

National College of Ireland  
MSc in Web Technologies



# A Usability Evaluation Research of a Web based E-Learning Application.

Dissertation  
Submission Date  
September 2015

---

Author: John Fitzpatrick

A Dissertation submitted in fulfilment of the requirements for the degree of MSc in Web Technologies, in the School of Computing, at the National College of Ireland.

Dissertation Supervisor: **Dr. Anu Sahni**

Declaration of Authorship

I hereby certify, that this material which I now submit for assessment leading to the award of Master of Science in Web Technology is entirely my own work and has not been taken from the work of others, save and to the extent that such work has been sited and acknowledged within the text of my work.

Signed \_\_\_\_\_

Date \_\_\_\_\_

***Abstract***

When E-learning was first introduced to the Internet it was called Internet Based Training, and then Web-Based Training and you will still find these terms being used with some variations and is now generalized to E-Learning. The basic purpose of E Learning is to deliver knowledge to the user or to share information that assists users of the E Learning software to learn from a multitude of subjects now available through online Mobile or Native downloadable applications which use advanced interactive software tools which deliver very effective and efficient interactive activities for learners who wish to avail of this technology.

However, applying Usability testing principles to an E-Learning applications has significant information to collect in how learners use the E-Learning applications which will show satisfaction levels, efficient results and effective evaluation reports that bring to the front all aspect of how well a software product delivers it knowledge from a learners point of view.

This research document aims to use Usability testing methods to gather information from learners of an E-Learning Software application that accompanies this research document which in turn with analyse the data gathered and report on it's findings using standard usability tests.

Moreover, the document also intends to use the results of the analysed reports to suggest ways that the E-Learning application can be modified if necessary to benefit the learners by adopting new techniques or learning methods to the E-Learning software.

## **Acknowledgement**

*I would like to express my deepest gratitude to my Supervisor, Dr. Anu Sahni for her excellent guidance, patience, and providing me with excellent advice and support during this research dissertation.*

*I would also like to thank all of the participants who took part in the Usability Tasks and tests that were necessary to complete this research paper without which it would have been impossible to complete. I would also like to thank Vikas Sahni (asp.net lecturer) who gave me encouragement to continue with my Dissertation and my software development endeavours over the course. A special thanks to my Usability lecturer, Dr. Damien MacNamara, who inspired me to gain a love for learning everything regarding the wonderful science of Usability.*

*I would also like to thank Dr. Keith Maycock for his unrelenting understanding on my academic journey and for his leadership qualities in helping me achieve my present academic level. I would also like to thank the National College of Ireland for their excellent course modules and lectures that have led to my completion of a Higher Diploma in Software Development and progressively from this, a Masters Degree in Web technology.*

*Finally, I want to thank Yabla.inc for their kind permission allowing me to use some of their video material for my Dissertation demonstration concerning E-learning and Usability evaluation.*

## Content

<i>Declaration of Authorship</i>	2
<i>Abstract</i>	3
<i>Acknowledgements</i>	4
<i>Contents</i>	5
<i>Abbreviations</i>	8

## Chapter 1

1.0 Introduction	10
1.1 The Research Question Overview	10
1.2 The Research Question	11
1.3 Approach to researching & Answering the Research Question	11

## Chapter 2

2.0 Literature Review	13
2.1 Introduction	13
2.2 Assumptions	14
2.3 What is E-learning?	14
2.3.1 E-learning anywhere	16
2.3.2 Is E-learning for everyone?	16
2.4 What is Usability	17
2.4.1 Why is Usability so Important	19
2.4.2 Basic Design Flaws	19
2.4.3 When should Usability be applied	20
2.4.4 Where should Usability be tested	20
2.5 Usability Engineering	21
2.6 The Usability Engineering Life Cycle	22
2.7 System Usability Scale (SUS)	23
2.7.1 What are the benefits of SUS	24
2.7.2 The Advantages of using a questionnaire	24
2.7.3 Disadvantages of using a questionnaire	25
2.8 Usability Heuristics for User Interface Design	25

## Chapter 3

3.0 Methodologies for Usability Evaluation	27
3.1 Planning a Usability test	27
3.1.2 How many participants should the Testing Involve	28
3.1.3 Elements of the Test Plan(s)	28
3.2 What are Test metrics	29
3.2.1 Best Practices	30
3.3 Two typical Usability Tests	30
3.3.1 System Usability Scale (SUS)	30
3.3.2 First Click Testing	31
3.4 Designing the Software	31
3.1.4 How the Software is accessed	32
3.4.2 Tracking User Input and Navigation	33
3.5 Usability Tasks and Scenarios	33
3.5.1 The Usability Task Scenarios	34
3.6 Reliability and Validity of Data	39
3.6.1 SUS as Reliable	39
3.6.2 SUS as a Valid Source	39
3.7 Overview of Usability Task Methodologies	39

## Chapter 4

4.0 Analysis and Findings	41
4.1 First Click Results	41
4.2 Navigation Visual Effectiveness	44
4.3 Efficiency and Functional Task	46
4.4 SUS questionnaire	52
4.5 Software Code samples	54
Conclusions	59

Bibliography	61
List of Tables	62
List of Figures	62
List of Graphs	62
Appendix (I) SUS Questionnaire	63
Appendix (II) Screenshots	64
Appendix (III) User Activity Logs	66

## **Abbreviations**

**SCORM (Shareable Content Object Reference Model):** SCORM is a series of e-learning specifications describing interoperable ways to store, launch and track course content and learner data.

**ROI (Return on Investment):** Generally, a ratio of the benefit or profit received from a given investment to the cost of the investment itself. In e-learning, ROI is most often calculated by comparing the tangible results of training (for example, an increase in units produced or a decrease in error rate) to the cost of providing the training.

**SME Subject Matter Expert:** The member of a project team who is most knowledgeable about the content being instructed upon. Frequently, the SME is an expert contracted or assigned by an organization to consult on the training being created.

**LMS (learning management system):** Software that automates the administration of learning/course delivery events. The LMS registers users, tracks courses in a catalogue, and records data from learners; it also provides reports to management. An LMS is typically designed to handle courses by multiple publishers and providers. It usually doesn't include its own authoring capabilities; instead, it focuses on managing courses created by a variety of other sources.

**LCMS (learning content management system):** A software application that allows trainers and training directors to manage both the administrative and content-related functions of training. An LCMS combines the course management capabilities of an LMS (learning management system) with the content creation and storage capabilities of a CMS (content management system).

**WBT (Web-based training):** Any instructional event that can be accessed via the Internet or the Web.

**WYSIWYG (what you see is what you get):** Pronounced "wizzy wig," a WYSIWYG program allows designers to see text and graphics on screen exactly as they will appear when printed out or published online, rather than in programming code.

**XHTML (Extensible Hypertext Mark-up Language):** A hybrid of XML and HTML. Web pages designed in XHTML should look the same across all platforms.

**XML (Extensible Mark-up Language)** is a set of rules for encoding documents electronically. Although XML's design focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services.



**AICC:** Aviation Industry Computer-Based Training Committee, an international association of technology-based training professionals that develops training guidelines for the aviation industry.

**BMP (Bitmap Image):** A graphic image stored as a specific arrangement of screen dots, or pixels. Web graphics are bitmap images. A graphic which is defined by specifying the colours of dots or pixels which make up the picture. Also known as raster graphics. Common types of bitmap graphics are GIF, JPEG, Photoshop, PCX, TIFF, PNG

**CMS (Content Management System):** Software application that streamlines the process of designing, testing, approving, posting and publishing digital content.

**CSS (Cascading Style Sheet):** A feature of HTML developed by the W3C. With Cascading Style sheets, both web designers and end users can create style templates (sheet) that specifies how different text elements (paragraphs, headings, hyperlinks, etc.) appear on a web page.

**DHTML (Dynamic Hypertext Mark-up Language):** DHTML is an HTML extension that allows web pages to react to the end users' input, such as displaying a web page based on the type of browser or computer end users are viewing a page with.

**EPSS (Electronic Performance Support System):** A program that provides on demand assistance on a discrete task. Considered to be a support tool or job aid. A good example of an EPSS is the built in help functions of many software programs.

**F2F (face-to-face):** Term used to describe the traditional classroom environment.

**GIF (Graphics Interchange Format):** A file format, and filename extension, for graphics files for display on web pages.

**GUI (Graphical User Interface):** A way of representing the functions, features and contents of a program to a user by way of visual elements, such as icons, as opposed to textual elements, such as words and character strings. The Microsoft Windows operating system is the classic example of a program with a GUI.

**HTML (Hypertext Mark-up Language):** The standard programming language for web content designed to be accessed by browsers.

**ILT (instructor-led training):** Usually refers to traditional classroom training, in which an instructor teaches a class to a room of students. The term is used synonymously with on-site training and classroom training.

**UEM** Usability Evaluation Methods

**SUS** System Usability Scale

**SUPR-Q** Standardized Universal Percentile Rank Questionnaire

# *1*

## **1.0 Introduction**

*The research question stems from the necessity of Modern Website to give as much exposure to it users regarding, Usability, Learnability, and likeability. Websites that can deliver the optimum amount of efficiency and effective usage to its users owe most of the positive attributes to their modifications or good design because of the benefits of Usability tests and subsequent improved design because of this. The research in this paper, coupled with the Usability testing of the accompanying software endeavours to deliver in a thorough way, the necessary adequate answer that is worthy of such a Research question.*

## **1.1 The Research Question overview**

The World Wide Web as an information and communication Technology is now widespread as an educational medium with instructional training for both Interactive training and distance learning which can include mediums such as Video training, video-conferencing, quiz's, interactive text information and audio materials. Today, E-learning online software is in high demand for individuals and for corporate training programmes for whole companies or staff members. The efficiency and the effectiveness of learners getting optimum cost-effective and quality learning can depend not just on the individual's learning ability, but rather on how well the software delivers the content to the user at a level where the user is acquiring the optimum retention value to their level of satisfaction.

Usability testing principles can greatly determine from testing, gathering information and analysis, the extent of how well this coupling of User and Application work as an efficient and effective system of learning. The Research question is proposing to determine this coupling that in itself becomes a Heuristic approach in its goal and purpose.

## **1.2 The Research Question**

The research question is asking, by examining Usability principles tests on an E-Learning online software application and analysing the results of such tests, what are, if any, the determining factors or methods that should be modified or appended to an existing E-learning software which should become a permanent feature of that software that will benefit the Users of the Software in such a way that it will enhance the learning experience in gaining a greater retention ability and user satisfaction through a more effective and efficient delivery of the content material.

## **1.3 Approach to Researching and answering the research Question.**

Beginning to answer a research question can only come from researching a more comprehensive understanding of the system as a whole regarding the Interactive software, the users of the software, and the usability testing as an E-learning interactive online application.

This research looks at a usability approach together with usability principles overall being employed to evaluate a system that attempts to use the power of E-learning values of delivery to individuals or groups of people. It is because of this that the research will use the Usability testing approach, along with best practices to evaluate a Software application that accompanies this research paper.

The approach adopted by this research paper is firstly to examine the Research question in detail. The Historical information of already existing E-learning software applications is a focus that must attempt to identify with some aspects of the E-learning software that will be used to accompany this document and all research reflected in the Literature Review section.

The methodology of applying Usability techniques using several personas from a varied background, age and gender is approached as a controlled testing environment of data gathering through a detailed instruction method.

Verbal and visual interaction between users and an expert testing instructor continues with data gathering behaviour and from verbal and online questionnaires. Following all Usability data gathering and testing, the subject of analysis and reporting using graphical representations and literal analysis results must be formed. This completions can then be used to form conclusions.

The conclusions become the pinnacle of the research and how suggestions of modifications are necessary or not in order to enhance the software to a level of a more optimum delivery of the learning material to the learners or users.

# 2

## *2.0 Literature review*

### **2.1 Introduction:**

E-learning techniques which are used to convey a form of learning modules to the user come in many different styles of methods and content. This Dissertation research paper is concerned with the Usability Evaluation of an E-learning application that was designed to teaching languages especially foreign languages. The literature review intends to introduce some of the methods used in E-learning but the primary focus is to evaluate the E-learning software using usability evaluation techniques in order to ascertain how interactive E-learning can be evaluated concerning their efficiency, effectiveness and learnability. The learnability in usability in this case is not how well the user learns the topic of the E-learning software, but rather how well the user learns how to use the E-learning software itself especially where satisfaction factors are present.

Foreign language teaching and learning has always been a subject of contention as some consider it a difficult topic for some whereas easier for others; This idea might be true but the emphasis here in this research paper is whether an usability evaluation can show from analysis where any efficiency, effective or satisfactory issues arise through using the methods dictated by the E-learning application design and delivery. A major role of the research is to determine some of the general and established models of evaluation especially the Heuristic evaluation when applied to web based E-learning application are sufficient in determining or identifying Usability issues.

Using existing literature the criteria for Usability must be established. The review will include a definition of what E-learning is first, so that a correct understanding of why Usability can determine what it should deliver is being delivered or not.

Real end users are the invaluable part of the evaluation as their experience of using the E-learning software and their interactions through Navigation and discovery over time to reach their goals is what the usability evaluation intends to reveal for analysis and conclusion.

## **2.2 Assumptions:**

Coupled with this research paper there is a web based interactive E-learning software application designed specifically to accompany this Dissertation and is intended to be the only application used as part of the Interaction between the users and the learning topic.

The only assumption is that the E-learning software is considered a robust interactive web based application used in teaching to users of the software, a foreign language. No assumption is made about the persona of the users at the beginning and data is collected online using the software as part of a Pre-questionnaire and Interview method. Another 'Post Questionnaire' and basic data collection interview follows the end of the usability Evaluation testing. Background knowledge of E-learning application is not assumed to any reader, and so a concise description and explanation of what e-learning is described in the review so as not to cause any ambiguity between the E-Learning methods of learning and the Usability evaluation techniques.

## **2.3 What is E-Learning?**

An overview:

E-learning is a form of learning that utilises electronic technology where a user can access an educational curriculum outside of the traditional classroom style of teacher-pupil method of learning. Most cases of E-learning refer to a particular course which is delivered entirely online.

There are many different terms used to describe E-learning ranging from distance learning to online learning or computerised learning. Of course E-learning also includes learning using content from other methods; for instance, native downloadable apps and CD-ROM's.

Some of the E-learning experiences are:

1. Web applications
2. Downloadable Native apps.
3. Live Video Streaming.
4. Audio courses.

5. Live quiz.
6. Live questions/answer sessions.

A common attribute that defines E-learning is the ability to interact with the software. The software allows the user to communicate with the learning software, or with the professor in live video learning. The ability to interact creates an type of online Classroom where students can interact with the lecturer or other students.

In 'live' interactive classes, the mere fact that the student can 'virtually' ask questions or participate live is a major difference in how a student learns especially when student can communicate in a group learning environment.

Many business and corporate training course are run online which can be run live or at leisure. Many business's or small companies run 'Safety at Work' courses which are very common for use in an E-learning environment where students can be given graphic and text content using drag-and Drop interfaces where the learning process can be taught over a period of time and results from tests or quiz's give instant results which can be stored or uses as a learning tool to correct mistakes.

As there is a major shift towards a higher knowledge society, companies working conditions have moved towards needing their staff and management to become more involved in company training programmes that can be delivered over the Internet that can enhance the skill set of their employees.

Conceptually, E-learning can be considered broadly synonymous with instructional technology, Informational Communication Technology(ICT), EdTech, Learning Technology, Multi-media Learning, Technology Enhanced Learning(TEL), Computer Based Training(CBT), Computer Based Instruction(CBI), computer managed instruction, computer-aided instruction(CAI) , Internet Based Training(IBT), online education, Virtual education, virtual Learning Environment(VLE), m-learning and digital education. All of these terms are used to describe different styles or types of E-learning but they do raise different and individual digital approach to their delivery methods.

In the 1980's and 1990's, electronic learning did receive bad press as many thought that computers would remove the human element that some learners arguably need to get the full value of education. But today, technology embraces smart phones, Tablets, and laptops in the classroom as an almost necessary aid to their learning experience.

Building partnership with quality training software delivered online shares a unique experience of gaining interactive content from teams of highly qualified trainers through very valuable content delivered through video, audio or graphics, live online or through stored interactive content.

### 2.3.1 E-Learning, anywhere.

There are many face to face courses that operate during normal business hours but by allowing staff to complete company training courses online where and when ever suits allows a lot of busy companies to minimize disruption to their normal company transaction which on the outside seems to be a positive advantage of E-learning /training and certainly might suit the student/trainee too as companies to see the value of up-training their staff at all levels which in turn can also assist the worker in gaining valuable up-skills possibly leading to promotion etc. This can be also very valuable for some staff as they might not need to travel to outside trainings centres creating a more efficient training programme overall.

