# Learning to be an Information Architect

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This article describes a recently introduced module at University College Dublin School of Information and Library Studies (SILS), entitled *Information Architecture: Designing the Web*. The module provides students with a realistic experience of how information architects apply their skills to produce usable web sites, via a project to produce a documented Virtual Research Environment for information architecture researchers. The article discusses the importance of both information architecture and Virtual Research Environments to LIS education and explains how the module achieves its aims.

**Keywords:** information architecture, learning, usability, Virtual Research Environment, case study

## Introduction

The University College Dublin (UCD) School of Information and Library Studies (SILS) joined the iSchools Caucus in December 2010. As well as conducting and supervising research, SILS faculty teach undergraduate major and minor degrees in Information and Social Computing, and graduate degrees in Library and Information Studies (MLIS) and Information Studies (MA Information Studies). The components of these programmes are divided into self-contained modules. One such module, entitled *Information Architecture: Designing the Web,* was introduced in both the undergraduate and postgraduate programmes in 2011. It aims to provide students with a realistic experience of how information architects apply their skills to produce usable web sites. The module complements others offered by SILS, such as *Systems Analysis & Design, Web Publishing* and *Creating & Publishing Digital Media Content,* in providing SILS students with website development skills.

## Information Architecture

An appreciation of Information Architecture (IA) is central to the development of usable websites. IA is a growing and evolving discipline and its definition is still in a state of flux. In their seminal book, *Information Architecture for the World Wide Web* (a core textbook for the IA module), Morville and Rosenfeld (2007, p. 4) find it necessary to provide four definitions of the field. Among these, the following two identify some of the most important themes of the discipline: (a) "The art and science of shaping information products and experiences to support usability and findability"; (b) "The combination of organisation, labelling and navigation systems within websites and intranets."

As implied by the number and quality of posts being advertised in the ASIS&T careers pages (http://www.asis.org/careers.html), the role of Information Architect offers rewarding career prospects to information professionals. An ability to understand user needs, along with an appreciation of IT and its applications, makes graduates of LIS programmes a good fit for such roles. The SILS *Information Architecture: Designing the Web* module introduces students to the discipline and to give them an opportunity to practice the required skillset in as realistic a setting as possible.

## Virtual Research Environments

The definition of the Virtual Research Environment, or VRE, is still evolving (Jeffery & Wusteman, 2012). The UK Joint Information Systems Committee (JISC) Virtual Research Environments Programme, widely identified as the leader in the field of VRE development, states that:

> The term VRE is now best thought of as shorthand for the tools and technologies needed by researchers to do their research, interact with other researchers (who may come from different disciplines, institutions or even countries) and to make use of resources and technical infrastructures available both locally and nationally. (JISC, 2010)

Given the wide scope of this definition, determining what is and what is not a VRE can be challenging. Some environments that could be identified by the above description are instead defined using the following terms: collaboratories, collaborative virtual environments, gateways, science gateways, portals, virtual organisations, and cyberenvironments (Carusi & Reimer, 2010; Voss & Procter, 2009).

Wusteman (2008) and SURF (2012) argue that librarians have a crucial role to play in the successful development and optimal use of VREs. Wusteman (2008) goes further, arguing that librarians need to be proactive in identifying and advocating for their potential roles in VRE development and use. It is important that information professionals in general understand the concept and implications of VREs. However, it appears that this topic has yet to make a large impact on LIS syllabi. I believe that the use of VREs as a case study in the SILS IA module is beneficial to the students on several levels: it introduces them to the concept of VREs, and to the wider and increasingly important concept of support for research by information professionals, while also providing a complex real-world issue for them to grapple with and to which to apply their developing IA skills.

## Information Architecture: Designing the Web

The title of this module may be controversial for some IA purists: web design, it could rightly be argued, covers skills, such as graphic design, which are not strictly the domain of the information architect. The reason for the title is purely pragmatic: informal student feedback suggested that simply titling the module *Information Architecture* did not provide the majority of students—who have never before heard the term *Information Architecture*—with any inkling of the module's content. Adding the rider Designing the web provided potential participants with some idea of the general aims of the module. Although it cannot be proven that the subsequent 23% increase in student numbers was a result of this change of title, informal feedback suggests that it had some effect.

