturers range of other products. Everywhere you turn, there is digital technology.

Often is the case that the gadgets we use or the systems we access are helpful. Making life easier for the user. Just let the technology do the work. However as with all other things, there is often at least one disagreeable feature. Frequently considered is the idea that although the technological details may be beyond our understanding, more thought could have been given to the logic and design of the systems user interface.

Affordance, as defined in the Merriam-Webster dictionary is *"the quality or property of an object that defines its possible uses or makes clear how it can or should be used"* [3]. When we apply that to the digital world, affordance can be described as the umbrella term for design and intuitiveness of user interfaces the enable use of our chosen digital system. More clearly, systems should have a design that compliments its purpose, a layout that fits with the common flow of use and be intuitive enough that users are able to discover how to do what need, without significant increase to cognitive workload: systems need good affordance.

Another mechanism often employed during system design is the concept of metaphors. The Cambridge English Dictionary defines a metaphor as an expression that describes an object by referring to something with which it is considered to have similar characteristics [4]. In terms of system design the meaning is similar although it refers more to how functions and symbols relate to their real-world counter parts to make navigation and use more intuitive. Possibly the most well known is the desktop metaphor. When developing personal computers at Xerox Parc, designers faced with the challenge of communicating how the interaction designed works to the users. Icons were designed to represent the tasks they carried out in the real world, such as folder and file icons and a recycle bin for discarded files [5]

The following report analyses the OnTheHub eStore [6]. OnTheHub is a software repository for those with academic affiliation to accepted universities, where software packages relevant to academic studies can be downloaded for free or purchased at a discounted rate. Considered is the level of affordance and metaphors that compare with real-life concepts. A task analysis of the OnTheHub eStore is undertaken and a paper prototype redesign of a selected feature is provided.

2. Task Analysis

2.1. What is Task Analysis?

Task analysis is the process of learning how users accomplish tasks and achieve their intended goals, in order to identify the tasks that a software application or website must support. Task analysis can also help to re-define or refine navigation through an application or determine the appropriate content scope of search features [7].

2.2. What is the Purpose of Task Analysis?

Task analysis can be completed in several formats depending on the task being analysed. For example, procedures are strictly defined and unambiguous. Procedural task analysis breaks down the defined steps that users must take to successfully achieve their task.

In hierarchical task analysis, tasks are arranged sequentially with each task needing to be completed before the next can start. For example, Task 1, needs completing before Task 2 can be started. Task 2 needs to be completed before Task 3 can be started and so on.

Cluster or elaboration analysis is used where there is no logical order is required to achieve the goal. Analysers need to determine the clusters of relatable information and determine how the information is structured [8].

A task analysis is undertaken to define and describe in detail the tasks and sub-tasks a user will perform. This can help to prioritise and sequence tasks and inform website or application design. It affords designers the chance to create useful scenarios and experiment on new ideas before building the application or website.

2.3. Task Analysis – OnTheHub eStore

A hierarchical task analysis was performed on the OnTheHub eStore website. OnTheHub is a student resource providing licenced software at discounted rates. Access to the website is dependant on the user proving association with an affiliated education institution.

The main task that users aim to achieve on the website is to purchase a licence and download software. There are several sub-tasks that need to be undertaken in order to achieve the goal. The below diagram is a visual representation of how a user would purchase software via OnTheHub.

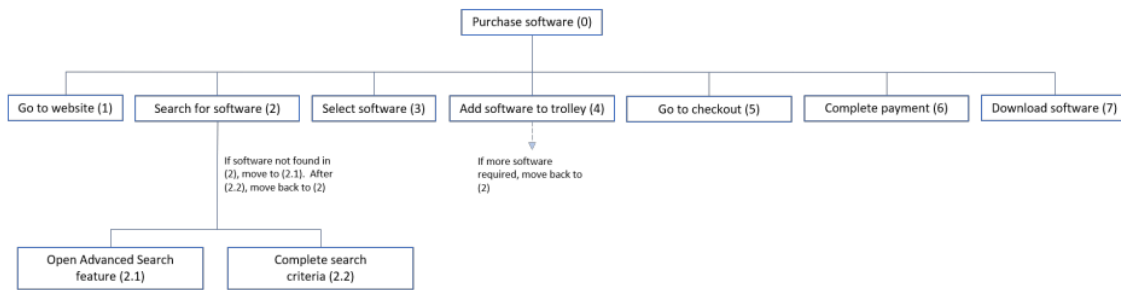


Figure 1 - OnTheHub: Task Analysis

In order to carry out the task analysis, a user with relatively low experience of using OnTheHub was asked to work through the site and try to download the software package **SPSS**. For the purpose of analysis, the user was required only to take the task as far as the purchase page without purchasing the software package. Handwritten notes of the observation can be seen below.