Corporate Training E-Learning network

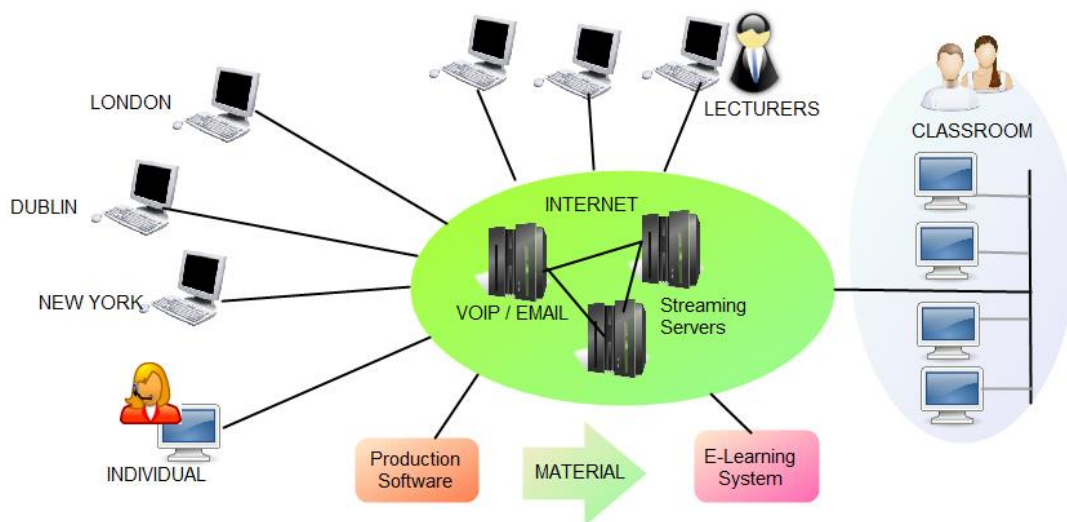


Figure 1

### 2.3.2 Is E-learning for everyone?

It can be argued that E-learning may not be for everyone. Because the ideas of e-learning having the flexibility to be used any time, anywhere, may suit some students that have the discipline to work through the material with a consistency and /or regular basis. Without this quality e-learning course can backfire and have



a negative effect on their initial goal to be flexible while still delivering the content. On the other hand, e-learning that is delivered live requires a different type of discipline that requires the student to get used to an environment possibly outside the classroom with a very modern approach to interaction with lectures and other students.

It has to be said that different e-learning delivery systems have different attributes that require certain disciplines for different students. Although the student may not be in a classroom situation, the e-learning network system allows for groups of students to interact with each other still, these are called 'Cohorts' where each student learns the material separately but yet are expected to learn simultaneously and are expected to interact with other students via discussion boards typically through online Classroom Management Systems.

As in all training courses, assignments need to be submitted and deadlines of course material needs to be covered on time. This level of discipline is separate from the effectiveness of e-learning and must be adhered to regardless on the effectiveness on how the e-learning system delivers the content. On the other hand not every student feels comfortable working in large groups allowing e-learning to be an ideal learning platform for certain disciplines.

## **2.4 What is Usability?**

Basics:

How well a User can learn to use a Software product and achieve their goals is the main aim of Usability evaluation. It can also refer to how satisfied the user of the software is, whether it's an E-commerce website or an E-learning website, or whether the user just wants to acquire information in the easiest or quickest time, then usability evaluation is used to determine the level at which this goal is achieved.

Usability has often been described as the quality of the user's experience especially when it comes to interacting with products, systems, devices or any application. Primarily it's all about effectiveness, efficiency and of course overall satisfaction by the users of the system.

Important factors that arise when talking about Usability, are a combination of factors which include testing Intuitive design, ease of learning and Memorability after visiting a website, especially when navigating from page to page in order to achieve a goal.

Evaluation on how many errors a user makes when trying to achieve a goal is termed Error frequency and severity. This is also a test of how well the user can recover from a serious error of interactivity and can be measured.

Subjective satisfaction is a factor of some usability evaluation and is considered as a satisfaction level of using a site.

Usability is a quality attribute and can be used to assess how easy a software interface can be used. The word itself, 'Usability', can also refer to methods for improving how easy a website can be used during the design stage.

Five of the main components of usability can be described as;[1]

- Learnability
- Efficiency
- Memorability
- Errors
- Satisfaction.

Learnability can be described as how easy users accomplish a basic task the first time they come across the design. Efficiency can be described as; a user has learnt a task, how quickly can they perform the same task again.

Memorability is when a user has left the site for a period of time and returned. The easy of use the user has in re-establishing their proficiency in using the website again. Errors can simply described in how many a user makes and the severity of the errors. The ability to recover from the errors is also taken into consideration.

Satisfaction is exactly what it says. How satisfied the user is in using the design.

One important features of Usability is called utility. Utility refers to the functionality of the website design. Does it do what the users expect it to do or need it to do? When you put usability and Utility together you get a website that is useful.

To define **Utility** in detail it can be formulated as:

*Utility=whether the site provides the features /functionality you need*

*Usability = how easy and how pleasing these features were to use*

*Usefulness = Utility +Usability*

So from these simple equations it easy to see that both utility and usability are both equally important when it comes to how useful a site is.

To say that a site has everything you need but is complex to use renders the site less useful as the Interface might have links that navigate to several unnecessary pages before reaching the correct one or badly designed visuals content that cause confusion all lead to the website becoming less useful because of Usability flaws.

#### **2.4.1 Why is Usability so Important**

In simple term, if a website is too difficult to use, the users / visitors to the website leave. It's as simple as that. When the first page the user visits is the Homepage, and it doesn't clearly state whatever the company or the product offers users tend to leave. Hard to read text can play a major part in the first impressions and can cause confusion right from the start. Should any of links have ambiguous headings can lead to a user getting lost as they browse the pages and often back to where they started from. If a user has to spend too much time reading or trying to figure out something, then the usefulness of the site begins to diminish. Users will leave and visit a similar site quickly when interfaces of links cause the visitor to encounter problems. So this is one major aspect of why Usability is so important.

#### **2.4.2 Basic design flaws.**

One of the most basic laws of using an e-commerce site, for example is; if a user can't find a product, then the user can't buy it. Usability test can make sure that the design of the software ensures any flaws encountered in purchasing a product. This law goes for any website that has either a product, a service or in this case of research, learning a language. Most users are searching for a product, a service or information.

On Intranets or the web, when employees use it as their business, employee productivity suffers if the Usability of the site has flaws. If time and efficiency are important to a company, which is usually the case, money is lost if the Usability of a company website cannot be accessed efficiently to deliver the required information or service.

This is where best Practices can show its value especially if a company spends 10% of the Design budget on Usability. If 10% of the budget returns a double the quality of the design metrics, then it's easy to see why Usability should be part of the design process. This can be seen as a parallel of a small cost at design stage to doubling sales of a Product or service rendered as a web product. This type of prudent action can also double your registered users if used as a simple benchmark

to seeing the value of Usability applied to a website. This is a good metric for any Key Performance Indicator (KPI) that is motivated by the design project.

### **2.4.3 When should Usability testing be applied to a website?**

Usability can play a role at multiple stages of the website design. The decisions of testing a website for Usability depend on the stage of where the design of the Website is at that moment. If the website is already up and running or if the design is a start from scratch, there are main steps to consider

- If there is already a website up and running, then test the old site to keep whatever is good and works.
- If you have competitors on a very similar genre to your, it's worth testing the design to get some data or a range of options for your website.
- It can be prudent to do a field study of the users of the website to get a feel for the personas influenced by your website.
- Depending on your budget paper designs can be tested too as part of a cost effective Usability test.
- Run ongoing Usability tests as the Site progresses from Design to Production to going live.
- Once you decide on a final design, test it once more as Usability errors creep into a new design during implementation.

### **2.4.4 Where to do Usability testing.**

If a company is testing for Usability on a more regular basis, say 3/4 times a year, then a specific dedicated usability laboratory could be set up to provide a consistent environment for testers. However a good conference room or somewhere that can be isolated from distraction and any interference factors like external noise pollution or machinery. It's important that the focus is on the website and that the tester is allowed to feel comfortable in a well lit and pleasant environment. A very important part of any Usability test is to make sure that wherever it's held, that the door of the room is not constantly being opened and closed by anyone who thinks the room is vacant. A simple sign on the door to ward off potential intrusions is prudent.

## **2.5 Usability engineering**

The main goal of Usability engineering is to optimise the user's experience and this can always be an interactive system such as that of e-commerce or e-learning. When saying optimal user experience, this can have a different meaning to different systems; in other words, finding a product or finding information on another.

Even though there are heuristics that can serve as usability guidelines, such as effectiveness or efficiency for interactive systems (examples cf. Neilson 1994), the work of the Usability engineer would involve a creativeness to finding ways to modify existing software design using best practices that could be currently under Usability testing. E-learning systems are no exception to the same rule for any interactive website, and have been known to be among the most challenging websites or applications for Usability engineers.

This challenge can be because of the E-learning sector being heterogeneous regarding its material and content, plus it's the method of delivery. Engineers need to tailor the necessity to incorporate the e-learning material pedagogical Usability.

So this can involve two different aspects of Usability:

1. Creating a system that is trouble free inasmuch as it becomes error free in usability.
2. The system supports the learning process of the material being taught, which in essence, Pedagogical Usability is.

Both of these different Usability process are interlocked and are part of the user's cognitive abilities. So what problems does the engineer have to worry about considering these two different usability attributes? The main goal for the engineer is to lighten the load for the interaction between the user and the system so that more human cognitive recourses are available for the learning goals of the E-learning topic.

So for a Usability engineer, an advantageous requirement is helpful to have a detailed knowledge of human learning goals and processes. [2]

Of course a case can be argued to say that once the Usability of the interactive system is optimised, the user will automatically have a greater ability to learning because of the optimisation.

(Nielsen, J. (1994). Usability Engineering. San Francisco: Morgan Kaufmann)

In research concerning pedagogical usability, the science has been quantified as such: Usability can, according to Keinonen (1998, 62) be defined as a characteristic related to:

1. The product's design process,
2. The product itself,
3. Use of the product
4. User experiences of the product or
5. User expectations. In the present research, usability is understood primarily as the product's usability attributes, which are measured through subjective user experiences with a self-evaluation questionnaire.

## **2.6 The Usability Engineering Life cycle**

Bias and Mayhew (2005) created a usability engineering Life Cycle (UEL). This was a means to build a Usability test plan. Incorporating an UEL at the beginning it can provide a rigorous plan analysis for testing that is essential to get the most out of Usability design, analysis and testing. [3]

It's really a three phase plan. (Bias and Mayhew 2005)

### **1. Requirement analysis**

- Establish the user Characteristics
- Tasks the product needs for operation
- Set goals for the Usability study

Mayhew and Tremaine (2005) have assert that implementing the UEL to develop a usable Web site or Web-enabled application takes 8 to 12 months to develop and provide a decent ROI, but this assertion is an average estimate.

This nowadays may vary considerably and is dependent on team size, budget and design costs.

Gather user requirements:

Use paper prototyping and get feedback on the.

Focus on these points:

- User profiles
  - A description of User characteristics:  
(This might include physical limitations)
- Usability Goal setting

Set a specific quantitative goal (Task to reach a goal)

- Platform restrictions and capabilities

Test design on different platforms to avoid any limitations on the site

- General design guidelines

This is all about consistency on the website that adhere to websites today

Master pages, Global links, Colour display and Text patterns.

Making sure the site looks similar in different Browsers.

## **2. Design Testing and development**

Create a structured top-down approach for User interface, (for website)

(This step requires most attention/feedback from a Production team)

## **3. Installation**

Get feedback from users during and after development

(This can cause changes to be made to website from Production team)

If you or the team discover any changes to be made you may go back to phase 2.

This stage could also force you back to phase 1 that would require you to reanalyse the requirements and then go through the steps again.

### **2.7 System Usability Scale (SUS)**

The SUS or System Usability Scale is a very reliable tool for measuring usability.[5]

The user of a website is given a questionnaire after the website has been navigated where the user has reached a level of satisfaction on achieving a goal or purchasing a product, or simple gathering information to a level where the user has achieved what they came to the website for in the first place. After using the site the user is now very qualified to answer the SUS questions.

The SUS was originally created by John Brook in 1986, and it allowed a user to evaluate a variety of products and services which was not limited to a website. It might involve Hardware, all software, Mobile devices and applications. The questionnaire consisted of 10 items (questions) and the responses had a five value option of Strongly agree or strongly Disagree and it's varying degree's of agreement with the question.

### **2.7.1 What are the Benefits of SUS**

In the first place SUS has become Industry Standard. There are hundreds of references, articles and publications referring to the benefits and validity of such a system scale. Namely,

- It's a very simple questionnaire to administer to participants.
- Reliable results can be achieved even with few user test.
- It can differentiate between a usable system and an unusable system very effectively.

Some considerations to keep in mind if deciding to use a SUS as a usability test.

The scoring is a little complex:

It easy to interpret the final score as a percentage, whereas it's not;

Even though the final score will always return a value between 1 and 100.

One of the best ways to interpret the score is to 'Normalize' it which will produce a percentile ranking. SUS is not diagnostic. It's use is in classifying the website for ease of use and the satisfaction of achieving a goal.

### **2.7.2 The Advantages of using a Questionnaire**

- The biggest single advantage is that usability questionnaires give feedback. That is feedback from the point of view of the user. If the questionnaire is reliable then you can be assured that this feedback will be from a whole user population.
- Another big advantage is that the metrics used are independent of the system. In other words you can compare a perceived usability of a website with say an electronic mailing device. This can also be applied in comparing an expert to a novice in an 'ease of use' of the website.
- One big advantage is that questionnaire are quick and easy to administer and there for can be cost effective, and of course the data can be used to demonstrate the usability targets have been met.



### 2.7.3 Disadvantages of using a SUS Questionnaire

- The questionnaire tells only of the user's reaction as the user perceives the situation. This can make this type of questionnaire can be bad for frequency occurrence or time measurements. So the questionnaire has to be based on subjective measures or performance measures.
- The questionnaire cannot tell in detail of errors but good questionnaires can get you close to the issues which can depend on the specific question.

### 2.8 Usability Heuristics for User Interface Design. (By Jakob Nielsen)[6]

*A quick summary. The ten general principles for interaction design. They are called Heuristics because they are really broad rules and not specific usability guidelines. ( These 10 principles are by Jakob Nielsen)*

#### **1. Visibility of system status**

*The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.*

#### **2. Match between system and the real world**

*The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.*

#### **3. User control and freedom**

*Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.*

#### **4. Consistency and standards**

*Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.*

#### **5. Error prevention**

*Even better than good error messages is a careful design which prevents a problem from occurring in the first place. Either eliminate error-prone conditions or check for them and present users with a confirmation option before they commit to the action.*

#### **6. Recognition rather than recall**

*Minimize the user's memory load by making objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to*

another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.

**7. Flexibility and efficiency of use**

*Accelerators -- unseen by the novice user -- may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.*

**8. Aesthetic and minimalist design**

*Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.*

**9. Help users recognize, diagnose, and recover from errors**

*Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.*

**10. Help and documentation**

*Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.*

# 3

## **3.0 Methodology for Usability Evaluation**

Usability testing is probably the best way to understand how users convey their experiences of using a website or any software application. A well designed user test can be a valuable piece of information when web designers or developers need to modify or amend major parts of their website or software. Users behave somewhat differently than anticipated by web designers regarding navigation, page visibility, content understanding and goal achievement when using a website to, for example, purchase an items or when gathering information.

Because of this, Usability has come to the forefront of the rescue. Ordinary, or expert users can now give feedback to designers from simple testing on navigation, efficiency use, and many other Usability methods.

I intent to employ several of these methods, using questionnaires, pre and post of using a website. These test will be set out as Scenarios or Tasks which are a special set of instructions assigned to user to complete under a controlled instructor environment.

## **3.1 Planning a Usability test**

Each usability test in this research paper will be referred to as a scenario, and one of the first steps in each test to the planning for the test.

This plan must be performed in stages.

1. A small document outlining each scenario of a task that will be put forward to the user to carry out.
2. A description on how this task will be organised or instructed.
3. The metrics that will be captured. (Time or goal factors)
4. A preparation of all equipment to be used
5. An appropriate environment with no distraction to carry out the task
6. An electronic or paper record of all activity, whether verbal or visual.

### 3.1.2 How many Participants should the tests involve?

According to Neilson (), an outline of users needed differ according to the type of testing.

