Research & Project Management

Infrared Institute 'Handbook'

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SPARK REVOLUTIONS

Research

Development

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Research Overview

Summary

The move from traditional education towards online education is a complex transition. It is important to study how the heterogeneous communication tools can be used to promote participation in online education. Previous research of participation, has shown that it has a positive effect on, students' intellectual growth and their motivation to study.

Market

Constant budget cutbacks in education markets appear to be expediting efforts to move education online. As available resources are shrinking, timely access to prerequisite classes becomes more difficult.

Whether taking online course material from the comfort of your own home, or as an enhancement to a traditional class, online learning allows students to take courses that may be harder to find or get into. Educators are increasingly looking to online courses as a way to handle more students with less funding.

Statistical Outlook

Reasons

The Journal of Educators online recently performed a study to identified the reasons behind choosing to educate via online facilities:

Reason	Mean	SD	"to some extent" and higher -%
Online format fit with personal life	5.98	1.26	88.3
Program offered desired specialisations	5.85	1.36	86.9
Program was progressive	5.83	1.18	88.3
Program was accessible	5.80	1.19	89.3
Online format provided adequate structure	5.46	1.27	81.4
Program invited student input	5.33	1.42	76.4
Opportunities for face to face interaction with other students	5.27	1.50	74.7
Relatively short time to complete the degree	5.23	1.66	73.1
Program and job requirements could be coordinated	5.07	2.04	69.4
Program was recommended by peers/ colleagues	4.67	2.08	64.3
Program was recommended by previous teachers	3.16	2.04	33.4

The most important reasons highlighted were accessibility, fit with personal life, perceived progressiveness of the program and desired specialisations offered.

Other affecters were found in age and gender. The older the respondent, the greater was the influence of face-to-face interaction, fit with personal life and shorter time to complete. When compared to men, women were more influenced by how the program structure fit

with personal life, whether the program offered the desired specialisation, by recommendations from peers or colleagues and by the shorter time to complete.

Feature	Mean	SD	"to some extent" and higher - %	Mean (presence)	SD	"to some extent" and higher - %
Blends with work schedule	6.48	0.98	96.4	5.62	1.61	84.1
Fits with personal schedule	6.24	1.07	91.8	5.42	1.58	78.3
Interaction with a broad cross section of students	6.04	1.21	89.2	5.64	1.43	81.5
Opportunities for learning through asynchronous communication	5.97	1.11	89.5	5.7	1.48	84.5

The study identified that a program designed to be compatible with the respondent's work and personal schedules was the most important.

Flexibility is frequently among the main reasons for choosing online programs. Flexibility for a mid-career student is likely a requirement more integral than a simple choice of when to log onto the course site and post a comment.

Supporting previous research findings, this study demonstrates that flexibility was a significant criterion for choosing an online course over a traditional program, even more so for older respondents and women. The findings suggest that a balanced approach to course design offering opportunities for real time interaction, either online or during residencies, along with asynchronous communication would be most attractive to the mid-career student segment, particularly older, more experienced students.

Research Analysis

Online Education

“Encourage information exchange by establishing requirements and by giving online students reasons to participate “

In the study, three key inhibitors in efficient information exchanging were identified. To start, some online students felt too intimidated to participate because an admiration of others' contributions in the asynchronous seminars.

The *anytime, anywhere* feature of asynchronous seminars is advantageous because students with other obligations such as family and work may still participate on weekends, at night or in small chunks throughout the day since all communication is stored.

However, unless appropriately managed this may be a disadvantage since the contributions could be accessible by all participants, including the lecturer.

Thus this, along with the reviewed studies suggest that it is imperative to establish reasonable quality requirements. If a discussion is to occur, it may be preferable to discuss ideas rather than expect online students to create a “finished product”.

It is suggested that it can be useful to limit the length of contributions in asynchronous online seminars in order get the feeling that one is part of a dialogue rather than a monologue.

Shared Task Management

The study showed that task management exchanges were more or less nonexistent in the asynchronous seminars. However, in the synchronous seminars, the students had to decide what to discuss, and how to sum up and present the results of their discussion within a specific time period.