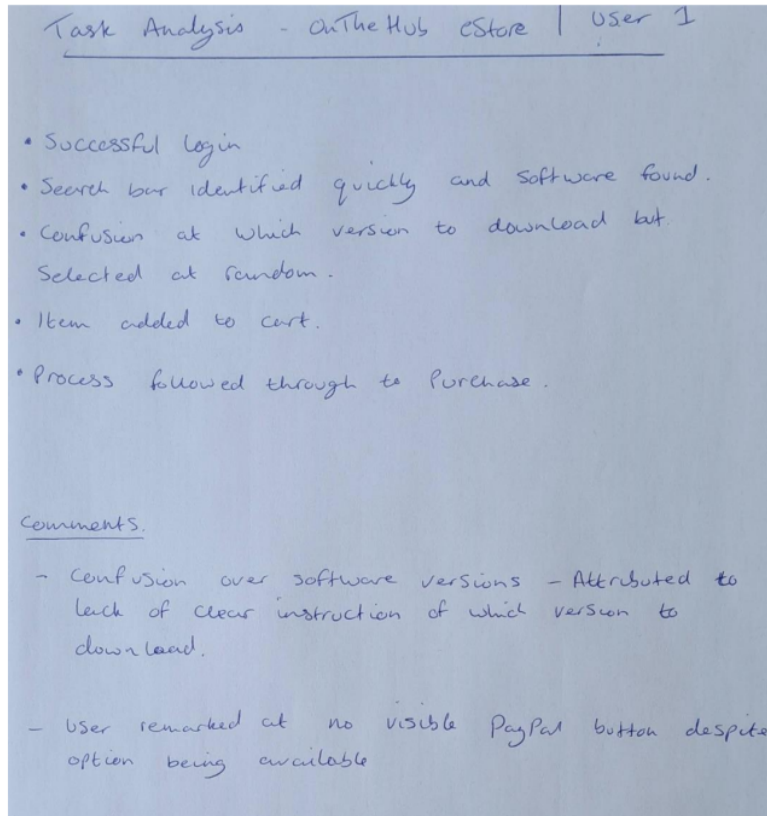


Figure 2 - Task Analysis

3. OnTheHub eStore – Paper Prototype

Below is a paper prototype created to refine some of the features of the OnTheHub website.

3.1. Page 1

The homepage is the first page a user sees after logging in. It consists of icons denoting popular software downloads, a search bar and a list of clickable links to software by specific development organisations.

Missing, is a description of what each software application can provide, and this is only evident when the software button is clicked. Also not available, is the option to quickly add an application to the trolley. Again, in order to add the application for purchase users are required to select it, launch a new screen and then click “Add to Cart”.

In the paper prototype below, a “Quick Add” button has been provided beneath the software icon. Furthermore, on hovering the mouse over the icon, an opaque pop-up appears with a short summary of the application. This gives users the opportunity to further understand what they are looking at, without the need to launch into a new screen.

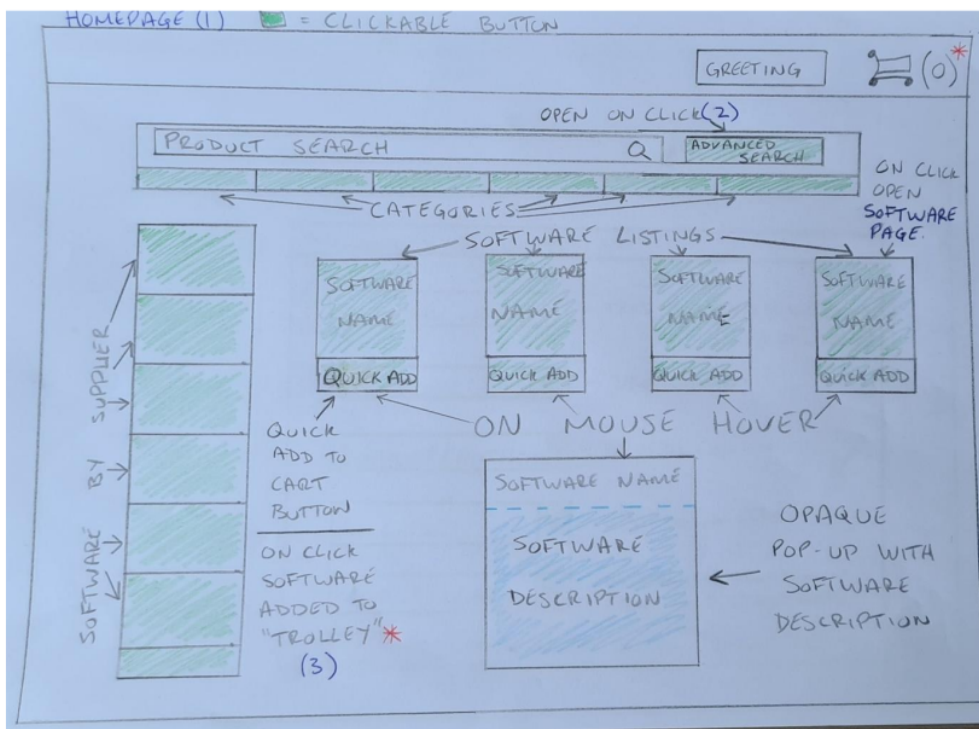


Figure 3 - Paper Prototype: Page 1

3.2. Page 2

The OnTheHub search feature is basic. It provides a single search bar that requires the user to know the at least part of the name of the software to find it. Page 2 of the paper prototype details an “Advanced Search” feature that enables more specific targeting of software packages. It provides a simple free text field for searching that allows the use of % wildcards, a dropdown box with a list of categories (e.g Statistical, Word Processing, Programming), a drop down box with a list of software developers to search by developer name/company, a dropdown box for distinguishing by licence fee (e.g. Free or Paid) and a final drop down box to display the most popular packages recently downloaded. This menu is dynamic and should change as applications increase or decrease in popularity. Finally, a check box is available to ensure that only software packages with associated user guides are displayed.