In recent years, the focus of Irish third-level curricula design has shifted from being "content-driven" to being "outcome based," with an emphasis on advancing competencies and skills (Bourke, 2011; McMahon, 2010). This IA module follows that trend, supporting learning through the tackling of a complex, real-life problem. To this degree, it uses the problem-based learning approach. However, two weekly lectures remain a key component of the module. In addition, group work is not central; apart from one example of pair work, most assessments are carried out individually. The decision to emphasise individual work was made in order to provide a balance with the strong emphasis on group work in SILS programmes in general.

The project provides the opportunity for students to apply the skills of analysis, planning, research, design, testing and documentation, learned throughout the module, in order to produce a documented VRE for IA researchers. In all components

of the assessment, the student is required to imagine that he or she is an information architect working for a company that specialises in website development. Within this company, the student is a member of a team that is creating a VRE for IA research groups, using Agile methodology (http://agilemanifesto.org/).

Agile software development methods encompass many variants but share a common philosophy, as detailed in the Manifesto for Agile Software Development (http://agilemanifesto.org/).

Whereas more traditional methods attempt to deny the possibility of change of requirements or opinions within a project, Agile methods attempt to respond to change. Agile development (Sy, 2007) involves a rapid succession of incremental software releases, or iterations. Coding begins early in the project and is preceded by only as much documentation as is actually necessary to move the project forward. Each iteration, generally produced at regular intervals of between two and four weeks, results in a "working version" or prototype. The latter is a stable, testable piece of software and implements a subset of the product's final functionality. As well as frequent releases, Agile philosophy focuses on close collaboration and rapid feedback between developers and users. Each working version is delivered to users or customers for evaluation, and their feedback is fed into planning for the next iteration. The technical aim of the project in this module is to produce and test an initial working version of a VRE, that is, to follow the process of developing a website through one iteration. The iteration timeline differs from the normal two to four weeks in that it is carried out over the twelve weeks of a semester.

Accompanying lectures cover tenets of information architecture for a range of devices on which the internet is currently accessed, including desktops, laptops, mobile phones and tablets. Given limited student access to mobile devices such as tablets and smart phones, the focus of the current project is on the production of a website for desktop or laptop computer. However, it is expected that, in the medium term, it will become feasible to provide the students with the option of designing their VRE for a mobile device.

The intended audience for all the materials and documentation that the students produce is their imaginary team colleagues. All deliverables are expected to be realistic in relation to this context. Students lose marks for lack of realism, poor presentation, or exceeding the required word or page counts.

In a twelve-week, one-hundred-hour module, it is not possible to address all the aspects of IA that would be relevant to real-world website development. Student learning is focused around a series of five assessment deliverables that provide opportunities to learn and practice a range of skills. These components are listed below, along with the percentage awarded for each:

1. Personas and scenarios [10%]
2. Information architecture report [40%]
3. The actual VRE, developed using Google Sites [20%]
4. Usability testing report [20%]
5. Website metadata [5%]

The remaining five per cent is awarded for lecture attendance.

These five components are treated, not as unrelated exercises, but as aspects of one overall project. Students are encouraged to ensure that, as far as practicable, all deliverables are consistent in the system they propose. However, an important tenet of Agile software development is the recognition that an understanding of user requirements evolves during a project. Thus, students are not tied down, at any stage, to proposals made at an earlier stage of the project, but are simply required to document and justify any adaptations they make in the design.

The use of a series of assessment components for which the teacher provides

prompt, detailed feedback that the student can use to improve subsequent components, means that the module can prioritise "formative assessment for learning over summative assessment for validation and accreditation" (Taras, 2008, p. 173). There follows a more detailed discussion of each of the assessment components.

## Personas and Scenarios

IA emphasises the central importance of understanding a website's target audience. Personas, also referred to as *user personas* or *user profiles*, are a simple, widely-used method of documenting the characteristics of imaginary sample users, including their typical information-seeking behaviours, their familiarity with the web and technology in general, as well as other information as to how they may ultimately use the website (FatPurple, 2007).