(i) Usability tests using five users can reveal almost as many usability problems as you would find if you used many more users.

(ii) Quantitative Studies (Statistics) need at least 9 user in order to get Statistical data that has significance.

(iii) Card testing can need up to 15 users.

(iv) Eye tracking needs a minimum of 39 users if you desire stable Heat maps.

IN general, for any diagnostic Usability tests, somewhere between six and eight users of any target audience can be adequate to uncover problems of most products including web-sites.

### 3.1.3 Elements of the Test Plan(s)

#### ***The Scope:***

The Scope: The testing of the Entire learning section of a Website which involves an E-learning website that is designed to deliver content that teaches a foreign language to the users. The site uses Video and quiz type vocabulary content. The tests cover about 70% of the overall site disregarding such things as Password recovery and change password or general Information in the 'About' or 'Contact' pages.

***Purpose:*** Each test will have a specific purpose. One test might be the time taken to navigate from one Page to another in a specified time with the least amounts of clicks. Or another test might specify a particular to watch and its corresponding vocabulary. The focus will be on a specific purpose of a particular test.

#### ***Schedule and Location:***

The location and environment will be recorded including the time and place for each Usability test.

***Session:*** A detailed description of the Test Period. It's start time, End time, and approximate duration. (Usually 30 minutes). If observers are involved and any distracting source that might have affected or influenced the results. This part of the report might also include any external issue that might cause inaccurate reading: for example, a user might be a hurry to finish or who might arrive a little late as scheduled.

**Equipment:** All equipment will be indicated and in this case will be the same for all user testing.

**Scenarios:** The Scenarios are the actual tasks set out for each User tester. The Scenario's are identical for each participant and will be a description of the instructions that will be asked of the user to complete. Exact instructions will be paramount to testing results.

**Metrics:** Subjective Metrics: include the questions that will be asked prior to testing which are sometimes called background questionnaires: The Post questions will involve questions such as 'ease', 'satisfaction', and likelihood of future use of the site or recommendations.

**Quantitative metrics:** This will involve all data measurement regarding testing, i.e. successful completion rates, error rates, time on tasks.

There will be only one Instructor (*Moderator*) per user involved in the user test.

### 3.2 What are Test Metrics?

There are several different type of Metrics that have a pinnacle role in the User tests that need to be identified.

#### (I) Successful Task Completions

When a user is given a task to complete. The completion of the task to its end is a metric on it own regardless of the time taken. Time should be noted so that it can be compared to the average time it usually takes to complete a task.

(ii) **Critical errors:** a critical error can be a deviant to the actual Target of what the scenario suggests should happen. This could be as simple as an error of reporting of an incorrect completion of a goal or false data from the user.

(iii) **Non-Critical errors:** These are errors that have been encountered by the tester but somehow corrected but result in the user not being able to complete the task as efficiently or possible not at all. This can be as simple as Navigating to the wrong page in a website.

(iv) **Error free rate:** This can be measured as the rate of the test users who complete the tasks (scenarios) without any errors.

(v) **Task Time:** As it says, it's the time it takes to complete a task

(vi) **Subjective Measures:** These measurements (evaluations) are reported by the test Users the concern ease of use, ease of finding (searching) information. This can be rated by the users on a 5-7 LIKERT scale.

### **3.2.1 Best Practices:**

In order to have a controlled environment for the Usability test, a protocol of best practices will be observed.

1. All test user participants will be treated with respect and made to feel comfortable during the tests.
2. The Website is being tested and not the User and the User should be helped to understand that their assistance is of value to the Instructor and all final results
3. The instructor is neutral in the usability test and is there to listen, view and assist with the scenario instructions and should not be involved or influential in any way with the choices of the user.
4. Leading the user or helping with tests is inappropriate when dealing with the software alone. The instructor can assist in help if there is a problem with the functionality of any software breakdown of some sort. The instructor can end the scenario if there is a need to or can use discretionary advice (hints) if absolutely necessary.
5. Detailed notes of all activity should be recorded as deemed by the test.
6. All details on measurement should be recorded, i.e. success time, time, errors, etc.

### **3.3 Two Important Usability Tests.**

Usability has many testing techniques and there are two which will play a vital role in the E-learning accompanying website application. One being System usability *Scale (SUS)* and the other being '*First Click*'.

The E-learning software has code that behaves as a tracking mechanism to collect data from the user to record when a user logs-in, or goes to a certain page in the application. This data is recorded as date/Time and Page Title. This will serve as a defining test called 'First Click' and will assist on whether the visibility of navigation is working as it should. The other test is a System Usability Scale test, which starts out as questionnaire consisting of ten questions which are graded by the user according to the popularity of the question being asked. The questionnaire is part of the application and is completed when as a Post test questionnaire

#### **3.3.1 System Usability Scale (SUS)**

The SUS test provides a quick reliable way to measure Usability. It has 10 questions with a possible 5 levels of response options in a manner of Strongly Agree or

Strongly Disagree extreme. It allows for the usability of websites for variety of products and services. (Created by John Brooke in 1986)

SUS questionnaires have become industry standard, and can test user's perception of the usability of any website.

An SUS questionnaire is used in this research as one part of the task/scenarios for Usability to participants to test for Usability.

### **3.3.2 First click testing**

Navigation and clicking links play a major role in the user goal success. If a user can't get to where they want to go as efficient and effectively as possible then something needs to be improved on the website.

Research [1] has shown that the users First Click has a very high percentage success rate when reaching their goal; up to 87% chance of success on the correct first click as compared to 46% success when the first click follows the incorrect path for successive links.

### **3.4 Designing the software.**

This dissertation has a companion software website application. It was designed to be used as a Usability test and is a fully working model of a generic E-learning application. The website was constructed using Microsoft's Visual Studio 2010. The computer language is a cocktail of modern languages which include c#, Html(5), CSS, and a .Net platform using ASP.net 3.5. The whole website is deployed on a shared hosting provider with a backend database MSSQL 2008.

The user interface is public and has a security login that allows the users to be separated into roles of administration and test-users. This separation is important as a lot of the usability questionnaires and tracking are functions of the software and can be accessed through an administration login for analysis and results. The software is unique and boasts the ability to teach a foreign language using E-learning techniques through interactive and quiz style vocabulary testing. ( see figure 3)

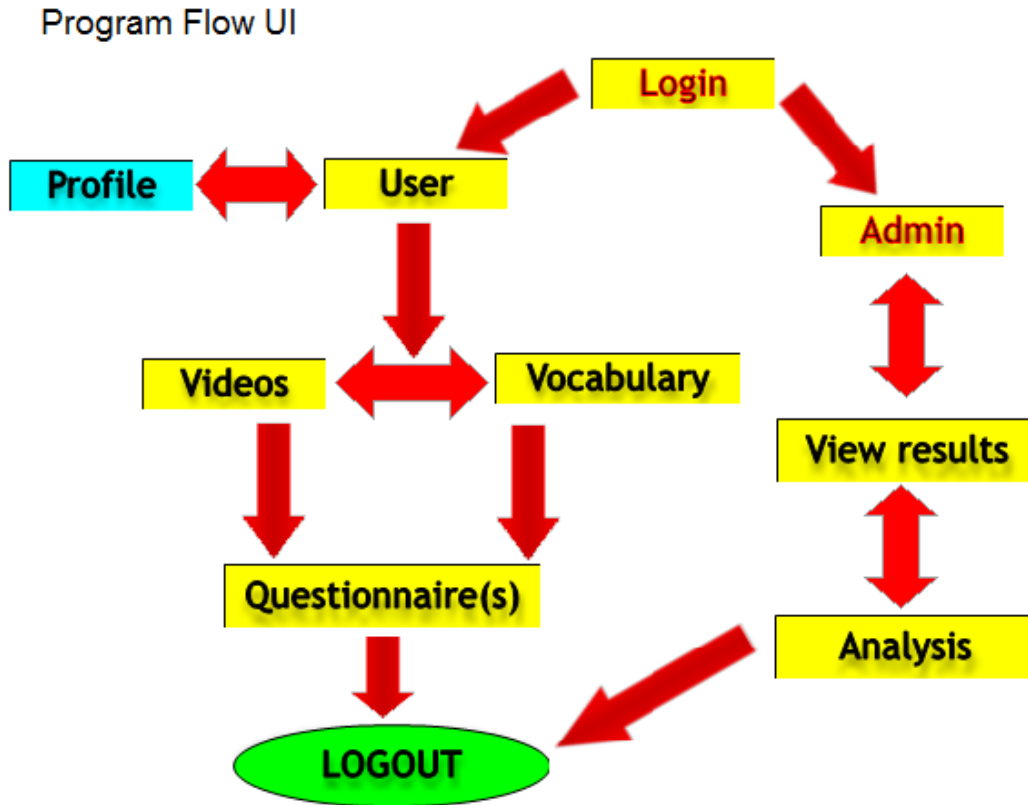


Figure 2

### 3.4.1 How the software is accessed.

The user can register a username /password combination in order to get access to the tutorials which include Videos and vocabulary quiz style learning pages. Each user has a Profile page which serves as an information gathering process for the usability testing. From the data gathered from the user the Administration can formulate a Persona that is relevant to the evaluation testing. In the case for this research paper, pre registered users have been set up in preparation for the Tasks and Scenarios for Usability testing. Each user is given a Username and a Password unique to each participant and must login before beginning the Usability tests.



List of Participants: (9 in total)

user login	No.
member1	user1
busybee	user2
sunbeam	user3
batswing	user4
honeybee	user5
windyday	user6
socksaway	user7
wickerman	user8
axelgrease	user9

Table 1

The URL of the Website to be tested is

<http://www.crimzon.eu/>

### 3.4.2 Tracking user input and Navigation.

The software captures most of the Navigation aspects of each user and stores these actions as a text type data in a MSSQL Database as a printable paper trail. The Text can be accessed by the Administrator for each user of the software at any time.

When a user logs into the system successfully, or when a user navigates to any page in the system that requires user privileges, a record is sent to the database with the Server time and page name. This record is a text based data type and can be copied and pasted to any document that has a text format ability. The 'text trail' or Text Log can also be analysed once displayed to analyse for date /Time of Navigation of task completed. Button clicks are also recorded for important click during the Usability testing.

### 3.5 Usability Tasks and Scenarios

For the Usability testing participants are requested to complete five tasks completely in a closed and relaxing environment with full access to a PC/Laptop, mouse, and quality earphones. A full explanation is given on how the tasks are to be performed and a moderator is always at hand for any problems or technical issues. The participants are at all times led to feel comfortable, relaxed and under no duress to feel pressured into any situation that they have not already prepared or informed about.

When the participant is ready the usability tasks begin.

The Participants have been given a username and a password that is unique to them only and are encouraged to ask any questions before the task begin.

As part of the Scenarios Tasks, the participants are informed that they have been awarded a free years Subscription to a French Language learning site that contain French and English language content with some Audio / Video material, all available on the site to use and browse as part of the Usability testing.

The participants are informed strictly that the testing is not about how well they can learn the French Language or how good their ability to learn a language is, but rather, they are informed that the testing is about the Usability of using the E-learning is regarding it, effectiveness, efficiency and similar factors regarding Usability and not their skill on language learning.

The participants are also informed that any personal information they give is anonymous and will not be used or shared to any other outside sources. The Information and analysis gathered from the Tasks will be used as a research which will be documented as a public Dissertation into the usability of the mentioned website for Usability purposes and nothing else.

### 3.5.1 The Usability Task Scenarios.

This is a concise list of the Usability Task scenarios that were tested by Users who willingly participated in this research.

Task	Session Time	Participants	Equipment	Metrics Used
First Click	2 min	9+Moderator	PC/Laptop	Observations
Effectiveness Test	10 min	9+Moderator	PC/Laptop	Observations
Efficiency Test	10 Min	9+Moderator	Laptop+Earphones	Observations
SUS Questionnaire	no limit	9 users	PC/Laptop	SUS metrics

Table 2

Task	Quantitive Metrics
First Click	Critical Error/Completion Rates/ease/satisfaction
Effectiveness Test	Critical Error/Completion Rates/ease/satisfaction
Efficiency Test	Critical Error/Completion Rates/ease/satisfaction
SUS Questionnaire	perception of Usability

Table 3

### Task 1: First Click

Task 1	First Click
Equipment	Laptop, Mouse, Keyboard
Participants	9 users and One Moderator
Instructions	User is asked to Update their Profile Information and then logout
Purpose	This task is designed to see if the User's first click will be to login and then continue to Click the Profile Link as a first Click
Time expected	2 Minutes
Post Questions	Ease of Use (1-5) / Satisfaction of goal Completed(1-5) 1=easy: 5=Difficult
metrics:	Critical Errors: Non-Critical Errors : Successful(binary) Completion Rate

Table 4

**Notes on Task 1:** This task assumes that the user is not logged in. It might seem obvious but a lot of websites assume that subscribed Users assume that the link to profile information can only be accessed by first logging in. This is course true, but will the users of this Task follow the mainstream assumptions with their first click that leads to the First Click link 'Profile'. This task is measuring the 'First Click' Usability task to ascertain the assumptions of a user of this website regarding security and ability to complete the task.

### Task 2: Navigation Visual Effectiveness

Task 2	Navigation Visual Effectiveness
Equipment	Laptop, Mouse, Keyboard
Participants	9 users and One Moderator
Instructions	User is asked to Choose a Video Tutorial that Most closely resembles making a Booking by Phone when In France
Purpose	This is a visual test to see if the visual content alone can can trigger correct link navigation by user
Time expected	not timed
Post Questions	Ease of Use (1-5) / Satisfaction of goal Completed(1-5) 1=easy: 5=Difficult
metrics:	Critical Errors: Non-Critical Errors : Successful(binary) Error Free Rate: Completion Rate

Table 5

**Notes on Task 2:** Some websites use great visual attributes especially when it comes to navigation. However, a site that uses too little guidance needs to be clearly outlined as a link for Navigation. This task is testing how effective the Visual Video tutorial is and if the imagery of the link is enough to suggest its content and path to a desired goal. The user is asked to choose a video based entirely on the imagery and the suitable video type that matches the users Level of French that the link portrays from a visual context. Errors can be made along the way for the user as there is no specific text link that ensures the designated goal will be achieved. Observation and post dialog play a role in gathering data on this task: the moderator does ask an 'ease of use' of the software completing the task, and a satisfaction level is also asked. But deeper questions on whether the user thinks that there should have been text information regarding the video was a hindrance or a help must also be determined in a Post question. It's important in this task that the user's Level of French indicates whether the user choose a video with English Subtitles or without English Subtitles. The analysis choices will be indicative of whether the software clearly displays textual visual content to the users also.

### Task 3: Efficiency Functional Task

Task 3	Efficiency Functional Task
Equipment	Laptop, Mouse, Keyboard + Earphoes
Participants	9 users and One Moderator
Instructions	The user is told that there are two parts to this Task. Part 1: is not tested and not timed Part2 is tested and Timed Part 2 is tested to see if the goal can be achieved and within a specific timeframe
Purpose	The purpose of this Task is to measure how long in Time it takes a user to complete a task. This test is in two parts. Part 1: The user can Browse the Video +Vocabularly content at will. Part 2: The user is tested on how the user navigates and completes a task that tests the functionality of the Vocabulary and the Video a a learning Couple medium.
Time expected	Timed from Part2 of Task
Post Questions	Ease of Use (1-5) / Satisfaction of goal Completed(1-5) 1=easy: 5=Difficult
metrics:	Critical Errors: Non-Critical Errors : Successful(binary) Error Free Rate: Completion Rate: Estimated time to Complete Time Taken to Complete.

Table 6

**Notes on Task 3:** This task is about how efficient the website is at measuring how long it takes a user to complete a task even though the user has already been given a chance to navigate the expected paths and material already at their leisure. The task is set up as a two part journey for the user. The first part involves the user being guided with instruction by the Moderator to explore the website at leisure. The user is asked to choose a specific video and watch and attempt to absorb some of the content or at least become familiar with one or two of the phrases. At all times the users is made aware that they are not being tested for their knowledge of the French language or that their ability to learn a language is being tested. The user is asked to navigate between the Video and the associated vocabulary at leisure and to use the two companion learning tools as if they were trying to learn a language. This is not timed but is capped by a suggestion of no more than 8 minutes or thereabouts. After this part of the task is complete, the user takes a break for one minute and navigated to the Home page. Dialogue is encouraged at this stage with the moderator on any issues etc.