ADVANCED SEARCH (2) ☒ = CLICKABLE BUTTON

GREETING  (0)

PRODUCT SEARCH

ADVANCED FIND TITLE

SOFTWARE NAME - TEXT SEARCH (% WILDCARD AVAILABLE)

CATEGORY  - DROPDOWN

SUPPLIER/AUTHOR  - DROPDOWN

LICENSE  - DROPDOWN (FREE/PAID)

MOST POPULAR  - DYNAMIC DROPDOWN FROM MOST PURCHASED

☒ INCLUDES USER GUIDE (CHECK BOX)

Figure 4 - Paper Prototype: Page 2

3.3. Page 3

Page 3 of the prototype shows a modified cart or cart page. Chosen software packages are listed to the left, with a check box to signal that the user requires the appropriate user guide from the download as well as the software application.

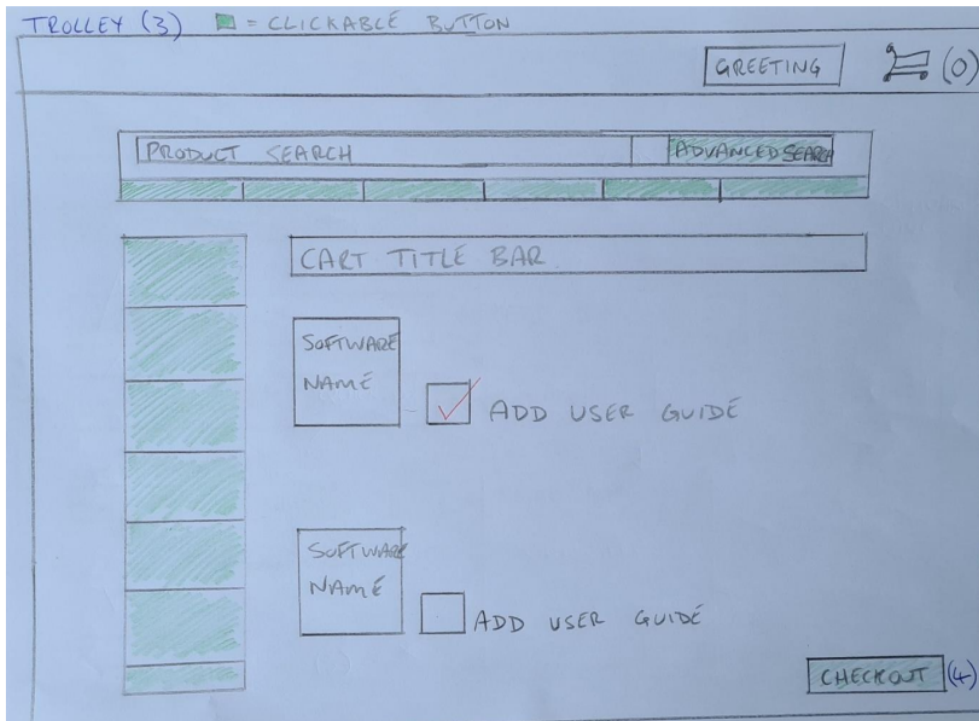


Figure 5 - Paper Prototype: Page 3

3.4. Page 4

Finally, page 4 details some modification to checkout page, specifically the payment method section. Titles from above the boxes have been removed and added to the box themselves. These titles are then removed when the box is clicked, and the cursor inserted.

This frees up real estate on the page to allow the implementation of a new checkbox. This check box gives users an opportunity to split payments over £100 in to three equal payments over three months. This feature may be useful for high value purchases and when the user is unable to afford outright the cost of the software package.

CHECKOUT - PAYMENT METHOD (4) ☐ = CLICKABLE BUTTON

PAYMENT METHOD

CREDIT/DEBIT CARD

PAYPAL

NAME ON CARD* ← TEXT BOX

CARD NUMBER* ← TEXT BOX

EXPIRY DATE*

MONTH ☐

YEAR ☐

CVC* ← TEXT BOX

↑ DROP DOWN ↑ DROP DOWN

☒ SPLIT PAYMENTS OVER 3 MONTHS ← CHECK BOX
(MINIMUM VALUE £100)

Figure 6 - Paper Prototype: Page 4

4. Human factors

When designing an application or website, it is important to consider the human-system interaction perspective. Humanity appears to be constantly seeking ways to impose itself on its environment and computer technology is no exception, with the way in which humans interact with computers undergoing a dramatic shift that will significantly impact the way we work [9]. To this end, users expect the interfaces they use to make completing their tasks easier.

When using an interface, such as that depicted in the above paper prototype, users rely heavily on short term memory. Short term memory is used when we follow a chain of reasoning such as access a website and purchase an item. At a high level, there is a defined path that one must follow to achieve the task and although there can be variations (e.g. Purchasing more than one item at a time), the goal is the same, to find the checkout and purchase an item.

The interactions built into the paper prototype for OnTheHub feed well into human memory. The path that one must take to purchase a software package resembles that of most other purchasing systems, where items are selected and added to a cart. When happy with their selections, users then visit the checkout to complete their purchase. Furthermore, purchasing in this way is an interface metaphor for how one would select and buy physical items in the real world in that they select the products they want, add them to the cart or basket and move to the checkout to complete the purchase.

In terms of visual perception, most information from graphical user interfaces (GUI's) is conveyed visually and common human behaviour is to fixate the gaze on the centre of the object being viewed when it first appears followed by single rapid step-like movements to other areas that are more visually prominent. These movements are known as *saccades* [10]

The OnTheHub prototype takes account of this behaviour and aims to provide a layout to compliment. For example, page 1 presents the search bar at the top which is the most natural position. Likewise, the left of the page shows a list of software suppliers while the centre and right of the page show the most popular software packages themselves. Although physical lines are not included on the page, the human mind recognises the distinct groups and interprets these three features as being separated into sections.