Communication needs to be structured to avoid misuse. For example a student was a frequent contributor of sentences classified as task management and social support, while seldom exchanging information.

Social Support

Social support was also near nonexistent in the asynchronous seminars presented through our content analysis. In the synchronous seminars almost a fifth of the sentences were classified as social support.

In the interviews, it was evident that the participants felt more confident in providing each other with social support synchronously. However, two key inhibitors to participation in terms of social support were identified. First, some students felt that it was difficult to get to know others online and mentioned that they wanted to get to know class members better before providing each other with social support online.

This suggests that it is important to organise and emphasise social aspects of participation if the students and teachers meet face-to-face. In courses with no or few face-to-face meetings this issue is difficult to address.

Blended Learning

Our research has also identified that when online education is used by itself, online learning appears to be as effective as conventional classroom instruction.

The research completed by the U.S. Department of Education Office identified that blends of online and face-to-face instruction with conventional face-to-face classes, blended instruction has been *more* effective.

Results

i. Functionality Hierarchy

Student

	Search	Navigation / progress bar	Continual performance check	Quizzes	Chat	Offline Capable	Knowledge base
Blended Learning	10	10					10
Higher retention			10	10			10
Quicker / More effective	8						8
Asynchronous communication			8		8	8	
Accessibility	10					10	
Clear Structure	7	7					
Totals	35	17	18	10	8	18	28

Admin

	User Management	Add/Edit information	Track progress	Live communication
Add revenue stream	10	10	10	10
Life Long Learning	9	9		
Blended Learning		7	7	7
Higher Success rate			8	8
Totals	19	26	25	25

In order of importance this is our current functionality hierarchy:

Student

Search - by far the easiest navigation method is search. This allows users to immediately find the information they require which is relevant to them, in a similar fashion to wikipedia.

Knowledge Base - furthering the wikipedia concept, the handbook should be usable in manner similar to wikipedia.

Offline Capable - this allows users to view the handbook whilst disconnected to the internet, however it is secured in a manner that avoids piracy.

Continual Performance Check - by completing tasks students are able to measure their performance against other students.

Navigation/Progress Bar - although a common requirement of many sites navigation is not the most important element of this project, as we not only have included a search function, but also have a sequential and structured method of progressing through the course.

Quizzes - after our chat it seams that this element is of lesser importance, as the practical application of knowledge is to be implemented outside of the scope of this project.

Chat - live communication and chat between users will help to reassure and positively reenforce learning.

Admin

Add/Edit Knowledge Base
Track Progress
Live Communication
User Management

User Experience

Based on our research, we believe an iterative approach to user experience is paramount. This allows for linearity of learning, with re-iteration enabled via intelligent marking criteria. It is also imperative that the application is cross-platform and interoperable, focusing on a responsive, simple interface.

The type of user experience can be separated into two broad categories, *Student* and *Admin*.

Student

The Student experience needs to represent not only the knowledge-base specific to the course, but also be presented as a reference guide to be used after the initial course. The course aspect of this guide should include interactive questions and suggestive revision topics based on average performance metrics. It's imperative that this information is presented in a clear and readable fashion.

Students should also be able to quickly gauge average performance based on their current class, along with their likelihood to pass each module within the course. This would form part of the overview screen, which would allow users to immediately revise recommended sections.

Admin

The administration section needs to allow for new documents to be generated along with observing the progress of currently active students in a visual format. Through this portal, the facility for mass emailing and user registration by class should be available.

Not an alternative

In coherence with our research any solution should not be presented as an alternative to face-to-face interactions, and should thus include dedicated elements of human interaction. This should either be through the form of collaborative interactions, where the system allows users to see when others are learning, or with literal classroom interaction.