After the minute pause, the user is given the task to find the shortest route to the vocabulary that was associated with the Video just watched. There are two possible routes, but both lead to the correct vocabulary section. The user is then asked to find the meaning of a French word and return verbally the answer in English from the Vocabulary section just navigated to. The user is also asked to return the fourth optional answer on the same vocabulary list where the correct answer was returned. The reason for this is to be sure that the user actually navigated to the correct link and not returned the result from memory or knowledge. The user is offered no assistance in the Part 2 of this task. If a successful goal is not achieved then the user is asked to go to the Home page for a Post task survey.

This task is timed based on Part 2 of the task, and the software has built in code to monitor the task for time and mouse clicks. The task also has a printable paper trail which is shown in appendix (III) of this document.

#### Task 4: System Usability Scale questionnaire

Task 4	SUS Questionnaire
Equipment	Laptop, Mouse, Keyboard
Participants	9 users
Instructions	User is asked to complete an Online Questionnaire
Purpose	This is a System Usability Scale Questionnaire. It has two purposes 1. Feedback on Usability or Percieved usability of the website 2. Test to measure likability of Online Surveys:
Time expected	not timed
Post Questions	Ease of Use (1-5) / Satisfaction of goal Completed(1-5) 1=easy: 5=Difficult
metrics:	Completion Rate

Table 7

**Notes on Task 4:** This is an online questionnaire/Survey and is a standard Usability test used to gather a perception of a website's Usability. Each answer has a value associated and a tested algorithm is applied in order to gain a single value percentage that can be calculated and later analysed to give the usability state of a Website. This task is important as it gathers important information about flaws in website but also in how usable the site was for an individual or a group of users. The results of this task will be fully explored in the analysis section of this document.

### **3.6 Reliability & Validity of data**

The reliability of the information gathering is based on the Integrity of the users who participated in the Scenario tasks. Every User was hand picked from a group of volunteers, from different background and age groups. The profiles of each participant vary from Technologist, Artist and Business persons. Every participant was informed of the value of the Usability tests to a website developer and designer and the integrity of the user's answers and input is of paramount importance to the success of the testing in order to improve or highlight aspects of the present website. All users have agreed to give honest feedback and usability information in the questionnaires and in the dialogue that accompanied the moderator during and after the testing.

#### **3.6.1 SUS as Reliable**

To define reliability for SUS, refers to how consistent users respond to the repeatability of the responses. SUS is shown to be reliable to detect subtle differences with smaller sample sizes rather than home-grown questionnaires or other commercial ones. With SUS, sample size and reliability are unrelated, so SUS can be used with small samples (as few as two users) and still generate reliable results. However small sample sizes can generate imprecise estimates of unknown user-population SUS scores.

#### **3.6.2 SUS as a valid source**

A valid result measures how well something is measured that was intended to be measured. In SUS, it's perceived Usability; in other words, SUS can distinguish between a usable and an unusable system better than most proprietary questionnaires

### **3.7 Overview of Usability Test Methodologies**

All the tasks and testing of these task are coupled with the design of the software as a fully functionally website application and as a research module. However, the website was not designed as a testing ground for Usability tests, but rather as a real E-Learning platform that delivers content to a specific audience that wishes to Learn French as a foreign language through an English language perspective.

The Usability tests are part of a standard testing for any website including the one used here. The website is however modified to track navigation and to incorporate a Usability questionnaire for the purpose of researching how both the websites

usability stands up to the rigours of real users on a real online system connected to a real-time database server.

The analysis in Chapter 4 will reveal all results derived from user tests and questionnaires that are hoped to withstand any critical analyses.



# 4

## 4.0 Analysis and Findings

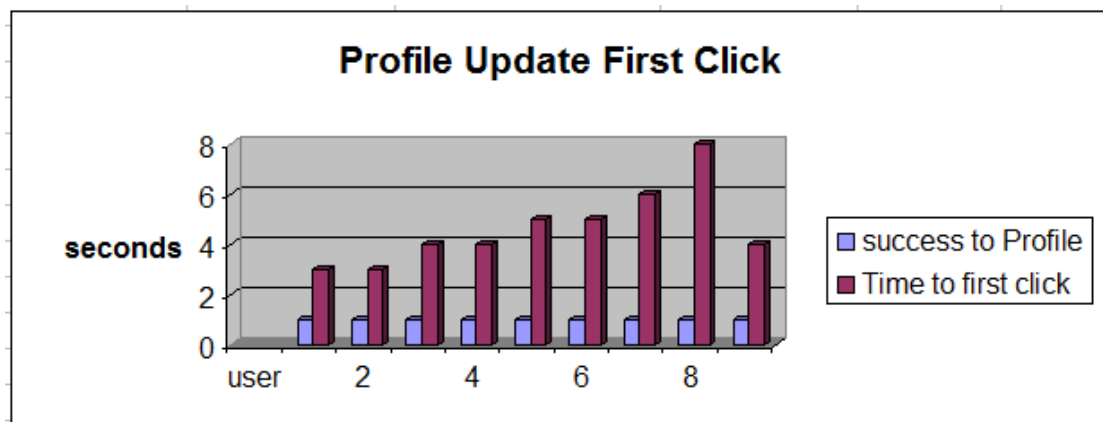
### 4.1 First Click Results

First Click test results are used to evaluate the intuitive of Links or buttons clicked within the context of the page design. The analysis of the first click can tell a designer of a website about the 'find-ability' of the website. The results are shown for 9 participants (see Graph 3)

#### Findings and analysis for first Click to update Profile:

Looking at the Chart 3 the first thing that is obvious is the success rate. Each user completed the task fully and completed the task. The success is signified by a binary 1 for success and a 0 for fail.

The other thing that is not surprising is the time it took to complete the task. Each user took a variety of time with a time difference of almost 3 seconds from the quickest to the slowest. The average time is actually 4.6 seconds which is quite high considering the link for 'Profile' is clearly displayed on the left panel of the Web site.



Graph 1 Update Profile: Success=1: Fail=0

The profile update success and its efficiency is closely related to the fact that each user did click the 'Profile Link first'. A very Basic task, would have delivered a much higher time between the users completed task had any one of the users clicked a different link first.

user	Clicked Profile First
1	Yes
2	Yes
3	Yes
4	Yes
5	Yes
6	Yes
7	Yes
8	Yes
9	Yes

Table 8

The Average time would be slightly higher and the time gap would have been considerably larger. [7] Even though these figures concur with the standard success rate of over 79% for users who click the correct Link first, it's very easily seen how easily the success rate can drop if the User were to click even one link away from the Path.

### User Profiles

Username	User	AgeGroup	Background	gender	French Level
member1	1	18-25	Technologist	M	Beginner
busybee	2	26-35	Business	M	Intermediate
sunbeam	3	26-35	Business	M	Intermediate
batswing	4	26-35	Technologist	F	Beginner
honeybee	5	36-49	Artist	M	Advanced
windyday	6	36-49	Technologist	F	Intermediate
socksaway	7	26-35	Artist	M	Intermediate
wickerman	8	over 50	Artist	F	Beginner
axelgrease	9	36-49	Business	F	Intermediate

Table 9

**Update User Profiles Ease of Use/ Satisfaction**

**\*Ease of use of in navigating to the Profile Update Interface:**

*(Metric) 1 = very difficult: 5= very easy*

From Table 10, it's clear that the updating of Profile data is very easy to use and probably need's no attention. The resulting range is between 4 and 5.

**\*Satisfaction that the Task was completed through navigation:**

*(Metric) 1=not satisfied: 5= very satisfied.*

**'First Click' user satisfaction and Ease of use Table**

user	Ease of Use 1-5	Satisfaction 1-5
1	4	5
2	4	5
3	4	5
4	4	5
5	5	4
6	5	5
7	5	5
8	5	5
9	5	5

Table 10

**Ease of use of in navigating to the Profile Update Interface:**

*1 = very difficult: 5= very easy*

From Table 10, it's clear that the updating of Profile data is very easy to use and probably need's no attention. The resulting range is between 4 and 5.

**Satisfaction that the Task was completed through navigation:**

*1=not satisfied: 5= very satisfied.*

Similarly from Table 7, there is a consistent 5 score result apart from one user.

**Conclusions from First Click Task:**

Whereas the task might seem quite simple, the navigation to update User profiles is not always obvious in Websites. From the results in the Tables, it has become apparent that the users found little difficulty in not only updating the Profile data correctly, but also, each user found the correct first link that completed the task, and all within the 2 minute estimated time frame. One intuitive latent task that accompanied this task is the fact that all users needed to be logged-in to complete

the task. This security requirement has now become so intuitive that each user automatically proceeded to login from the beginning of the task without any instruction. This awareness of security has become the **De facto** of al modern sites and is not limited to age, Profession or gender as can be seen from the variety of users Profile data in Table 9.

**Recommendations for change/modifications: none**

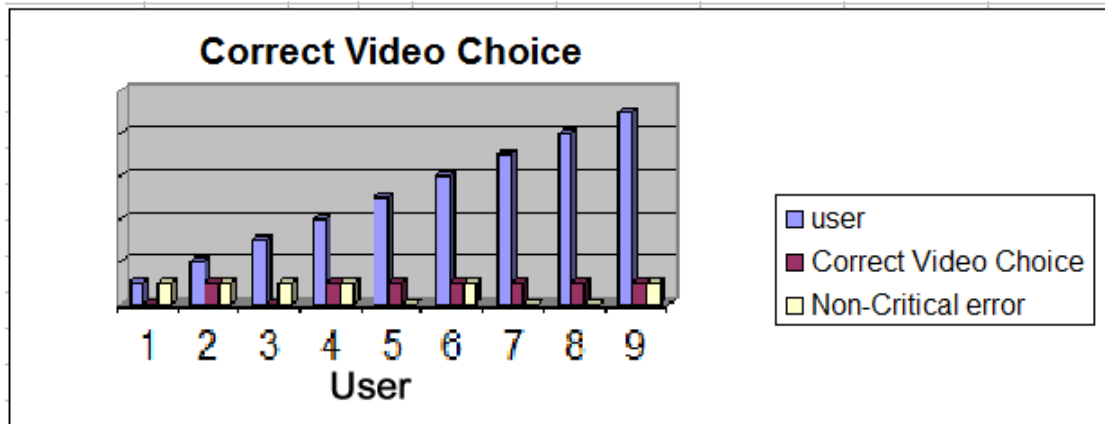
#### 4.2 Navigation Visual Effectiveness.

As the users are asked to choose a video based on information from the moderator the user needs to use Visual information in order to choose the correct video. Table 8 shows the choices made by the users. The video that needs to be chosen is Video C as in Figure 8. The reason for this is because the Video depicts a Woman using a Phone as if in conversation. However video D is also a good choice, but has a non-critical error associated with it as this video is depicted as a video with no English Subtitles. That information is in text and needs to be chosen only if the user is Fluent or near fluent in French. This task is testing Effectiveness based on the visual information on the website. This clearly a difficult task as the results show that there are 6 out of 9 possible non-critical errors and even 2 incorrect videos chosen. The difficulty of the task is laden with errors in the web design as there are no textual hint as to what the video is about. Chart 4 and Table 8 show a clear difference in opinion on which videos are visually appealing to the user when asked to choose a specific video based on Instruction.

#### Correct video Choice

user	Correct Video Choice	Non-Critical error
1	No	Yes
2	Yes	Yes
3	No	Yes
4	Yes	Yes
5	Yes	No
6	Yes	Yes
7	Yes	No
8	Yes	No
9	Yes	Yes

Table 11



Graph 2

**Correct Video Choice Task.**

**Navigation Visual Effectiveness User Satisfaction and Ease of use Table**

user	Ease of Use 1-5	Satisfaction 1-5
1	1	2
2	5	4
3	4	5
4	4	4
5	3	2
6	5	5
7	3	4
8	3	4
9	4	4

Table 12

**\*Ease of use/satisfaction of Video Choice**

*1 = very difficult: 5= very easy*

From Table 12, this task has a difficulty associated which also corresponds with the rate of the dissatisfaction by the users that they actually completed the Task correctly. Users 2, 4, 6, and 9 all picked the correct video with no critical errors and these 4 users also found it easier to less difficult too.

**\*Satisfaction that the Task was completed through navigation:**

*1=not satisfied: 5= very satisfied.*

Satisfaction was varied, from 2-5 and this corresponds with the actual users who found it easier to use or find the correct video.

**Conclusions:**

Figure 3 shows that the user can easily be confused by the video list and links displayed. The instruction by the moderator to the user was to choose a Video that would be most helpful with making a booking by telephone to a French only speaking agent. The choice of any of the video is narrowed by the image of the woman in video C and D as being a more plausible choice because of the telephone in the image. Video D choice has the extra dimension of being signified as having no English subtitles and therefore poses a non-critical error as the users are fluent in French. User 5 is

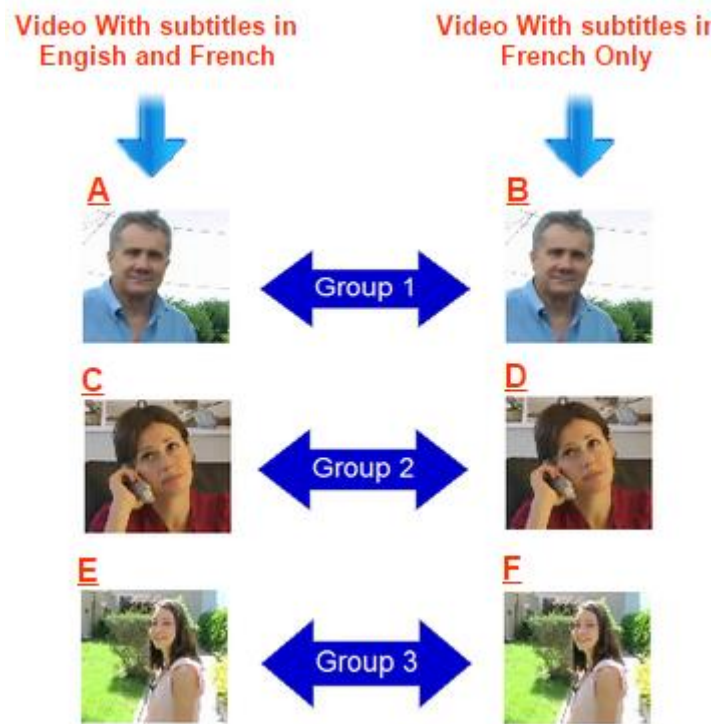


Figure 3

Advanced in French but has wisely chosen the correct video C with subtitles in English and French.

**Recommendations for change/modifications:** This task has highlighted lots of non-critical errors and illustrated the need for more information regarding the content of the video before chosen. When the video is navigated to as a link, the information is then presented, but too late for a specific choice. The user would have to re-navigate back to the video list and re-choose. So more textual headings and specific information on each of the video pairs is needed.

**4.3 Efficiency and Functional Task (Direct Path to Vocabulary)**

There are two results for this task:

**Results 1:** Navigating to the vocabulary through the shortest path (not timed)

The user was asked to find the shortest navigational clicks to get to the Vocabulary from the Home Page. The quickest route was via the Tutorials and then the

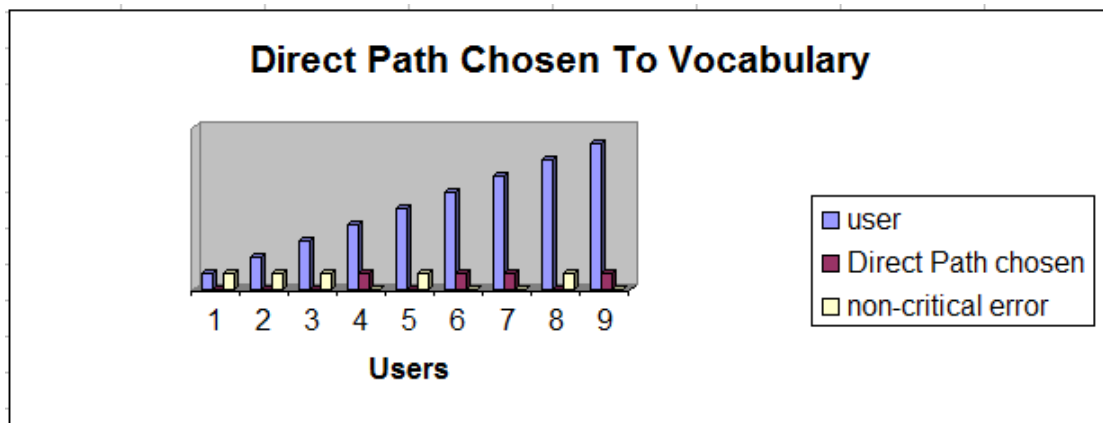
vocabulary link on the option page. Users did not associate the vocabulary in the Option page as being the same Vocabulary Link in the Video viewing page. This generated a non-critical error and took one extra click to get to the desired Vocabulary page. The users were given up to 8 minutes to familiarize themselves with the Video /Vocabulary pages prior to this task and therefore no error would have been expected.