In 1977, psychologist J. J. Gibson coined the term “affordance” to refer to actionable properties between the world and an actor [11], the actor in this case being the user of the interface. Put more plainly, affordance is the term given to how well the features of an interface describe their function. For example, the above metaphor of adding an item to a cart could be regarded as good affordance, as the process resembles that of a real-world scenario and something most users are likely to be familiar with, resulting in minimal cognitive load for interface users.

Building on this and adding an interface design context, Don Norman focuses his discussion on “perceived affordance”. Perceived affordance relates more to what the user perceives than to what is true, and designers are more concerned with ensuring that the user perceives an action as possible [12].

Another example of good affordance in the above paper prototype is the checkout and payment method system on page 4. Each field depicts the information it requires using text descriptors and all fields are named as they are on a physical bank card. Again, this makes it easier for users to

understand what is being asked of them and allows them to quickly workout how to move forward with their purchase.

5. User Walkthrough and Evaluation

To understand whether the paper prototype of OnTheHub would improve its usability or not, a user walk through was required. The user was then asked to evaluate the prototype and provide feedback on features that they felt were useful and those they felt needed more development.

During the evaluation, users felt the design was well constructed with a high degree of continuity. It was reported that use of the sight felt efficient with good affordance throughout and the features were easy to learn, playing well to human memory.

It was felt that the layout was engaging, with clear and concise instructions and there was benefit from the wide use of metaphors, whilst the advanced search feature was easy to understand and provided users with a way to find exactly what they were looking for.

Users felt that whilst the design felt intuitive, it would benefit from extra navigation such as back buttons on each page as well as an error reporting function. They also noted the lack of accessibility options for users with disabilities.

Overall, they felt the OnTheHub paper prototype had a clean design that flows well, showing the user exactly how to search for a product and purchase a software package.

A copy of the user evaluation can be seen in **Appendix 1**.

6. Reviewing Other Paper Prototypes

To broaden understanding of paper prototypes and how web interfaces can be designed, refined and re-designed, it was necessary to review prototypes developed by others.

A six-page paper prototype that redesigned the University of Wales Trinity Saint David Moodle website was provided and can be seen in Appendix 2.

Page 1 of the Moodle prototype is well designed. It is simple, easy to understand and the addition of a specific "Assignment" button that takes users to an assignment related section is useful. Page 2 proposes a collapsible list of assignments grouped by study level. They layout is again simple and concise with good affordance, allowing users to easily understand what they are looking at and determine the area of interest as well as see outstanding and submitted assignments.

Page 3 divides the different sections clearly and buttons that change colour when assignments are submitted, or feedback received adds further clarity. Also available to users is the option to change font size and colour, this facilitates users with disabilities such as poor eyesight or colour blindness.

Page 4 denotes an assignment submission page. Again, this is clearly divided, and appropriate sections are easily identified. A large box with the option to drag and drop files to upload is an excellent way to limit cognitive load on users by reducing the number of clicks needed during a file upload, as well as the mental involvement in doing so.

In summary, the UWTSD Moodle prototype is well conceived. Sections are clearly divided and grouping assignments by module in a simple view is a good metaphor for a similar real-world scenario.

The design could benefit from extra navigation, perhaps in bread crumb format on each page to remind users of where they are and how to return to the previous sections.

7. Rapid Prototyping Using Adobe XD

Following on from the paper prototype design of OnTheHub, a software prototype was created using AdobeXD.

7.1 Page 1

The below screen print is of page 1 before a user hovers over the product icons. It shows the home screen with the features detailed in the paper prototype. A button to allow users to report a problem has been added, as suggested in user feedback.