The first of the five assessment components for the IA module is due in Week 4 of the twelve-week semester. Students are required to create three personas for the VRE that they are designing. Each persona should be a maximum of one page in length and be attractively presented. The aim is to represent a wide range of typical users of the VRE across the three personas but, as in a real-world situation, it is not necessary to create profiles for every distinct user group. A sample persona is illustrated in Figure 1.

In this first assessment component, students are also required to produce a bulleted list of potential scenarios, that is, tasks that users of their IA VRE may wish to perform. Typical scenarios might include:

• User logs in to the VRE
• User creates a profile
• User invites group members to participate in an event
• User collaborates with group members in editing a document

Scenarios, also referred to as *scenarios of use* (UsabilityNet, 2006a), are another method of helping the development team to focus on user needs and how the user will want to interact with the final website. In a real-world situation, once personas and scenarios are identified, the further step of playing out the scenarios using different personas is generally performed. Thus, in the above example, the scenario of "User collaborates with group members in editing a document" could be further explored for Anne, the persona illustrated in Figure 1. However, in order not to overburden the students at this early stage, they are not asked to play out the scenarios using their personas.

## Information Architecture Report

In Week 8 of the semester, students are required to submit a report covering the following aspects of their proposed VRE:

• Site organisation structure
• Site navigation systems
• Labelling systems
• Blueprint
• Wireframes

### *Site Organisation, Navigation, and Labelling*

As already identified, the application of organisation, labelling, and navigation is central to the discipline of IA, just as it has always been central to the disciplines of librarianship and information science. Indeed, as Morville and Rosenfeld (2007, p. 54) comment, in the web age, "we're all becoming librarians." This section of the assessment allows the students to apply these core skills to a website context. Organisation schemes and structures, embedded and supplemental navigation systems, and appropriate labelling schemes for navigation and for contextual links are all addressed. Students are required to demonstrate the relevance to their VRE of every design decision they make.

## Anne's area of research is Heuristics

*"I have several years' practical experience in Information Architect but now I spend a lot of time researching usability testing and heuristics. I would like to share my knowledge with other Information Architects and to build on my research profile"*

*has 8 years' experience in Information ...tecture. A Computer Science graduate, she worked ...Information Architect in-house and as a ...ltant on many large projects. Nowadays she ...s a lot of her time on research. Her main research ...st is Heuristics. She has written several articles on ...pic and hopes to host workshops on Heuristics for ...nation Architects, Usability Engineers and ...mics. She is a member of the Information ...tects Institute and has presented at local and ...ational conferences.*

**Anne's Objectives**
o   Share papers and ideas

o   Raise personal profile

o   Gauge possible interest in Heuristics workshop

**What can Anne do in a Virtual Research Environment?**
- Create space where she can share her wealth of knowledge with other Information Architects and researchers

- Post her own papers and comment on others' papers

- Create an event; organise a workshop

**Anne's Favourite Tools**

LinkedIn    Illustrator

Visio

Twitter    Blog
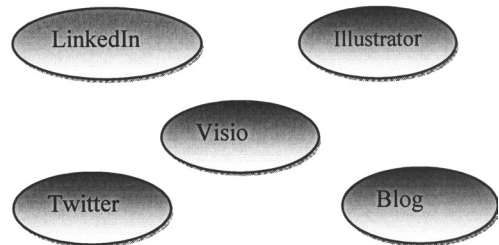
*Anne wants to share knowledge with others on the implementation aspect of Information Architecture*

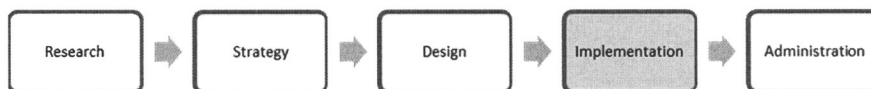Research ➤ Strategy ➤ Design ➤ Implementation ➤ Administration

**Figure 1.** Sample Persona for VRE project.

### Blueprints and Wireframes

As with most tools and techniques used in IA, the definition of a blueprint varies between practitioners. The definition used in this module is a simple graphical view of the hierarchy of web pages for a website.