**Direct Path Task**

user name	user	Direct Path chosen	non-critical error
member1	1	No	Yes
busybee	2	No	Yes
sunbeam	3	No	Yes
batswing	4	Yes	No
honeybee	5	No	Yes
windyday	6	Yes	No
socksaway	7	Yes	No
wickerman	8	No	Yes
axelgrease	9	Yes	No

Table 13

**Direct Path Chosen Graph**



Graph 3

**Direct Path. Ease of Use /Satisfaction on Goal**

user	Ease of Use 1-5	Satisfaction 1-5
1	2	3
2	3	3
3	3	2
4	3	2
5	3	2
6	3	3
7	3	3
8	3	4
9	4	4

Table 14

**\*Ease of use/satisfaction Direct Path to Vocabulary**

1 = very difficult: 5= very easy

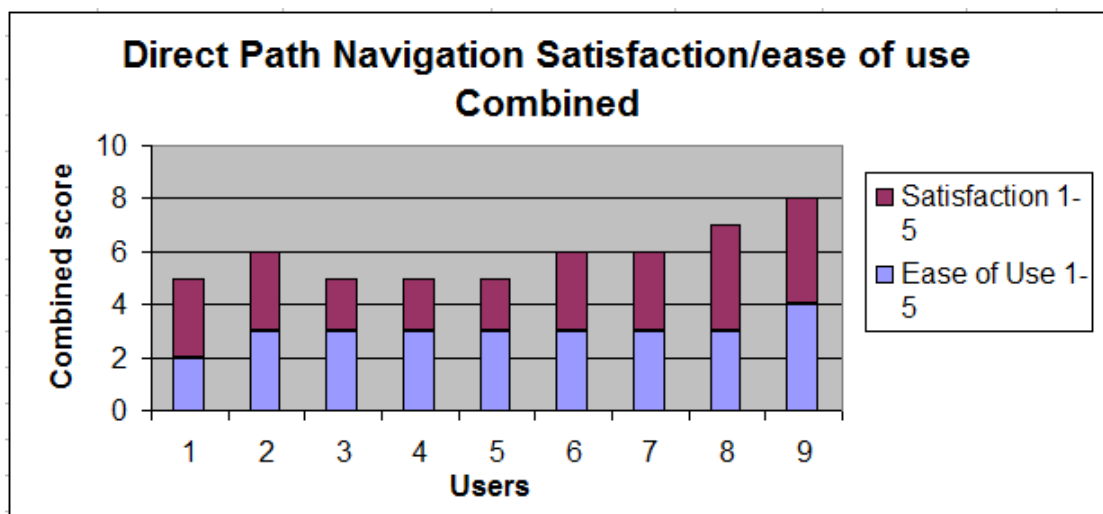
From Table 14, this task shows a lot of user difficulty associated with the task which again is directly reflected in the satisfaction level. Almost all users expressed a level 3 of ease of use, which returns a feeling of uneasiness with navigating by the shortest route.

**\*Satisfaction that the Task was completed through navigation:**

1=not satisfied: 5= very satisfied.

Satisfaction was average to low, with only two users giving a score of 4. With about half the users actually choosing the quickest path this dissatisfaction is justified.

A combined value for Ease of use and Satisfaction for Direct Path Navigation



Graph 4



*(Result1 continued)*

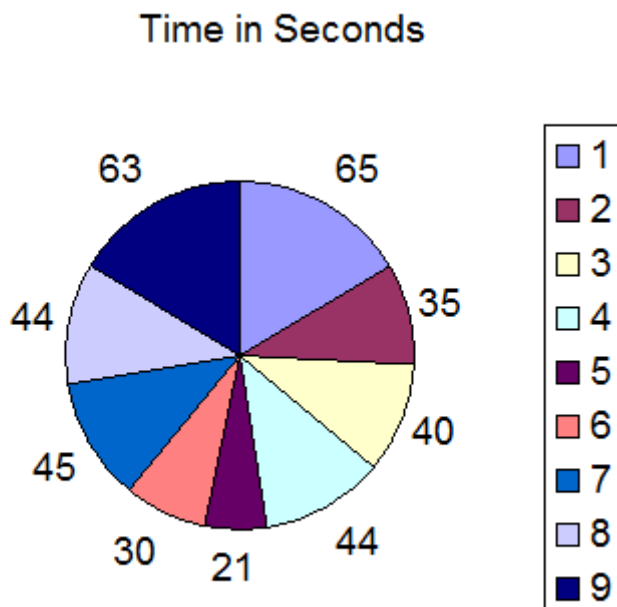
A visual analysis of Graph is shown in Graph 4. If both scores of 'Ease of Use ' and 'Satisfaction of Completion of Task' are combined or added , the result is very interesting as having a high score on both metrics, and is indicative of a positive response by users giving a Quantitative and Qualitative combination score. In this case the higher the score on the graph shows a very positive slant towards the Interface being very usable.

*(Efficiency and Functional Task continued)*

**Results 2: Timed Task to report translation displayed on the Vocabulary.**

All users completed the task successfully.

The efficiency in which the website design allowed for the completions by all users was well within the final times shown in Pie-chart 1. Each segment specifies a user who completed the task. The time allocated for the task for each user is specified in Table 15.



Pie-Chart 1

Table15 shows the comparison between the time taken to complete the task and the estimated time allocated. The chart also highlights when assistance was requested from the User to the moderator even though it was well within the estimated time to complete that task.

user name	user	Task Completed	Estimated Time	Time taken(sec)	non-crucial errors	Assistance requested
member1	1	Yes	2 minutes	65	0	Yes
busybee	2	Yes	3 minutes	35	0	Yes
sunbeam	3	Yes	4 minutes	40	0	No
batswing	4	Yes	5 minutes	44	0	Yes
honeybee	5	Yes	6 minutes	21	0	No
windyday	6	Yes	7 minutes	30	0	Yes
socksaway	7	Yes	8 minutes	45	0	Yes
wickerman	8	Yes	9 minutes	44	0	No
axelgrease	9	Yes	10 minutes	63	0	Yes

Table 15

### Report translation displayed on the Vocabulary

#### Ease of use/ Satisfaction

user	Ease of Use 1-5	Satisfaction 1-5
1	3	5
2	4	5
3	4	5
4	4	5
5	4	5
6	4	5
7	4	5
8	4	5
9	2	5

Table 16

#### \*Ease of use/satisfaction Report Translation Task

1 = very difficult: 5= very easy

From Table 16, the task shows a remarkable ease of use with a surprising score since most users asked for assistance with this task. In this case even with a good ease of use score, a question must be asked about the Interface as most users did not complete it successfully without assistance. Remarks like “Where do I click?” and “I’m not sure what to do next” can be viewed as a flaw in design feature on a web page that describes how to use it in plain Text.

#### \*Satisfaction that the Task was completed through navigation:

1=not satisfied: 5= very satisfied.

Satisfaction was high, as all users were satisfied that they achieved their goal.

## **Analysis and Conclusions for results 1 and results 2.**

**Results1:** Navigation from the home page to the Vocabulary section of a designated video was a bit of a confusion for users as most users did not associate the Vocabulary link in the Video viewing page with the Vocabulary link in the Video options Page. The cause of this might be associated with the idea that the user already knows from the beginning of the task, that they were allowed to browse between watching the video and navigating to the vocabulary. As this was a known method of getting to the vocabulary, it became the safest way to complete the task, and not necessarily the quickest or the least amounts of clicks. The point of interest is that all the users were given time to familiarise themselves with the entire site and especially the videos and the vocabulary as part of an exercise of learnability and usability. The results show that there is a lack of consistency between the web pages and need to be given a re-design concerning the position of the Vocabulary Buttons/links.

**Recommendation for results 1:** Vocabulary links need to be made part of a master page style in order to cancel out the ambiguity that task 1 entailed.

**Results2:** The task was completed by all users well within the estimated time of 2 minutes, however, this task brought up a lot of queries from the users when using the Vocabulary. Remarks like “Where do I Click?” and “I’m not sure what to do next” were indicative of an interface with critical errors. Most of the users began using the quiz style vocabulary without reading the Text instructions on the right of the quiz buttons. (See figure 4)

When asked by the moderator if they had thought of reading the instruction in text on the same screen, the reply related to the text being too long in detail.

This is not seen as a design error, but rather as a usability error regarding satisfaction as a means to achieving a goal.

**Recommendation for result 2:** Text needs to be more concise and displayed with more prominence concerning instructions. Users do not need long winded instructions or ambiguous information.

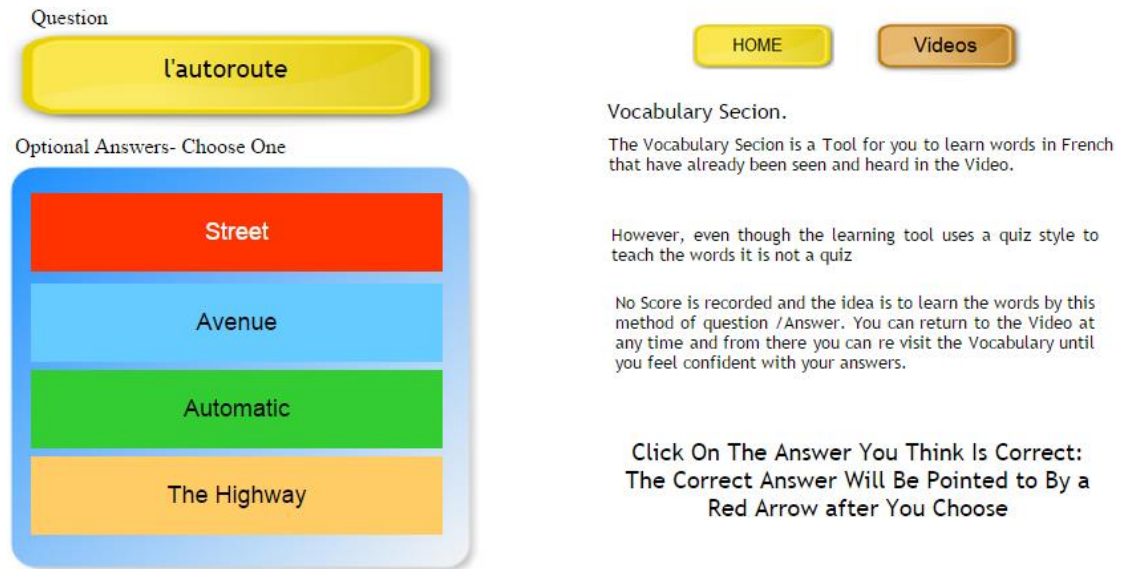


Figure 4

#### 4.4 SUS Questionnaire Test Results and analytics

SUS results for 9 users.

	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10	score
user1	3	4	4	3	5	3	3	3	2	4	50
user2	4	2	4	1	5	3	3	1	4	5	70
user3	5	1	5	1	5	2	5	1	5	1	97.5
user4	4	1	5	1	5	2	4	1	4	3	85.5
user5	4	2	4	1	5	1	5	1	3	3	82.5
user6	4	1	4	1	5	2	4	1	3	3	80
user7	3	1	5	2	4	2	4	1	3	3	75
user8	5	2	4	1	4	1	4	1	3	4	77.5
user9	4	1	5	2	5	1	4	1	4	2	87.5

Table 16

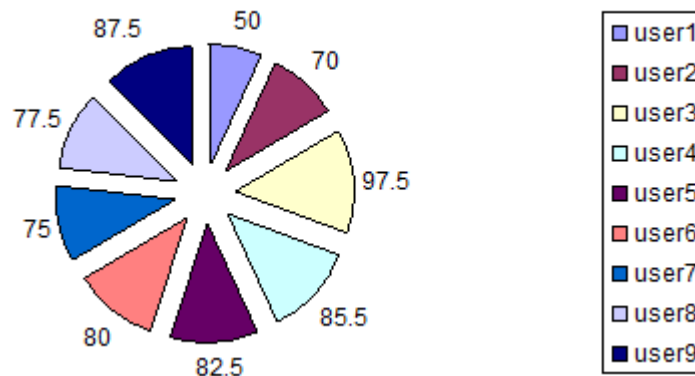
#### Analysing SUS scores.

This data shown that SUS is a reliable and valid measure of perceived usability. It performs as well or better than some commercial questionnaires and even home-grown internal questionnaires. So with 9 users what the SUS score means compared to industry standards. The SUS is not diagnostic and doesn't tell what specific

problems with the website, but what it does do is give a RED or a Green light in knowing how badly a website needs work to improve it.

Pie Chart shows that no user scored less than 50, which is a positive feedback over feedback of 9 elements.

#### SUS Score using 9 test Elements



Pie Chart 2

The guide lines for analysing the score in this study is set out as:

The Average of a SUS score is 68. (This is not a percentage) but it is a score out of 100. If the score is under 68 then there are probably some problems that need attention. Above 68 then something is going right.

#### **Overview of the metric result:**

80.3 Or Higher: This is an A. People love your site and will recommend it to friends.  
68 thereabout and the site gets a C. This is good but needs some improvements.  
51 or lower, the site gets an F. Usability is now necessary to improve your site.

So why can we sure that the SUS is completed correctly. Users value the site first and then complete the SUS questionnaire (See figure 5).



Figure 5

The SUS score is read from Table 16, and the average score is for all 9 users can be calculated:

**SUS Average Score = 78.39**

#### **Conclusion for SUS evaluation.**

Even though the Score is quite high, the first impression is that the site is on the right track, but as the recommendations are saying is that it does need improvement still. The score is still quite a bit away from being recommended to your the users friends, which has a huge trust and loyalty factor associated with Usability.

#### **4.5 Software code samples**

The software that accompanies this dissertation was developed using Microsoft's Visual Studio 2010. The software languages and scripts chosen were C#, asp.net, CSS and HTML5. The Framework is .Net 3.5 and the database is an MSSQL Server hosted on a share hosting site with the domain; <http://www.crimzon.eu>

The asp.net 3.5 technology supported by Microsoft is ideal for developing E-Learning modules as it is coupled not only with Microsoft support, but has been proven to have a robust framework that fully supports the Windows Platform.

For simplicity, I have chosen to use the 'Profile' feature of asp.net as it solves a lot of problems when storage of large amount of data for the tracking logs and Profile information that needs to be accessed for reading and writing by the users and for the website administration functions. As the functionality of the software uses the process of 'PostBack' as a means of website functionality and security.

The data for Profile information is stored on a secure server using an MSSQL Server database, while other less sensitive information is stored as dynamic arrays hard coded for speed and fast access.

The Vocabulary is stored as a small sample in arrays which are accessed by instantiating class files for use in a multi-user environment such as the Internet.

This is an example of the code used to store and access the vocabulary by a user.

(See code 1)

```

using System;
using System.Collections.Generic;
using System.Linq;
using System.Web;

/// <summary>
/// Summary description for Class1
/// </summary>
public class classone
{
    public string[,] qanda = new string[20, 7]; //set up a D String Array

    //video Frémestroff

    public string getqanda(int a, int b)
    {
        qanda[1, 1] = "1'autoroute";
        qanda[1, 2] = "Street";
        qanda[1, 3] = "Avenue";
        qanda[1, 4] = "Automatic";
        qanda[1, 5] = "The Highway";
        qanda[1, 6] = "4";

        qanda[2, 1] = "a frontière ";
        qanda[2, 2] = "The front";
        qanda[2, 3] = "Cover";
        qanda[2, 4] = "The Border";
        qanda[2, 5] = "The edge";
        qanda[2, 6] = "3";

        // ....more code.....//
        ...
        ...
        ...
        return qanda[a, b];
    }
}

```

code1

The class can be instantiated by the following lines in the partial class (see code 2)

```

using System;
using System.Collections.Generic;
using System.Linq;
using System.Web;
using System.Web.UI;
using System.Web.UI.WebControls;

public partial class voc1 : System.Web.UI.Page
{
    classone n = new classone();//instantiate the class named classone
    public int cnt = 1; //global variable cnt to page
    public int att; //global attempts variable to page
    ...
    ...
    ...
}

```

code2

The question is then assigned to q, Potential answers to variable A1 to A4 and then reassigned to the Text Box as a caption. (see code 3)

```
//get q and A's
n.getqanda(cnt, 1);
string Q = n.getqanda(cnt, 1); //retrieve the question
string A1 = n.getqanda(cnt, 2); //retrieve the first option
string A2 = n.getqanda(cnt, 3); //retrieve the second option
string A3 = n.getqanda(cnt, 4); //retrieve the third option
string A4 = n.getqanda(cnt, 5); //retrieve the fourth option

//assign q1 first
questionLBL.Text = Q;
//assign the captions to the questions
answer1BTN.Text = A1;
answer2BTN.Text = A2;
answer3BTN.Text = A3;
answer4BTN.Text = A4;

...
....
...
...
```

Code 3

The correct answer is retrieved and is stored as the last array element into the variable 'correctans'. Now the correct answer can be logically checked by which Button the user chooses and display as Correct or incorrect. (see code 4)

```
string correctans = n.getqanda(cnt, 6); //retrieve the correct answer
correctanswerLBL.Text = correctans
```

code4

A Label with the text 'CORRECT' or 'WRONG' can be easily displayed if The correct answer is matched...or not a match (see code5)

```
if (correctans == "1")
{
    correctwrongLBL.Text = "CORRECT";
}
else
{
    correctwrongLBL.Text = "WRONG";
}
//SHOW the correct/Wrong label
correctwrongLBL.Visible = true;
```

Code 5

This process is iterated through the Vocabulary session, or until the user decides to click a link to the Home page of the video Page options. The software looks after the instantiated class with house keeping and reallocates any memory to the user.