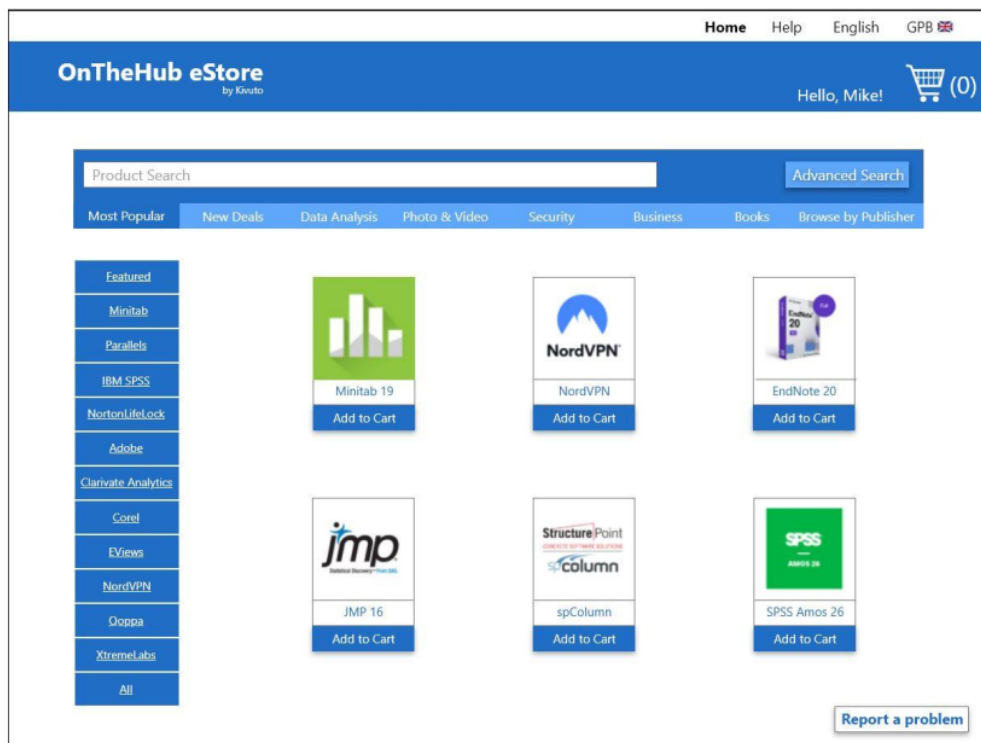


Figure 7 - Software Prototype: Page 1a

Below is screen one after a user hovers over a product icon. Hovering presents a short description of the software.

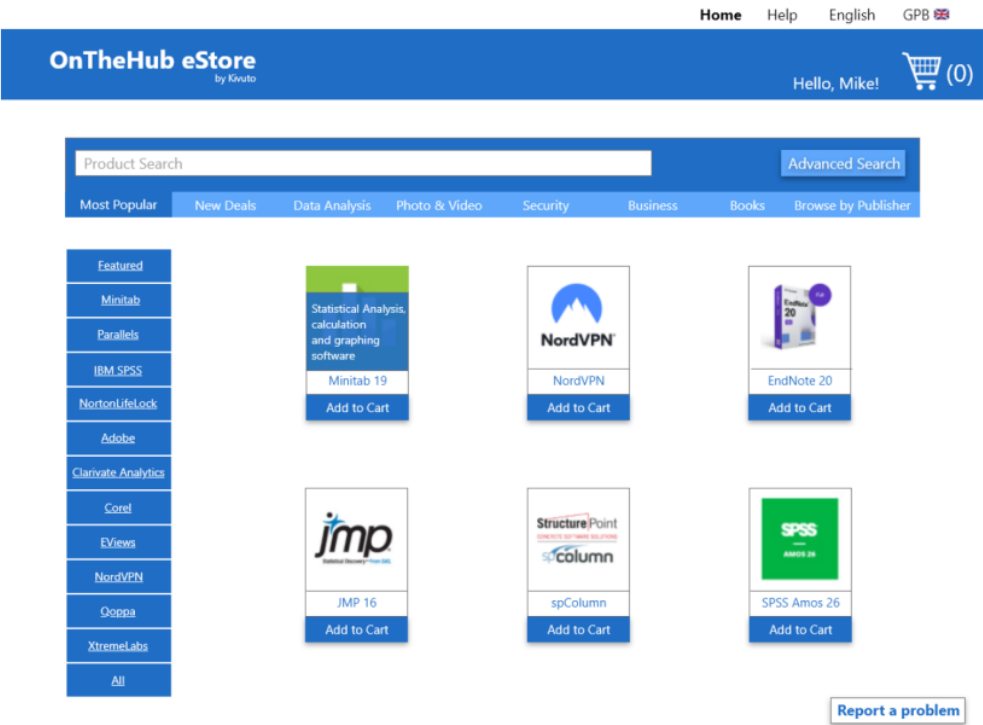


Figure 8 - Software Prototype: Page 1b

7.2. Page 2

The below screenshot is of page two of the prototype. It assumes a user has selected the **Advanced Search** feature. Page 2 also includes the option to report a problem as well as breadcrumb navigation below the page header, also suggested in user feedback.

The screenshot displays the 'OnTheHub eStore' interface. At the top, a blue header bar contains the site name 'OnTheHub eStore by Kauto' on the left, and user information 'Hello, Mike!' and a shopping cart icon with '(0)' on the right. Navigation links for 'Home', 'Help', 'English', and 'GBP' are positioned above the header. Below the header, a breadcrumb trail reads 'Home > Advanced Search'. A search bar with the placeholder 'Product Search' and an 'Advanced Search' button is present. A horizontal menu below the search bar lists categories: 'Most Popular', 'New Deals', 'Data Analysis', 'Photo & Video', 'Security', 'Business', 'Books', and 'Browse by Publisher'. On the left side, a vertical list of product categories includes 'Featured', 'Minitab', 'Parallels', 'IBM SPSS', 'NortonLifeLock', 'Adobe', 'Clarivate Analytics', 'Corel', 'EViews', 'NordVPN', 'Osoppa', 'XtremeLabs', and 'All'. The main content area is titled 'Advanced Search' and contains several input fields: 'Enter Name of Product', 'Category' (with a dropdown arrow), 'Software Publisher' (with a dropdown arrow), 'License (free/paid)' (with a dropdown arrow), and 'Most Popular' (with a dropdown arrow). There is also a checkbox labeled 'Product includes user guide' and a 'Search' button. At the bottom right of the page, a 'Report a problem' button is visible.