Wireframes are mock-ups of the major pages of a website, as illustrated in Figure 2. They are not screenshots and generally do not include content or graphical

components, as this may detract attention from the navigational and organisational components and the overall page layouts. Students are required to submit between one and three wireframes for their proposed VRE, representing the structure of their site's main pages. Site users need to be able to create a mental model of a website. Thus, consistency of layout between site pages is vital. Students are encouraged to take this into account and may be penalised for submitting more than one wireframe if there is no obvious benefit to end-users of providing more than one page layout. Sometimes, the home page or some other page (for example a search page) will differ in layout from the rest of a site's pages; on these occasions, students are permitted to submit two, or possibly three, wireframes.

The message that brevity is paramount is emphasised to the students. They are strongly discouraged from accompanying their wireframes with a lengthy description of their contents. *Callouts* are used to add notes about functionality of page elements, as illustrated in Figure 2. Apart from this, the wireframes should require
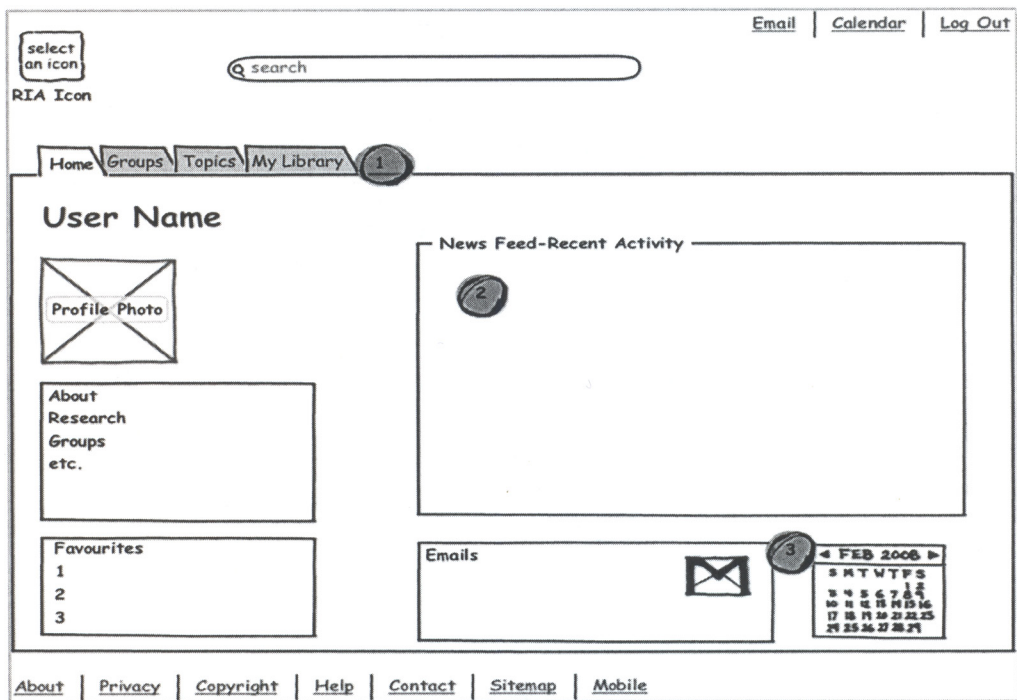


Notes

1. Global navigation bar. There is no local navigation bar at the home page.

2. Page items such as news feeds, profile information and favourites contain links to

   other pages.

3. Preview of email and calendar with links to those applications.

**Figure 2.** Sample Wireframe for VRE homepage. Callouts are identified as circled numbers.

only a minimum, if any, accompanying text. Wireframes should be able to stand on their own; if they cannot, students are encouraged to rethink their design.

### Report Production

With an emphasis in second- and third-level education on the production of essays, students often find it challenging to produce a report that would be appropriate in a real-world work context. Time is spent in this module helping students to improve their report-writing skills.

As already mentioned, students are required to imagine that the audience for their information architecture report is the other members of their fictional web development team. They are encouraged to design the report accordingly, with an emphasis on realism and usefulness. For example, students are warned against the following common mistakes:

- *Including references to the learning environment,* for example to modules, lecturers and so on.
- *Attempting to explain the basics of IA.* Students are often tempted to produce a report that reads like a primer of IA; they must be constantly reminded that a professional web development team will understand IA basics and do not need them explained. As a corollary to this, their reports should rarely include quotes from textbooks, and, thus, unlike academic essays or theses, are unlikely to require a reference section.
- *Producing a report that is so general as to be of relevance to virtually any website,* rather than being of specific relevance to the IA VRE they are creating. It follows that a general diagram taken from lecture slides or the web is unlikely to be appropriate. Students are strongly encouraged to make full use of diagrams, but the latter should specifically describe some aspect of their VRE, not just IA principles in general.