The user can revisit the vocabulary anytime and a new vocabulary class memory will be instantiated and the user continue using the class object.

The software uses security to protect all of the folders to their specific permissions allocations. For instance, all users logged in and the administration roles can access the web pages associated with this folder, but anonymous users can't. They will automatically be redirected to the login page. (see code6)

```
<?xml version="1.0" encoding="utf-8"?>
<configuration>
  <system.web>
    <authorization>
      <allow roles="admin" />
      <allow roles="user" />
      <deny users="?" />
    </authorization>
  </system.web>
</configuration>
```

Code 6

In asp.net script the Profile data can be stored and accessed using simple declarations in the web.config and accessed or assigned in the C# code. this is one of the more powerful features of the .Net framework. code 7 shows the Profile and the SUS variables (see code 7)

```
<profile>
  <properties>
    <add name="user_name"/>
    <add name="email" defaultValue="update now"/>
    <add name="AgeGroup" defaultValue="update now"/>
    <add name="Background" defaultValue="update now"/>
    <add name="Gender" defaultValue="update now"/>
    <add name="Level" defaultValue="update now"/>

    <!-- SUS answer test-->
    <add name="ans1" defaultValue="0"/>
    <add name="ans2" defaultValue="0"/>
    <add name="ans3" defaultValue="0"/>
    <add name="ans4" defaultValue="0"/>
    <add name="ans5" defaultValue="0"/>
    <add name="ans6" defaultValue="0"/>
    <add name="ans7" defaultValue="0"/>
    <add name="ans8" defaultValue="0"/>
    <add name="ans9" defaultValue="0"/>
    <add name="ans10" defaultValue="0"/>
    <!-- end of SUS answer test-->

    <add name="log" defaultValue="" />
    <add name="sustot" defaultValue="empty" />
    <add name="spare3" defaultValue="empty" />
    <add name="spare4" defaultValue="empty" />
  </properties>
</profile>
```

code 7

Database connection is very straightforward in asp.net to an SQL Server.

The local server is a connection string name and the two different strings here can be swapped if the developer needs to test the database locally by swapping both strings depending. (see code 8)

```
<connectionStrings>
  <remove name="LocalSqlServer" />
  <!--
*local Database*
<add name="LocalSqlServer" connectionString="Data
Source=.\SQLEXPRESS;AttachDbFilename=|DataDirectory|\crimson.MDF;Integrated
Security=True;User Instance=True" providerName="System.Data.SqlClient"/>

  -->

<add name="LocalSqlServer" connectionString="Data Source=184.168.194.64;Initial
Catalog=crimson;User Id=xxxxxxx;Password='xxxxxxx';"
providerName="System.Data.SqlClient" />
</connectionStrings>
```

Code 8

Code to run the Videos in HTML: This code allows videos to run in Chrome, Explorer, Firefox, Android, Samsung..and most mobile devices. (see code 9)

```
<br />
  <!-- Start of HTML5 Video -->

  <div style="position:absolute; left:0px; top:-40px;">
    <video width="650" height="450" controls>
      <source src="http://www.crimzon.eu/video/v6ENFR.mp4"
type="video/mp4"></>
      Your browser does not support HTML5 video.
    </video>
  </div>
```

Code 9

## *Conclusion.*

*Website design combined with an E-learning content conjure up many different ideas and design approaches for designers and developers. The designer has lots to worry about, with designing a User Interface taking into account features like user interaction, ease of use, and importantly, features that take into account the usability aspects of the website.*

*In the case of this research paper, the web design and the website development not only must deliver an application that delivers the content in a way that users are in a position to improve upon or learn a new language. The features that must impress upon the user is the look of the website and its navigation links together with a friendly feel from start to finish.*

*The website designer must begin to understand his audience. They must become part of the user experience and empathise to a maximum the worth and values the user should expect from using a learning website taking into account clear and direct imagery that match the ability of the website delivery as an interactive toolset in the eyes of the user.*

*The designer must also become as if a developer also, as the backend and the frontend must merge into a seamless single entity that is polished to a limit where the user can appreciate the effort of the Interface to convey its information as a process of assisting the user to retain material content in the fashion that is expected of it.*

*The designer, developer must be in a position to push all their ideas forward through the modern web technology medium of the Internet via the World Wide Web. Platform issues and web limitation must be considered especially when mobile devices and Tablet usage are now the norm.*

*The science of Usability is now at a level of importance that it will always play a major role in improving how users get the most from a website, regardless of the content of service provided. E-commerce, E-learning and information website can be designed to their ultimate productivity through this wonderful science. This Dissertation research paper makes use of quite a lot of the processes of usability that are necessary to take the functionality of an learning website and it's users to into a powerful medium of learning that stands alone and ahead of lots of other ways to students choose to learn a foreign language.*

*This research paper has endeavoured to demonstrate through the development of a specific e-learning application and the process of usability the potential and power of combining Usability principles to E-learning. The elicitation methods of extracting all latent issues with the e-learning website have brought forth a new knowledge of how users and the website application merge as a valuable learning tool.*

*The Tasks and their scenarios as completed by the participants in this dissertation have brought forward an insight to the designer developer, as information on how to improve the website to its optimum level of delivery. Without Usability as a tool a website such as this might work very well for users of the website, but it might forever contain redundant functionality that otherwise could improve the experience of the learner. How users perceive the usability and their perception of satisfaction might never be known without usability being applied. A website could have magnificent content, clever audio video and excellent information, but without the knowledge of its delivery as perceived by the user, the website is in danger of becoming a stagnant repository of data that cannot become a metamorphosis of real learning information.*

*The results from this research has proven through the interaction of real people through the science of usability that improvements are necessary and that without the task tests carried out by the participants, these issues would become a latent issue to any extensibility or future development of the website application as a leader in e-learning methodology and interactivity.*

*Through the power of usability principles being applied to the website that is coupled with this dissertation, the designer /developer of the software, can modify the application to become a more efficient, more effective, more learnable, likable application, where the user can encompass their experience to a greater level of satisfaction to achieve their goal.*

## Bibliography

### Reference Links

- [1]<http://www.nngroup.com/articles/usability-101-introduction-to-usability/>
- [2]<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.152.2901&rep=rep1&type=pdf>
- [3] <http://www.informit.com/articles/article.aspx?p=726420&seqNum=6>
- [4] [http://elearningroadtrip.typepad.com/elearning\\_roadtrip/2010/07/elearning-](http://elearningroadtrip.typepad.com/elearning_roadtrip/2010/07/elearning-)
- [5] <http://www.usability.gov/how-to-and-tools/methods/system-usability-scale.html>
- [6][http://www.useit.com/papers/heuristics/heuristics\\_list.html](http://www.useit.com/papers/heuristics/heuristics_list.html)
- [7] <http://webusability.com/firstclick-usability-testing/>

### Reading References:

1. SUS: A quick and Dirty Scale by John Brook (Document)
2. Measuring Usability with the System Usability Scale (SUS) by Jeff Sauro  
<http://www.measuringu.com/sus.php>
3. SUS. A retrospective by John Brook  
[http://uxpajournal.org/wp-content/uploads/pdf/JUS\\_Brooke\\_February\\_2013.pdf](http://uxpajournal.org/wp-content/uploads/pdf/JUS_Brooke_February_2013.pdf)
4. Determining What Individual SUS Scores Mean. Adding an Adjective Rating Scale by Kortum Bangor and Miller May  
[http://uxpajournal.org/wp-content/uploads/pdf/JUS\\_Bangor\\_May2009.pdf](http://uxpajournal.org/wp-content/uploads/pdf/JUS_Bangor_May2009.pdf)
5. Molich, R., and Nielsen, J. (1990). Improving a human-computer dialogue, *Communications of the ACM* 33, 3 (March), 338-348.
6. Nielsen, J., and Molich, R. (1990). Heuristic evaluation of user interfaces, *Proc. ACM CHI'90 Conf.* (Seattle, WA, 1-5 April), 249-256.
7. Nielsen, J. (1994a). Enhancing the explanatory power of usability heuristics. *Proc. ACM CHI'94 Conf.* (Boston, MA, April 24-28), 152-158.

## **List of Tables**

Table 1: List of Participants Usernames	page 33
Table 2: Tasks: Session Times	page 34
Table 3: Tasks: Quantitative Metrics	page 34
Table 4: Task1: First Click	page 35
Table 5: Task2: Navigation Visual Effectiveness	page 35
Table 6: Task3: Efficiency Functional Task	page 37
Table 7: Task4: System Usability Scale (SUS)	page 38
Table 8: Task 1: First Click completion	page 42
Table 9: User Profiles	page 42
Table 10: First Click: Ease of Use/ Satisfaction	page 43
Table 11: Video Choice	page 44
Table 12: Navigation/Ease of use/Satisfaction	page 45
Table 13: Direct Path /Link	page 47
Table 14: Direct Path Ease of use/Satisfaction	page 48
Table 15: Report translation Task	page 50
Table 16: SUS Results	page 50

## **List of Figures**

Figure1: Corporate Training E-Learning network	page 16
Figure 2: Program Flow	page 32
Figure 3: Video Images Links	page 46
Figure 4: Vocabulary Page	page 52
Figure 5: How SUS obtained	page 53

## **List of Graphs**

Graph 1: Profile Update First Click	page 41
Graph 2: Video Choice	page 45
Graph 3: Direct Path Chosen to Vocabulary	page 47
Graph 4: Direct Path ease of use/Satisfaction	page 48
Pie-Chart 1 Report on Translation Task	page 49
Pie-Chart 2 SUS Scores	page 52

## Appendix I

System Usability Scale (SUS) Answer 1 for Don't Agree or 5 for Strongly Agree. 2,3,4 for level of agreement

I would use this website again

Don't Agree  1  2  3  4  5 Strongly Agree

---

I found the system complex to use

Don't Agree  1  2  3  4  5 Strongly Agree

---

I thought the system was easy to use

Don't Agree  1  2  3  4  5 Strongly Agree

---

I think that I would need the support of a technical person to be able to use the Vocabulary

Don't Agree  1  2  3  4  5 Strongly Agree

---

I found the different pages easy to navigate

Don't Agree  1  2  3  4  5 Strongly Agree

---

I thought the website was inconsistent

Don't Agree  1  2  3  4  5 Strongly Agree

---

I would imagine that most people would like to use this Website

Don't Agree  1  2  3  4  5 Strongly Agree

---

I found the Website too difficult to navigate

Don't Agree  1  2  3  4  5 Strongly Agree

---

I felt very confident using the website

Don't Agree  1  2  3  4  5 Strongly Agree

---

I felt the need to ask for help with some parts of the website

Don't Agree  1  2  3  4  5 Strongly Agree

SAVE

## Appendix II

**Learning**  
e-learning Portal for Language Learning

**User Tracking results**

Username: busybee [dropdown] [Get LOG Results] [Back To Admin] [User Icon]

All User Tracking  
Action : Date : Time

```

busybee: User Logged in Success:2015.08.26 02:30:39 P.M.
Home Page viewed:2015.08.26 02:30:39 P.M.
Profile page accessed:2015.08.26 02:31:11 P.M.
Profile page accessed:2015.08.26 02:31:32 P.M.
Profile Updated:2015.08.26 02:31:32 P.M.
Profile page accessed:2015.08.26 02:31:32 P.M.
Profile Updated:2015.08.26 02:31:32 P.M.
Profile page accessed:2015.08.26 02:31:50 P.M.
User Logged in Success:2015.08.26 02:33:06 P.M.
Home Page viewed:2015.08.26 02:33:06 P.M.
Video Options Page accessed:2015.08.26 02:33:32 P.M.
Video D Accessed:2015.08.26 02:33:44 P.M.
Voc2 Accessed:2015.08.26 02:34:57 P.M.
Video Options Page accessed:2015.08.26 02:35:00 P.M.
Video D Accessed:2015.08.26 02:35:02 P.M.
Home Page viewed:2015.08.26 02:36:41 P.M.
    
```

[Delete User Logs]

Use with Caution...Cannot be Undone

Screenshot 1: Admin Page: Get User Activity Logs

**E-Learning**  
e-learning Portal for Language Learning

**User SUS test Results**

Username: wickerman [dropdown] [Get Profile SUS Results] [Back To Admin] [User Icon]

Question	Score
Question 1.....	5
Question 2.....	2
Question 3.....	4
Question 4.....	1
Question 5.....	4
Question 6.....	1
Question 7.....	4
Question 8.....	1
Question 9.....	3
Question 10.....	4

SUS Analysed Results

System Usability Scale

SUS Result... 77.5

Screenshot 2: Admin Page: Get User SUS score



The screenshot shows the Crimzon E-Learning website interface. At the top, the header reads "Crimzon E-Learning" and "e-learning Portal for Language Learning". Below the header, the date "Monday, August 31" is displayed. The left sidebar contains three sections: "MEMBERSHIP" with links for "Questionnaire (SUS)", "Change My Password", "My Profile", "Tutorials", and "Logout"; "CONTENT" with links for "Home Page", "About", and "Contact"; and "ADMIN" with a link for "Administration". The main content area is titled "User Profile Information" and features a "Get Profile Data" button and a dropdown menu showing the username "batswing". Below this, the user's profile details are listed: Age Group (26-35), Gender (F), BackGround Occupation (Technologist), and French Competence (Beginner).

**Crimzon E-Learning**  
e-learning Portal for Language Learning

Monday, August 31

**MEMBERSHIP**

- [Questionnaire \(SUS\)](#)
- [Change My Password](#)
- [My Profile](#)
- [Tutorials](#)
- [Logout](#)

**CONTENT**

- [Home Page](#)
- [About](#)
- [Contact](#)

**ADMIN**

- [Administration](#)

**User Profile Information**

Get Profile Data Username

batswing

Age Group 26-35

Gender F

BackGround Occupation Technologist

French Competence Beginner

Screenshot 3: Admin Page: User Profile Information

## Appendix III

### LOG DATA FOR EACH USER

User name: member1

member1: User Logged in Success:2015.08.25 09:22:09 A.M.

Home Page viewed:2015.08.25 09:22:09 A.M.

Profile page accessed:2015.08.25 09:22:33 A.M.

Profile page accessed:2015.08.25 09:22:55 A.M.

Profile Updated2015.08.25 09:22:55 A.M.

Profile page accessed:2015.08.25 09:23:10 A.M.

User Logged in Success:2015.08.25 09:27:02 A.M.

Home Page viewed:2015.08.25 09:27:02 A.M.

Video Options Page accessed:2015.08.25 09:27:08 A.M.

Video A Accessed:2015.08.25 09:27:53 A.M.

Home Page viewed:2015.08.25 09:28:28 A.M.

Home Page viewed:2015.08.25 09:28:30 A.M.

User Logged in Success:2015.08.25 09:30:57 A.M.

Home Page viewed:2015.08.25 09:30:57 A.M.

Video Options Page accessed:2015.08.25 09:31:07 A.M.

Video A Accessed:2015.08.25 09:31:30 A.M.

Video Options Page accessed:2015.08.25 09:31:45 A.M.

User Logged in Success:2015.08.25 09:34:50 A.M.

Home Page viewed:2015.08.25 09:34:50 A.M.

Video Options Page accessed:2015.08.25 09:34:52 A.M.

Voc1 accessed:2015.08.25 09:34:59 A.M.

Video A Accessed:2015.08.25 09:35:02 A.M.

Video C Accessed:2015.08.25 09:36:26 A.M.