Figure 9 - Software Prototype: Page 2a

Below, also a screenshot of page 2, shows a user having selected the **Category** drop down menu

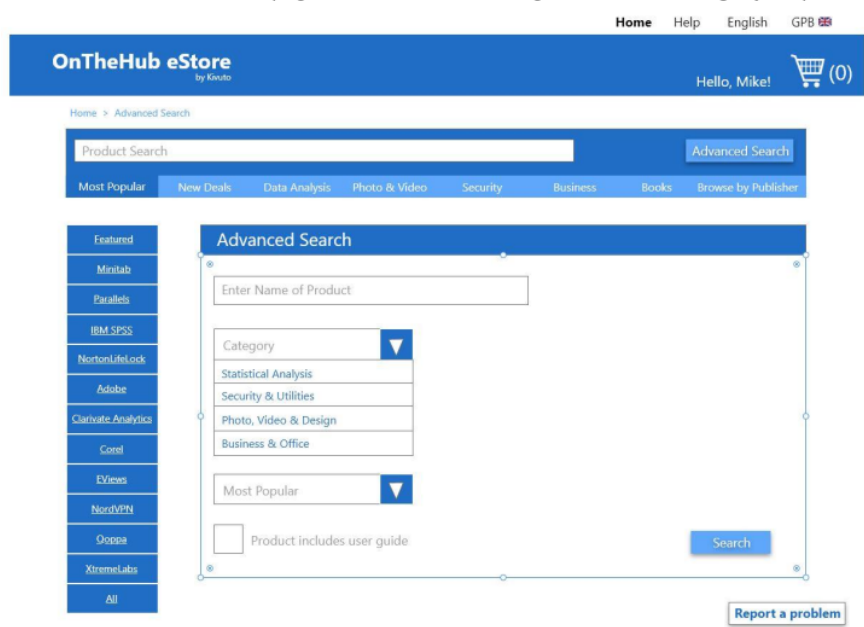


Figure 10 - Software Prototype: Page 2b

Finally, below is an image showing page 2 where a user has selected to only view products with user guides. With the below criteria selected, the search should return only those products related to Photo, Video & Design **and** that have associated user guides.

[Home](#) [Help](#) [English](#) [GBP](#)

OnTheHub eStore
by Knuts

Hello, Mike! (0)

Home > Advanced Search

 [Advanced Search](#)[Most Popular](#) [New Deals](#) [Data Analysis](#) [Photo & Video](#) [Security](#) [Business](#) [Books](#) [Browse by Publisher](#)

[Featured](#)
[Minitab](#)
[Parallels](#)
[IBM SPSS](#)
[NortonLifeLock](#)
[Adobe](#)
[Clarivate Analytics](#)
[Corel](#)
[EViews](#)
[NordVPN](#)
[Oceppa](#)
[XtremeLabs](#)
[All](#)

Advanced Search

Photo, Video & Design

▼

Software Publisher

▼

License (free/paid)

▼

Most Popular

▼

☒ Product includes user guide

[Search](#)

[Report a problem](#)

Figure 11 - Software Prototype: Page 2c

7.3. Page 3

Below, page 3 can be seen. It shows the user that there are two products in the cart as well as the total cost for everything they have selected in GBP. Again, the breadcrumb navigation is available as well as the ability to report a problem. The checkboxes allow users to optional download user guides associated to the product.

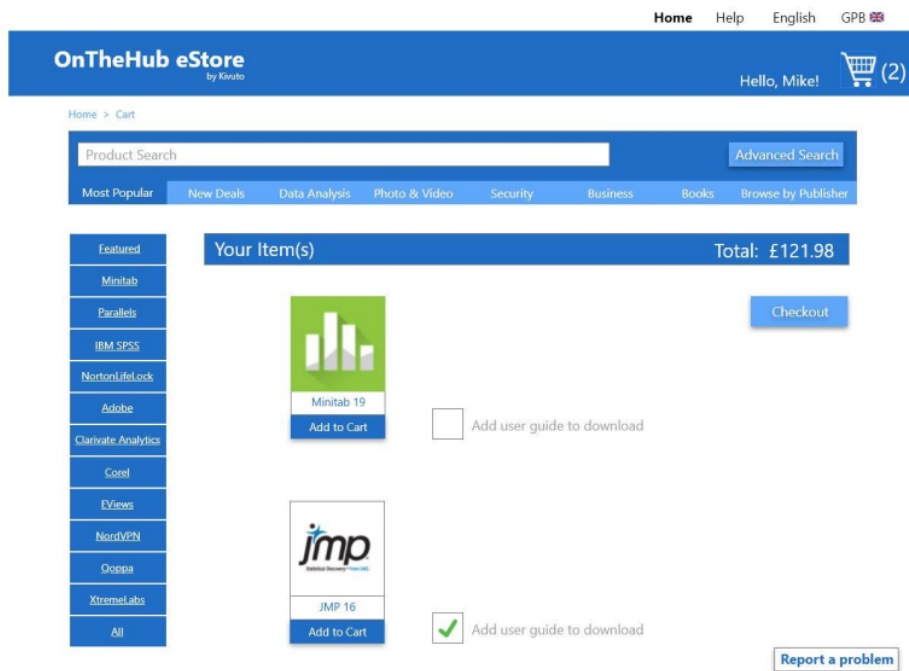


Figure 12 - Software Prototype: Page 3

7.4. Page 4

Page 4, again with breadcrumb navigation, cart details and the option to report a problem. The user can select a payment method (card or PayPal), complete their details and opt to split payments equally over three months, providing the value is over £100.