Structure is central to a successful report. Students are provided with a suggested layout, demonstrating the use of sections and subsections, and are instructed in how to use bulleted lists, tables, figures and diagrams to add clarity and brevity, without their inclusion becoming an excuse for vagueness.

Again, the virtue of brevity is emphasised. Students are reminded that their fictitious project colleagues will be reading such reports on a regular basis, are likely to be very busy and would prefer, wherever possible, to glance at a well-structured table rather than a few paragraphs of text. The maxim less is *(often) more* is emphasised. A critical evaluation of each sentence is encouraged; students should ask themselves whether it contributes new information to their report or simply introduces filler text. These can be hard lessons to learn. When being penalised for exceeding words counts, an occasional response is "Why am I losing marks for giving you more than you have asked for?"

The production of this report is often the student's first introduction to the useful skill of writing Executive Summaries. The latter should provide a summary that will allow readers to gain an overview of a report without having to read it in detail. Executive Summaries vary in structure; the format required in this context comprises a very short overview of the report, followed by a brief bulleted list of key recommendations, with a total length not exceeding a page.

## Creating the VRE using Google Sites

In Week 11, students submit their VRE. It is created using Google Sites (https://sites.google.com/). This simple-to-use system does not require an understanding of HTML or CSS. The emphasis is on the process of determining the appropriate site architecture, rather than on the technology involved. Students are not permitted to use alternative web site development packages

or web editors, and additional marks are not allocated for the inclusion of advanced features not available via Google Sites.

Google Sites provides a series of templates for various types of website, for example, *Classroom, Project Wiki* and *Outdoor Club*. Students are not permitted to use any of these templates, as this could discourage user requirements from directing their design. Instead, they are required to create their own templates from scratch. They are, however, permitted to use the templates that Google Sites makes available for individual pages (for example, announcement pages and site map pages).

Throughout this development stage, students are aware that their VRE will be tested by a colleague in the subsequent week. The VRE must be sufficiently interesting to ensure that there is something to test and to comment on. So, for example, they are encouraged to include sample content, rather than just the Greeked text typical of wireframes. However, due to the lack of sophistication of Google Sites, and to the students' time-constraints, it is not always feasible to incorporate all of the features described in their IA report. To compensate for this, students either submit a brief list of unimplemented features or they create dummy links to indicate where the relevant pages/features would be located if they existed. Figure 3 illustrates a sample VRE homepage created using Google Sites.

## Usability Testing

Usability refers to "the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use" (UsabilityNet, 2006b). Usability testing, or user testing, is now a common component of library-related software design, for example (Jung *et al.*, 2008; George, 2008, Long *et al.*, 2005; Norberg *et al.*, 2005). It involves representative users performing a series of representative tasks (Notess, 2005) in the presence of a tester. Asking users to think out loud about the tasks they are performing is generally found to be the most productive approach.



**Figure 3.** Sample VRE homepage created using Google Sites.

Students are required to carry out usability testing of their VRE and then, in Week 12, to submit a test report. Each student chooses a partner from within the IA module; they will be testing each other's VRE, taking it in turn to act as tester and facilitator.

As always, realism is emphasised; the tester acts as a representative of the proposed audience for the VRE. In other words, the students pretend that the tester is an IA researcher. By this stage in the module, the students should be sufficiently familiar with the field of IA to be able to play their parts successfully. To help them in this, they are encouraged to consider the personas they have created.

### Data Collection

Following the guidelines in Krug (2005), four main methods of data collection are employed: pre- and post-evaluation questionnaires, *get it* testing, and *key task* testing.