Video E Accessed:2015.08.25 09:37:01 A.M.

Video C Accessed:2015.08.25 09:37:13 A.M.

Voc2 Accessed:2015.08.25 09:37:28 A.M.

Next Question Clicked Voc2:2015.08.25 09:37:36 A.M.

Next Question Clicked Voc2:2015.08.25 09:37:42 A.M.

Next Question Clicked Voc2:2015.08.25 09:37:44 A.M.  
Home Page viewed: 2015.08.25 09:37:49 A.M.  
Video Options Page accessed: 2015.08.25 09:38:40 A.M.  
Video A Accessed: 2015.08.25 09:38:53 A.M.  
Voc1 accessed: 2015.08.25 09:39:27 A.M.  
Video C Accessed: 2015.08.25 09:39:41 A.M.  
Voc2 Accessed: 2015.08.25 09:39:44 A.M.  
Video E Accessed: 2015.08.25 09:39:50 A.M.  
Voc3 Accessed: 2015.08.25 09:39:53 A.M.  
Voc3 Accessed: 2015.08.25 09:40:23 A.M.  
Next Question Clicked Voc3:2015.08.25 09:41:07 A.M.  
Home Page viewed: 2015.08.25 09:41:25 A.M.  
Video Options Page accessed: 2015.08.25 09:41:27 A.M.  
Video A Accessed: 2015.08.25 09:41:30 A.M.  
Voc1 accessed: 2015.08.25 09:41:41 A.M.  
Next Question Clicked Voc1:2015.08.25 09:41:55 A.M.  
Next Question Clicked Voc1:2015.08.25 09:42:02 A.M.  
Next Question Clicked Voc1:2015.08.25 09:42:12 A.M.  
Next Question Clicked Voc1:2015.08.25 09:42:24 A.M.  
Next Question Clicked Voc1:2015.08.25 09:42:28 A.M.  
Next Question Clicked Voc1:2015.08.25 09:42:33 A.M.  
Home Page viewed: 2015.08.25 09:42:36 A.M.  
Video Options Page accessed: 2015.08.25 09:42:39 A.M.  
Video C Accessed: 2015.08.25 09:42:40 A.M.  
Voc2 Accessed: 2015.08.25 09:42:42 A.M.  
Next Question Clicked Voc2:2015.08.25 09:42:51 A.M.  
Next Question Clicked Voc2:2015.08.25 09:42:56 A.M.  
Next Question Clicked Voc2:2015.08.25 09:43:02 A.M.  
Home Page viewed: 2015.08.25 09:44:00 A.M.  
Home Page viewed: 2015.08.25 09:44:04 A.M.  
User Logged in Success: 2015.08.25 09:46:21 A.M.  
Home Page viewed: 2015.08.25 09:46:22 A.M.  
Questionnaire 1(SUS) Page accessed: 2015.08.25 09:46:29 A.M.  
Questionnaire 1(SUS) Page accessed: 2015.08.25 09:47:42 A.M.  
A Questionnaire Completed: 2015.08.25 09:47:42 A.M.

Home Page viewed: 2015.08.25 09:47:47 A.M.

Home Page viewed: 2015.08.25 09:51:04 A.M.

---

User name: busybee

busybee: User Logged in Success: 2015.08.26 02:30:39 P.M.

Home Page viewed: 2015.08.26 02:30:39 P.M.

Profile page accessed: 2015.08.26 02:31:11 P.M.

Profile page accessed: 2015.08.26 02:31:32 P.M.

Profile Updated2015.08.26 02:31:32 P.M.

Profile page accessed: 2015.08.26 02:31:32 P.M.

Profile Updated2015.08.26 02:31:32 P.M.

Profile page accessed: 2015.08.26 02:31:50 P.M.

User Logged in Success: 2015.08.26 02:33:06 P.M.

Home Page viewed: 2015.08.26 02:33:06 P.M.

Video Options Page accessed: 2015.08.26 02:33:32 P.M.

Video D Accessed: 2015.08.26 02:33:44 P.M.

Voc2 Accessed: 2015.08.26 02:34:57 P.M.

Video Options Page accessed: 2015.08.26 02:35:00 P.M.

Video D Accessed: 2015.08.26 02:35:02 P.M.

Home Page viewed: 2015.08.26 02:36:41 P.M.

Home Page viewed: 2015.08.26 02:36:55 P.M.

User Logged in Success: 2015.08.26 02:40:34 P.M.

Home Page viewed: 2015.08.26 02:40:34 P.M.

Video Options Page accessed: 2015.08.26 02:40:38 P.M.

Video E Accessed: 2015.08.26 02:40:44 P.M.

Video E Accessed: 2015.08.26 02:40:44 P.M.

Voc3 Accessed: 2015.08.26 02:42:23 P.M.

Next Question Clicked Voc3:2015.08.26 02:42:35 P.M.

Next Question Clicked Voc3:2015.08.26 02:42:40 P.M.

Next Question Clicked Voc3:2015.08.26 02:42:44 P.M.

Next Question Clicked Voc3:2015.08.26 02:42:48 P.M.

Next Question Clicked Voc3:2015.08.26 02:42:53 P.M.  
Next Question Clicked Voc3:2015.08.26 02:42:55 P.M.  
Next Question Clicked Voc3:2015.08.26 02:43:05 P.M.  
Next Question Clicked Voc3:2015.08.26 02:43:08 P.M.  
Next Question Clicked Voc3:2015.08.26 02:43:14 P.M.  
Video Options Page accessed: 2015.08.26 02:43:16 P.M.  
Video E Accessed: 2015.08.26 02:43:19 P.M.  
Voc3 Accessed: 2015.08.26 02:45:05 P.M.  
Next Question Clicked Voc3:2015.08.26 02:45:11 P.M.  
Next Question Clicked Voc3:2015.08.26 02:45:14 P.M.  
Next Question Clicked Voc3:2015.08.26 02:45:16 P.M.  
Next Question Clicked Voc3:2015.08.26 02:45:19 P.M.  
Next Question Clicked Voc3:2015.08.26 02:45:27 P.M.  
Home Page viewed: 2015.08.26 02:45:47 P.M.  
Video Options Page accessed: 2015.08.26 02:45:50 P.M.  
Voc3 Accessed: 2015.08.26 02:45:52 P.M.  
Next Question Clicked Voc3:2015.08.26 02:46:02 P.M.  
Home Page viewed: 2015.08.26 02:46:47 P.M.  
Home Page viewed: 2015.08.26 02:46:50 P.M.  
User Logged in Success: 2015.08.26 02:48:14 P.M.  
Home Page viewed: 2015.08.26 02:48:14 P.M.  
Questionnaire 1(SUS) Page accessed: 2015.08.26 02:48:17 P.M.  
Questionnaire 1(SUS) Page accessed: 2015.08.26 02:50:07 P.M.  
A Questionnaire Completed: 2015.08.26 02:50:07 P.M.  
Home Page viewed: 2015.08.26 02:50:09 P.M.  
Login Page Accessed: 2015.08.26 02:50:12 P.M.  
Login Page Accessed: 2015.08.26 02:50:18 P.M.

---

User name: sunbeam

User Logged in Success: 2015.08.26 09:45:49 A.M.  
Home Page viewed: 2015.08.26 09:45:49 A.M.  
Profile page accessed: 2015.08.26 09:45:53 A.M.  
Profile page accessed: 2015.08.26 09:45:55 A.M.  
User Logged in Success: 2015.08.26 02:55:00 P.M.  
Home Page viewed: 2015.08.26 02:55:00 P.M.  
Profile page accessed: 2015.08.26 02:55:19 P.M.  
Profile page accessed: 2015.08.26 02:55:32 P.M.  
Profile Updated2015.08.26 02:55:32 P.M.  
Profile page accessed: 2015.08.26 02:56:16 P.M.  
User Logged in Success: 2015.08.26 02:57:40 P.M.  
Home Page viewed: 2015.08.26 02:57:40 P.M.  
Video Options Page accessed: 2015.08.26 02:58:27 P.M.  
Video C Accessed: 2015.08.26 02:58:47 P.M.  
Home Page viewed: 2015.08.26 03:00:06 P.M.  
Video Options Page accessed: 2015.08.26 03:01:54 P.M.  
Video A Accessed: 2015.08.26 03:02:01 P.M.  
Voc1 accessed: 2015.08.26 03:03:30 P.M.  
Next Question Clicked Voc1:2015.08.26 03:03:36 P.M.  
Next Question Clicked Voc1:2015.08.26 03:03:50 P.M.  
Next Question Clicked Voc1:2015.08.26 03:03:57 P.M.  
Next Question Clicked Voc1:2015.08.26 03:04:02 P.M.  
Video Options Page accessed: 2015.08.26 03:04:06 P.M.  
Video A Accessed: 2015.08.26 03:04:12 P.M.  
Voc1 accessed: 2015.08.26 03:05:09 P.M.  
Next Question Clicked Voc1:2015.08.26 03:05:15 P.M.  
Next Question Clicked Voc1:2015.08.26 03:05:20 P.M.  
Next Question Clicked Voc1:2015.08.26 03:05:24 P.M.  
Next Question Clicked Voc1:2015.08.26 03:05:27 P.M.  
Next Question Clicked Voc1:2015.08.26 03:05:33 P.M.  
Next Question Clicked Voc1:2015.08.26 03:05:39 P.M.  
Home Page viewed: 2015.08.26 03:05:50 P.M.  
Video Options Page accessed: 2015.08.26 03:06:02 P.M.

Video A Accessed: 2015.08.26 03:06:05 P.M.  
Voc1 accessed: 2015.08.26 03:06:11 P.M.  
Next Question Clicked Voc1:2015.08.26 03:06:15 P.M.  
Next Question Clicked Voc1:2015.08.26 03:06:19 P.M.  
Home Page viewed: 2015.08.26 03:06:22 P.M.  
Home Page viewed: 2015.08.26 03:06:24 P.M.  
User Logged in Success: 2015.08.26 03:06:51 P.M.  
Home Page viewed: 2015.08.26 03:06:51 P.M.  
Questionnaire 1(SUS) Page accessed: 2015.08.26 03:06:56 P.M.  
Questionnaire 1(SUS) Page accessed: 2015.08.26 03:07:35 P.M.  
A Questionnaire Completed: 2015.08.26 03:07:35 P.M.  
Home Page viewed: 2015.08.26 03:07:37 P.M.  
Login Page Accessed: 2015.08.26 03:07:39 P.M.  
Login Page Accessed: 2015.08.26 03:07:46 P.M.

---

User name: batswing

User Logged in Success: 2015.08.26 03:17:45 P.M.  
Home Page viewed: 2015.08.26 03:17:45 P.M.  
Profile page accessed: 2015.08.26 03:18:06 P.M.  
Profile page accessed: 2015.08.26 03:18:18 P.M.  
Profile Updated2015.08.26 03:18:18 P.M.  
Profile page accessed: 2015.08.26 03:18:28 P.M.  
User Logged in Success: 2015.08.26 03:19:41 P.M.  
Home Page viewed: 2015.08.26 03:19:42 P.M.  
Video Options Page accessed: 2015.08.26 03:20:03 P.M.  
Video D Accessed: 2015.08.26 03:20:19 P.M.  
Home Page viewed: 2015.08.26 03:21:15 P.M.  
Video Options Page accessed: 2015.08.26 03:23:42 P.M.  
Video F Accessed: 2015.08.26 03:23:49 P.M.  
Voc3 Accessed: 2015.08.26 03:27:15 P.M.  
Next Question Clicked Voc3:2015.08.26 03:27:23 P.M.  
Next Question Clicked Voc3:2015.08.26 03:27:27 P.M.

Next Question Clicked Voc3:2015.08.26 03:27:30 P.M.  
Next Question Clicked Voc3:2015.08.26 03:27:33 P.M.  
Next Question Clicked Voc3:2015.08.26 03:27:36 P.M.  
Next Question Clicked Voc3:2015.08.26 03:27:38 P.M.  
Next Question Clicked Voc3:2015.08.26 03:27:42 P.M.  
Next Question Clicked Voc3:2015.08.26 03:27:46 P.M.  
Next Question Clicked Voc3:2015.08.26 03:27:52 P.M.  
Next Question Clicked Voc3:2015.08.26 03:27:55 P.M.  
Next Question Clicked Voc3:2015.08.26 03:27:57 P.M.  
Next Question Clicked Voc3:2015.08.26 03:27:59 P.M.  
Home Page viewed: 2015.08.26 03:28:03 P.M.  
Video Options Page accessed: 2015.08.26 03:28:21 P.M.  
Voc3 Accessed: 2015.08.26 03:28:23 P.M.  
Next Question Clicked Voc3:2015.08.26 03:28:28 P.M.  
Next Question Clicked Voc3:2015.08.26 03:28:30 P.M.  
Next Question Clicked Voc3:2015.08.26 03:28:32 P.M.  
Next Question Clicked Voc3:2015.08.26 03:28:34 P.M.  
Home Page viewed: 2015.08.26 03:29:27 P.M.  
Questionnaire 1(SUS) Page accessed: 2015.08.26 03:29:33 P.M.  
Questionnaire 1(SUS) Page accessed: 2015.08.26 03:30:41 P.M.  
A Questionnaire Completed: 2015.08.26 03:30:41 P.M.  
Home Page viewed: 2015.08.26 03:30:43 P.M.  
Home Page viewed: 2015.08.26 03:30:47 P.M.

---

User name: honeybee

User Logged in Success: 2015.08.26 03:38:41 P.M.  
Home Page viewed: 2015.08.26 03:38:42 P.M.  
Profile page accessed: 2015.08.26 03:39:03 P.M.  
Profile page accessed: 2015.08.26 03:39:34 P.M.  
Profile Updated2015.08.26 03:39:34 P.M.  
Profile page accessed: 2015.08.26 03:39:40 P.M.  
User Logged in Success: 2015.08.26 03:40:31 P.M.  
Home Page viewed: 2015.08.26 03:40:32 P.M.  
Video Options Page accessed: 2015.08.26 03:41:34 P.M.



Video C Accessed: 2015.08.26 03:41:50 P.M.  
Home Page viewed: 2015.08.26 03:42:55 P.M.  
Video Options Page accessed: 2015.08.26 03:44:49 P.M.  
Video A Accessed: 2015.08.26 03:45:01 P.M.  
Voc1 accessed: 2015.08.26 03:46:59 P.M.  
Next Question Clicked Voc1:2015.08.26 03:47:05 P.M.  
Next Question Clicked Voc1:2015.08.26 03:47:12 P.M.  
Next Question Clicked Voc1:2015.08.26 03:47:16 P.M.  
Next Question Clicked Voc1:2015.08.26 03:47:20 P.M.  
Next Question Clicked Voc1:2015.08.26 03:47:33 P.M.  
Next Question Clicked Voc1:2015.08.26 03:47:38 P.M.  
Next Question Clicked Voc1:2015.08.26 03:47:41 P.M.  
Next Question Clicked Voc1:2015.08.26 03:47:46 P.M.  
Next Question Clicked Voc1:2015.08.26 03:47:50 P.M.  
Home Page viewed: 2015.08.26 03:48:05 P.M.  
Video Options Page accessed: 2015.08.26 03:48:17 P.M.  
Video A Accessed: 2015.08.26 03:48:25 P.M.  
Voc1 accessed: 2015.08.26 03:48:28 P.M.  
Next Question Clicked Voc1:2015.08.26 03:48:32 P.M.  
Next Question Clicked Voc1:2015.08.26 03:48:34 P.M.  
Next Question Clicked Voc1:2015.08.26 03:48:36 P.M.  
Next Question Clicked Voc1:2015.08.26 03:48:37 P.M.  
Next Question Clicked Voc1:2015.08.26 03:48:39 P.M.  
Next Question Clicked Voc1:2015.08.26 03:48:41 P.M.  
Home Page viewed: 2015.08.26 03:48:43 P.M.  
Questionnaire 1(SUS) Page accessed: 2015.08.26 03:48:47 P.M.  
Questionnaire 1(SUS) Page accessed: 2015.08.26 03:50:07 P.M.  
A Questionnaire Completed: 2015.08.26 03:50:08 P.M.  
Home Page viewed: 2015.08.26 03:50:09 P.M.  
Login Page Accessed: 2015.08.26 03:50:12 P.M.  
Login Page Accessed: 2015.08.26 03:50:19 P.M.