Home Help English GBP

OnTheHub eStore
by Kendo

Hello, Mike! (2)

Home > Cart > Checkout

Product Search Advanced Search

Most Popular New Deals Data Analysis Photo & Video Security Business Books Browse by Publisher

Featured
Minitab
Parallels
IBM SPSS
NortonLifeLock
Adobe
Clarivate Analytics
Corel
EViews
NordVPN
Doppia
XtremeLabs
All

Payment Method Total: £121.98

Debit/Credit Card PayPal

Name on Card *

Card Number *

Expiry Date * CVC *

Month Year

☒ Split payments equally over 3 months (minimum value £100)

Submit Order

Report a problem

Figure 13 - Software Prototype: Page 4

8. Conclusion

To conclude, the application of various usability engineering techniques resulted in a paper prototype that provided a solid foundation for a software prototype. Using Task Analysis, it was clear to see what users of OnTheHub would need to achieve and how they would achieve it. Analysing the human factors involved in interface use, such as human memory as well as the use of interface metaphors showed where improvements to the website could be made. Completing a walkthrough of the paper prototype with users provided excellent feedback and positive suggestions which were carried into the software prototype. These included a button to allow users to report problems as well as breadcrumb navigation to help users identify where they are and guide them back to previous sections should it be necessary.

Future developments should consider accessibility options, such as colour and font size changes and audio readouts for visually impaired users.

References

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Appendices

Appendix 1

The paper prototype has been well thought out with constructive, continuing design. This shows efficiency and will be easily memorable.

There is good affordance for all pages with added benefit of metaphors that are widely used.

The layout is engaging with clear concise instructions showing appropriate navigational options allowing the user to find their way around the site.

The advances search option is easy to understand and gives the user a way to find exactly what they need.

The pages are easy to learn having similar design which allows for good memory functionality.

The finished design would benefit from back and forward buttons allowing the user to easily navigate around the site, it would also be good to have some sort of reporting errors function.

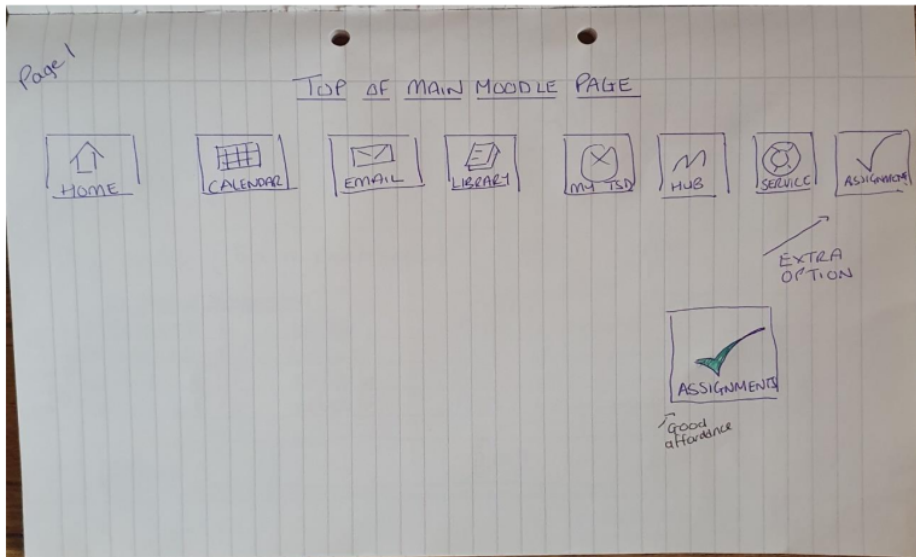
The site may benefit from option for users with disabilities.

Overall, this is a clean design which flows well showing the user exactly how to search for a product and purchase an item.

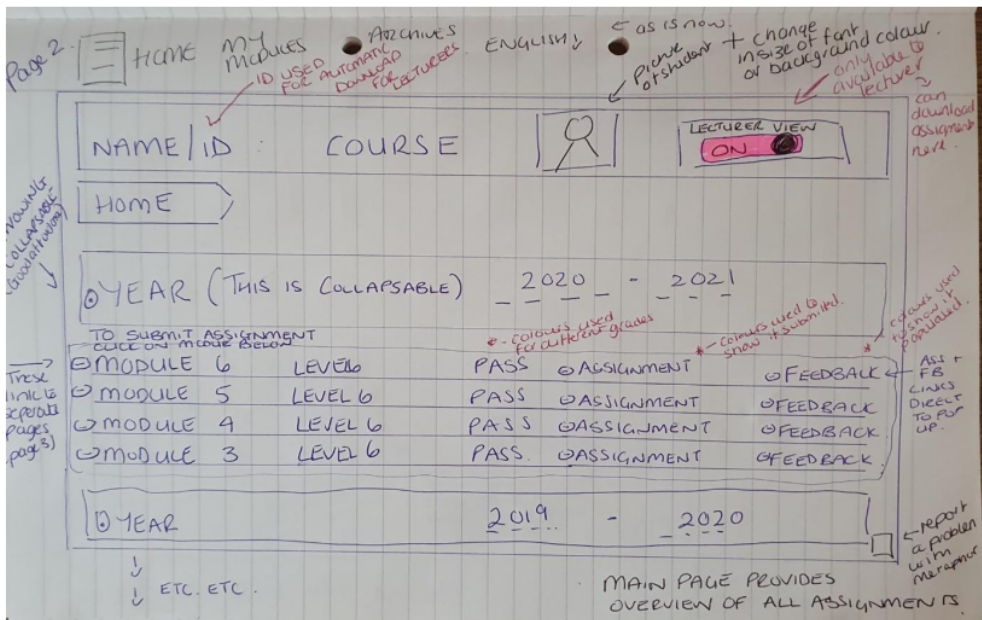
	Efficiency	Effectiveness	Engaging	Error Tolerance
Page 1	Easy to use with good colour coordination	Very effective easy to use. Easy to see how to purchase	Good layout and flow	No error reporting option
Page 2	Clear design efficient use of metaphors	Easy to see how to complete advances search	Easy to navigate	No error reporting option
Page 3	Easy to use – should there be disability options?	Continued flow allows users understanding	Additional options giving user ways to use guides	No error reporting option
Page 4	Navigation buttons needed but other than that very effective payment options	Very easy to use	Following the previous pages, very streamlined and engaging	No error reporting option