For each VRE test session, the tester answers a brief pre-evaluation questionnaire, designed by the facilitator, covering aspects such as their occupation (it is hoped that the answer here will be some variation on "IA researcher") and questions concerning their use of the internet and related software. If the session is to be recorded (see http://www.screencast-o-matic.com/ for an example screen recorder), testers are requested to provide signed permission. However, reviewing recordings can be time-consuming so, for pragmatic reasons in this module, the facilitator may choose simply to take notes. Whether they decide to record or not, facilitators are discouraged from transcribing the entire session. Instead, they are encouraged to summarise the majority of the session, transcribing only what they perceive to be the most interesting or significant actions or comments. Unlike academic research in LIS, transcription of full sessions is not usually attempted in real-world usability testing, due to its time-consuming nature.

Once signed permission for any recording has been received, the session moves on to what Krug (2005) describes as *get it* testing: the tester is shown the VRE in question for the first time and is asked to comment on their immediate response to it. This provides the facilitator with some initial pointers as to which aspects of their VRE are intuitive and which are not.

Testers are then asked to use the VRE to perform a series of *key tasks* (Krug, 2005) pre-defined by the facilitator, again thinking aloud as much as possible. The key task tests are followed by a brief post-evaluation questionnaire in which testers are given the opportunity to summarise qualitatively their experience of using the VRE.

### Usability Testing Report

The aim of the facilitator's report is to provide members of the VRE development team with a clear, easy-to-read summary of the usability issues uncovered. The report includes, among other features, a summary of responses to the questionnaires, along with pertinent user comments and actions in the *get it* and *key task* testing phases. It also presents a summary of the major usability issues raised by the test and makes specific suggestions for improvements to the site in the next iteration of site development, that is, for the next working version. Students are encouraged to present information in concise, tabular form where possible.

In an Agile development scenario, usability testing of a working version would involve multiple testers (Nielsen, 2000). However, to prevent assessment overload within the module, each VRE is tested only once. Thus, in theory, results should not be generalised and no conclusions can be made. To circumvent this restriction, students are required to include within their report the following phrase: "We are assuming that there were 5 testers and they all had similar comments/problems." This should be the only unrealistic aspect of the report.

In this assessment component, students are not penalised or rewarded for the quality of their VRE, nor for the number of usability issues discovered by their tester. The usability testing reports are assessed solely on the quality of the process and documentation of the usability testing. However, perhaps ironically, the more interesting reports tend to emerge from VREs where there are more usability concerns to explore.

## Metadata

At the end of the semester, the final assessment component is submitted: a sample of website metadata for the VRE. Although only worth five per cent this is an important exercise, as information architects need to understand the significance of metadata and site content to search engine results. Students are required to submit HTML description and keyword meta tags and a title tag for the home page of their VRE, as illustrated in Figure 4.

## Conclusions

On completion of the SILS undergraduate and postgraduate programmes, it is expected that students will display a wide range of attributes and competencies, including:

- Highly developed information seeking and organisational skills.
- Highly developed personal competency in information literacy skills, such as report writing.
- Advanced knowledge and understanding of how information systems and applications are implemented and used in a variety of contexts.

The IA module supports this learning and gives students experience of a website development project from the point of view of the information architect. It has proved to be a popular module. UCD Student Feedback on Modules surveys, Summer 2011 and 2012, show mean positive responses to all questions were above average for SILS modules. It also has engendered an enthusiastic response from students, as illustrated by the following selection of post-module student feedback:

"The realistic nature of the project—I could really see how I might apply this knowledge in the future. The continuous assessment meant I paid attention in all classes."

**Description**

```
<meta name="description" content ="RIA is a virtual research environment where
Information Architecture researchers can network, collaborate, share files and
much more. Sign up for free."/>
```

**Keywords\***

```
<meta name="keywords" content="research, VRE, researcher, information
architecture, IA, user experience, documents, academic, academics"/>
```

**Title**

```
<title> Welcome to Research in Information Architecture | RIA </title>
```

**Figure 4.** Sample metadata submission.

"The real world feel of reporting to senior management really helped my learning."

"I found it a strong challenge to understand what a VRE is and analyse what it should do[.] I think this reflects the real world challenge an IA architect would face when beginning a new project."

"The practical and incremental nature of the assignments."

"I thought breaking up the report was very effective and helped me gain important feedback."

## Acknowledgements

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