---

User name: windyday

User Logged in Success: 2015.08.27 12:27:13 A.M.  
Home Page viewed: 2015.08.27 12:27:13 A.M.  
Profile page accessed: 2015.08.27 12:27:41 A.M.  
Profile page accessed: 2015.08.27 12:27:55 A.M.  
Profile Updated: 2015.08.27 12:27:55 A.M.  
Profile page accessed: 2015.08.27 12:28:02 A.M.  
User Logged in Success: 2015.08.27 12:29:05 A.M.  
Home Page viewed: 2015.08.27 12:29:05 A.M.  
Questionnaire 1(SUS) Page accessed: 2015.08.27 12:29:25 A.M.  
Contact Page Accessed: 2015.08.27 12:29:30 A.M.  
About Page Accessed: 2015.08.27 12:29:32 A.M.  
Home Page viewed: 2015.08.27 12:29:35 A.M.  
Video Options Page accessed: 2015.08.27 12:29:40 A.M.  
Video D Accessed: 2015.08.27 12:29:47 A.M.  
Home Page viewed: 2015.08.27 12:30:37 A.M.  
Video Options Page accessed: 2015.08.27 12:31:58 A.M.  
Video E Accessed: 2015.08.27 12:32:02 A.M.  
Voc3 Accessed: 2015.08.27 12:33:34 A.M.  
Next Question Clicked Voc3: 2015.08.27 12:33:52 A.M.  
Next Question Clicked Voc3: 2015.08.27 12:33:56 A.M.  
Next Question Clicked Voc3: 2015.08.27 12:34:00 A.M.  
Next Question Clicked Voc3: 2015.08.27 12:34:07 A.M.  
Next Question Clicked Voc3: 2015.08.27 12:34:12 A.M.  
Next Question Clicked Voc3: 2015.08.27 12:34:16 A.M.  
Next Question Clicked Voc3: 2015.08.27 12:34:19 A.M.  
Next Question Clicked Voc3: 2015.08.27 12:34:22 A.M.  
Video Options Page accessed: 2015.08.27 12:34:25 A.M.  
Video E Accessed: 2015.08.27 12:34:27 A.M.  
Home Page viewed: 2015.08.27 12:35:22 A.M.  
Video Options Page accessed: 2015.08.27 12:35:35 A.M.  
Voc3 Accessed: 2015.08.27 12:35:37 A.M.  
Next Question Clicked Voc3: 2015.08.27 12:35:55 A.M.  
Next Question Clicked Voc3: 2015.08.27 12:35:57 A.M.

Next Question Clicked Voc3:2015.08.27 12:35:58 A.M.  
Next Question Clicked Voc3:2015.08.27 12:36:00 A.M.  
Next Question Clicked Voc3:2015.08.27 12:36:16 A.M.  
Home Page viewed: 2015.08.27 12:37:06 A.M.  
Questionnaire 1(SUS) Page accessed: 2015.08.27 12:37:07 A.M.  
Questionnaire 1(SUS) Page accessed: 2015.08.27 12:37:57 A.M.  
A Questionnaire Completed: 2015.08.27 12:37:57 A.M.  
Home Page viewed: 2015.08.27 12:37:59 A.M.  
Home Page viewed: 2015.08.27 12:38:02 A.M.

---

User name: socksaway

User Logged in Success: 2015.08.26 05:19:34 P.M.  
Home Page viewed: 2015.08.26 05:19:34 P.M.  
Profile page accessed: 2015.08.26 05:19:43 P.M.  
Profile page accessed: 2015.08.26 05:19:58 P.M.  
Profile Updated2015.08.26 05:19:58 P.M.  
About Page Accessed: 2015.08.26 05:20:06 P.M.  
Contact Page Accessed: 2015.08.26 05:20:12 P.M.  
Contact Page Accessed: 2015.08.26 05:20:22 P.M.  
User Logged in Success: 2015.08.26 05:21:34 P.M.  
Home Page viewed: 2015.08.26 05:21:34 P.M.  
Home Page viewed: 2015.08.26 05:21:51 P.M.  
About Page Accessed: 2015.08.26 05:21:52 P.M.  
Contact Page Accessed: 2015.08.26 05:21:54 P.M.  
Video Options Page accessed: 2015.08.26 05:21:56 P.M.  
Video C Accessed: 2015.08.26 05:22:03 P.M.  
Home Page viewed: 2015.08.26 05:22:49 P.M.  
Video Options Page accessed: 2015.08.26 05:24:09 P.M.  
Video E Accessed: 2015.08.26 05:24:18 P.M.  
Voc3 Accessed: 2015.08.26 05:25:56 P.M.  
Next Question Clicked Voc3:2015.08.26 05:26:02 P.M.  
Next Question Clicked Voc3:2015.08.26 05:26:05 P.M.  
Next Question Clicked Voc3:2015.08.26 05:26:35 P.M.

Next Question Clicked Voc3:2015.08.26 05:26:41 P.M.  
Video Options Page accessed: 2015.08.26 05:26:43 P.M.  
Video E Accessed: 2015.08.26 05:26:45 P.M.  
Voc3 Accessed: 2015.08.26 05:28:48 P.M.  
Next Question Clicked Voc3:2015.08.26 05:28:53 P.M.  
Next Question Clicked Voc3:2015.08.26 05:28:57 P.M.  
Next Question Clicked Voc3:2015.08.26 05:28:59 P.M.  
Next Question Clicked Voc3:2015.08.26 05:29:01 P.M.  
Next Question Clicked Voc3:2015.08.26 05:29:04 P.M.  
Next Question Clicked Voc3:2015.08.26 05:29:07 P.M.  
Next Question Clicked Voc3:2015.08.26 05:29:09 P.M.  
Next Question Clicked Voc3:2015.08.26 05:29:12 P.M.  
Next Question Clicked Voc3:2015.08.26 05:29:14 P.M.  
Next Question Clicked Voc3:2015.08.26 05:29:17 P.M.  
Next Question Clicked Voc3:2015.08.26 05:29:19 P.M.  
Next Question Clicked Voc3:2015.08.26 05:29:22 P.M.  
Next Question Clicked Voc3:2015.08.26 05:29:26 P.M.  
Next Question Clicked Voc3:2015.08.26 05:29:27 P.M.  
Next Question Clicked Voc3:2015.08.26 05:29:30 P.M.  
Next Question Clicked Voc3:2015.08.26 05:29:36 P.M.  
Next Question Clicked Voc3:2015.08.26 05:29:39 P.M.  
Next Question Clicked Voc3:2015.08.26 05:29:41 P.M.  
Next Question Clicked Voc3:2015.08.26 05:29:51 P.M.  
Next Question Clicked Voc3:2015.08.26 05:29:56 P.M.  
Next Question Clicked Voc3:2015.08.26 05:29:59 P.M.  
Next Question Clicked Voc3:2015.08.26 05:30:02 P.M.  
Next Question Clicked Voc3:2015.08.26 05:30:06 P.M.  
Next Question Clicked Voc3:2015.08.26 05:30:13 P.M.  
Next Question Clicked Voc3:2015.08.26 05:30:15 P.M.  
Next Question Clicked Voc3:2015.08.26 05:30:18 P.M.  
Next Question Clicked Voc3:2015.08.26 05:30:20 P.M.  
Next Question Clicked Voc3:2015.08.26 05:30:23 P.M.  
Next Question Clicked Voc3:2015.08.26 05:30:28 P.M.  
Home Page viewed: 2015.08.26 05:30:30 P.M.  
Video Options Page accessed: 2015.08.26 05:30:35 P.M.

Voc3 Accessed: 2015.08.26 05:30:41 P.M.  
Next Question Clicked Voc3:2015.08.26 05:30:46 P.M.  
Next Question Clicked Voc3:2015.08.26 05:30:49 P.M.  
Next Question Clicked Voc3:2015.08.26 05:30:51 P.M.  
Next Question Clicked Voc3:2015.08.26 05:30:54 P.M.  
Next Question Clicked Voc3:2015.08.26 05:30:56 P.M.  
Next Question Clicked Voc3:2015.08.26 05:30:57 P.M.  
Home Page viewed: 2015.08.26 05:31:01 P.M.  
Home Page viewed: 2015.08.26 05:31:03 P.M.  
User Logged in Success: 2015.08.26 05:32:32 P.M.  
Home Page viewed: 2015.08.26 05:32:33 P.M.  
Questionnaire 1(SUS) Page accessed: 2015.08.26 05:32:36 P.M.  
Questionnaire 1(SUS) Page accessed: 2015.08.26 05:33:28 P.M.  
A Questionnaire Completed: 2015.08.26 05:33:29 P.M.  
Home Page viewed: 2015.08.26 05:33:30 P.M.  
Home Page viewed: 2015.08.26 05:33:32 P.M.

---

User name: wickerman

User Logged in Success: 2015.08.27 10:16:11 A.M.  
Home Page viewed: 2015.08.27 10:16:12 A.M.  
Profile page accessed: 2015.08.27 10:16:31 A.M.  
Profile page accessed: 2015.08.27 10:16:31 A.M.  
Profile page accessed: 2015.08.27 10:17:29 A.M.  
Profile Updated2015.08.27 10:17:29 A.M.  
Profile page accessed: 2015.08.27 10:18:10 A.M.  
User Logged in Success: 2015.08.27 10:22:00 A.M.  
Home Page viewed: 2015.08.27 10:22:00 A.M.  
Video Options Page accessed: 2015.08.27 10:22:27 A.M.  
Voc1 accessed: 2015.08.27 10:23:42 A.M.  
Voc2 Accessed: 2015.08.27 10:24:02 A.M.  
Voc3 Accessed: 2015.08.27 10:24:09 A.M.

Voc1 accessed: 2015.08.27 10:24:18 A.M.  
Voc2 Accessed: 2015.08.27 10:25:41 A.M.  
Voc1 accessed: 2015.08.27 10:26:02 A.M.  
Voc2 Accessed: 2015.08.27 10:26:06 A.M.  
Voc3 Accessed: 2015.08.27 10:26:14 A.M.  
Voc2 Accessed: 2015.08.27 10:26:27 A.M.  
Login Page Accessed: 2015.08.27 10:26:46 A.M.  
Video Options Page accessed: 2015.08.27 10:26:51 A.M.  
Voc1 accessed: 2015.08.27 10:27:06 A.M.  
Voc2 Accessed: 2015.08.27 10:27:50 A.M.  
Voc2 Accessed: 2015.08.27 10:27:50 A.M.  
Login Page Accessed: 2015.08.27 10:28:30 A.M.  
User Logged in Success: 2015.08.27 10:28:30 A.M.  
Home Page viewed: 2015.08.27 10:28:30 A.M.  
Video Options Page accessed: 2015.08.27 10:28:33 A.M.  
Video Options Page accessed: 2015.08.27 10:28:34 A.M.  
Video C Accessed: 2015.08.27 10:28:38 A.M.  
Home Page viewed: 2015.08.27 10:29:31 A.M.  
User Logged in Success: 2015.08.27 10:32:14 A.M.  
Home Page viewed: 2015.08.27 10:32:14 A.M.  
Video Options Page accessed: 2015.08.27 10:32:27 A.M.  
Video A Accessed: 2015.08.27 10:32:32 A.M.  
Voc1 accessed: 2015.08.27 10:33:13 A.M.  
Next Question Clicked Voc1:2015.08.27 10:33:54 A.M.  
Next Question Clicked Voc1:2015.08.27 10:34:10 A.M.  
Next Question Clicked Voc1:2015.08.27 10:34:29 A.M.  
Video Options Page accessed: 2015.08.27 10:34:33 A.M.  
Video A Accessed: 2015.08.27 10:34:36 A.M.  
Voc1 accessed: 2015.08.27 10:35:55 A.M.  
Next Question Clicked Voc1:2015.08.27 10:36:03 A.M.  
Next Question Clicked Voc1:2015.08.27 10:36:08 A.M.  
Next Question Clicked Voc1:2015.08.27 10:36:12 A.M.  
Next Question Clicked Voc1:2015.08.27 10:36:18 A.M.  
Video Options Page accessed: 2015.08.27 10:36:44 A.M.  
Video A Accessed: 2015.08.27 10:36:46 A.M.

Voc1 accessed: 2015.08.27 10:37:22 A.M.  
Home Page viewed: 2015.08.27 10:38:31 A.M.  
Video Options Page accessed: 2015.08.27 10:38:43 A.M.  
Video A Accessed: 2015.08.27 10:38:52 A.M.  
Voc1 accessed: 2015.08.27 10:38:55 A.M.  
Next Question Clicked Voc1:2015.08.27 10:39:15 A.M.  
Next Question Clicked Voc1:2015.08.27 10:39:15 A.M.  
Voc1 accessed: 2015.08.27 10:39:18 A.M.  
Next Question Clicked Voc1:2015.08.27 10:39:19 A.M.  
Voc1 accessed: 2015.08.27 10:39:21 A.M.  
Next Question Clicked Voc1:2015.08.27 10:39:23 A.M.  
Next Question Clicked Voc1:2015.08.27 10:39:23 A.M.  
Home Page viewed: 2015.08.27 10:40:04 A.M.  
Home Page viewed: 2015.08.27 10:40:08 A.M.  
User Logged in Success: 2015.08.27 10:44:18 A.M.  
Home Page viewed: 2015.08.27 10:44:18 A.M.  
Questionnaire 1(SUS) Page accessed: 2015.08.27 10:44:21 A.M.  
Questionnaire 1(SUS) Page accessed: 2015.08.27 10:46:27 A.M.  
A Questionnaire Completed: 2015.08.27 10:46:27 A.M.  
Home Page viewed: 2015.08.27 10:48:11 A.M.

---

User name: axelgrease

User Logged in Success: 2015.08.26 05:01:25 P.M.  
Home Page viewed: 2015.08.26 05:01:26 P.M.  
Profile page accessed: 2015.08.26 05:02:32 P.M.  
Profile page accessed: 2015.08.26 05:02:48 P.M.  
Profile Updated2015.08.26 05:02:48 P.M.  
Profile page accessed: 2015.08.26 05:02:52 P.M.  
User Logged in Success: 2015.08.26 05:05:11 P.M.  
Home Page viewed: 2015.08.26 05:05:11 P.M.  
About Page Accessed: 2015.08.26 05:05:32 P.M.  
Video Options Page accessed: 2015.08.26 05:06:11 P.M.  
Video D Accessed: 2015.08.26 05:06:26 P.M.

Home Page viewed: 2015.08.26 05:08:06 P.M.  
Video Options Page accessed: 2015.08.26 05:08:43 P.M.  
Video A Accessed: 2015.08.26 05:09:07 P.M.  
Voc1 accessed: 2015.08.26 05:11:00 P.M.  
Next Question Clicked Voc1:2015.08.26 05:11:04 P.M.  
Next Question Clicked Voc1:2015.08.26 05:11:13 P.M.  
Next Question Clicked Voc1:2015.08.26 05:11:17 P.M.  
Next Question Clicked Voc1:2015.08.26 05:11:19 P.M.  
Next Question Clicked Voc1:2015.08.26 05:11:22 P.M.  
Next Question Clicked Voc1:2015.08.26 05:11:25 P.M.  
Next Question Clicked Voc1:2015.08.26 05:11:27 P.M.  
Next Question Clicked Voc1:2015.08.26 05:11:30 P.M.  
Next Question Clicked Voc1:2015.08.26 05:11:32 P.M.  
Next Question Clicked Voc1:2015.08.26 05:11:35 P.M.  
Next Question Clicked Voc1:2015.08.26 05:11:37 P.M.  
Next Question Clicked Voc1:2015.08.26 05:11:51 P.M.  
Next Question Clicked Voc1:2015.08.26 05:11:53 P.M.  
Video Options Page accessed: 2015.08.26 05:11:57 P.M.  
Video A Accessed: 2015.08.26 05:11:59 P.M.  
Home Page viewed: 2015.08.26 05:12:52 P.M.  
Video Options Page accessed: 2015.08.26 05:13:10 P.M.  
Voc1 accessed: 2015.08.26 05:13:12 P.M.  
Next Question Clicked Voc1:2015.08.26 05:13:19 P.M.  
Next Question Clicked Voc1:2015.08.26 05:13:21 P.M.  
Next Question Clicked Voc1:2015.08.26 05:13:23 P.M.  
Next Question Clicked Voc1:2015.08.26 05:13:25 P.M.  
Next Question Clicked Voc1:2015.08.26 05:13:28 P.M.  
Home Page viewed: 2015.08.26 05:14:00 P.M.  
Questionnaire 1(SUS) Page accessed: 2015.08.26 05:14:02 P.M.  
Questionnaire 1(SUS) Page accessed: 2015.08.26 05:14:50 P.M.  
A Questionnaire Completed: 2015.08.26 05:14:50 P.M.  
Home Page viewed: 2015.08.26 05:14:52 P.M.  
Home Page viewed: 2015.08.26 05:14:57 P.M.

---

*End of document*