Appendix 2

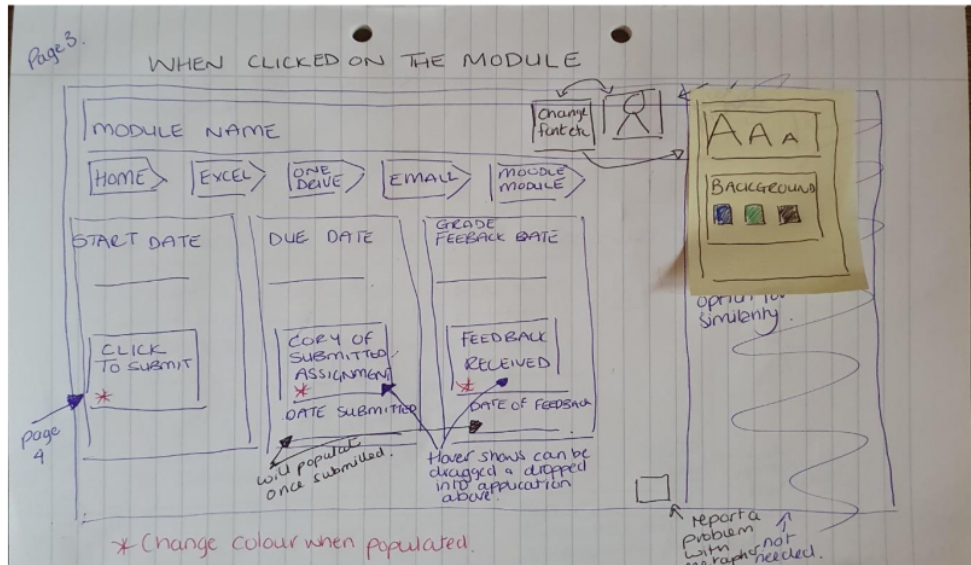
Page 1: Main moodle page for selection of additional option for view of assignments and feedback



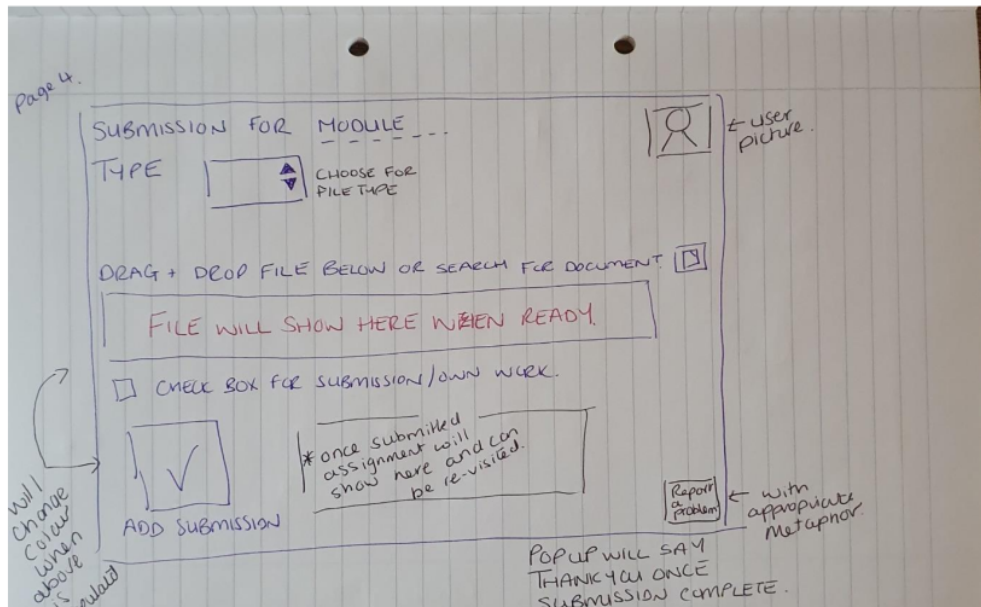
Page 2: Main assignment/feedback page



Page 3: Page shown when clicked on each module on the assignment/feedback page



Page 4: Submission page for assignments



UE_Assignment1

GRADEMARK REPORT

FINAL GRADE

69/100

GENERAL COMMENTS

Instructor

Introduction:

The general discussion here is well researched and written however introducing your chosen resource earlier and focussing discussion to that would be more effective use of the word count.

Task Analysis:

Good application of Hierarchical Task Analysis but you started with the website! Users don't want to visit a website as such - they want to source the products they need. Good user research demonstrated. The characteristics of users and context of use could have been examined.

Paper Prototype:

An effective paper prototype is presented, with good visual design and clarity. .

Human Factors:

Good research, discussion and use of examples from your prototype are demonstrated here. Metaphors are correctly identified, how could you ensure they are used effectively?

Review of another paper prototype:

Good practical analysis and suggestions here. One example of application of theory to give feedback, perhaps more theory could have been added.

Software prototype: Very good use of Adobe XD to create a well structured prototype. Good explanation and evaluation.

Evaluation:

A brief evaluation of techniques used with examples given.

Overall excellent prototype design and application of theory. The Intro and Task Analysis could have been closer tailored to where marks are awarded.

PAGE 1

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