Interactive

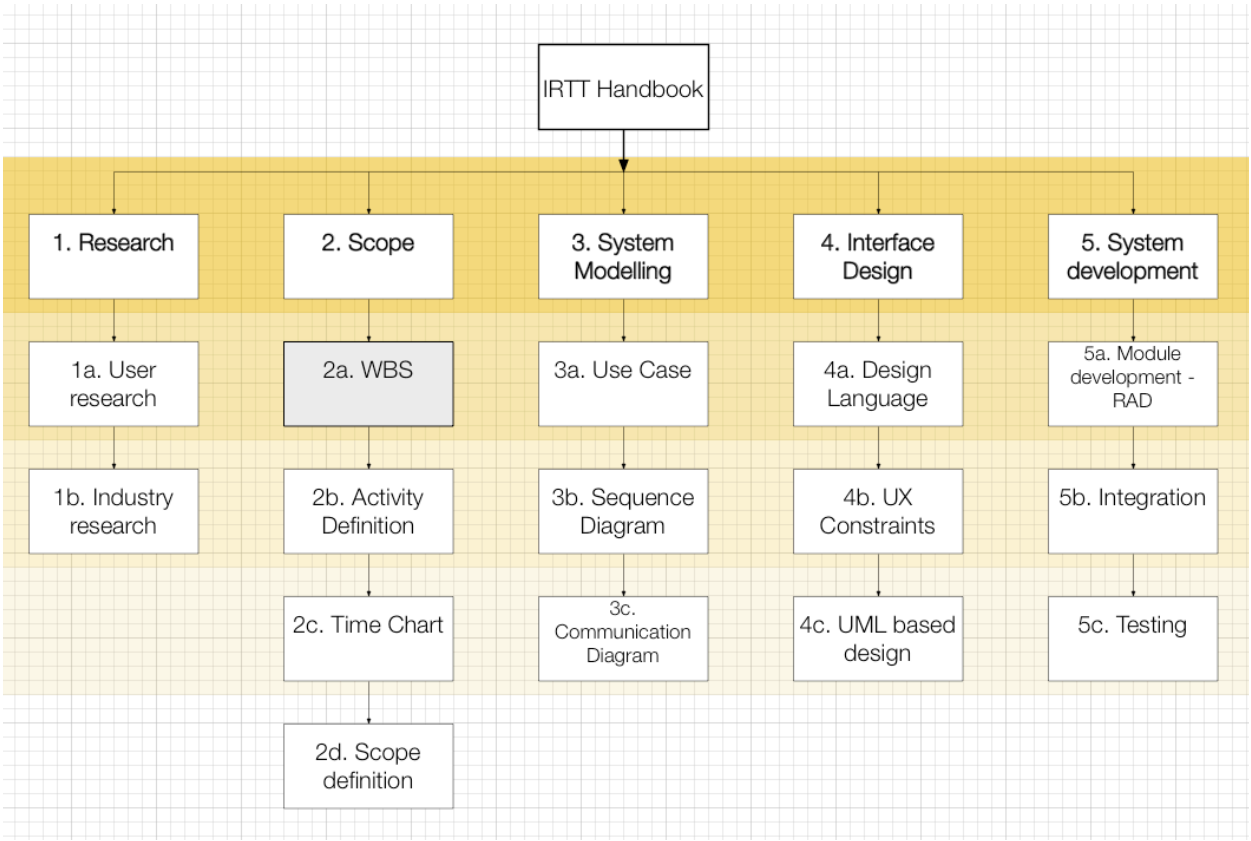
For more complex subject matter, offering diverse learning methods including more interactive learning methods allow us to harness technology for more than just course navigation and space saving.

This would include methods such as highlighting the difference between two images.

Project Management

The Work Breakdown Structure offers an overview of all tasks required to complete this project.

We are currently at the WBS stage, which highlights the tasks required to complete the project, from here we will outline the activity definition to add further detail to the specific activities required.



2b. Activity Definition

Activity	Definition
Research	Foundation of the entire development, providing us with the essentials to develop a successful application.
User research	We need to know about who is using the application to make it usable for them.
Industry research	By understanding how others achieve either what we want to or similar, we can learn from both their mistakes and successes.

Activity	Definition
Scope	Once we our foundation of research we then detail what it is we wish to do with that research.
WBS	This section details all that is required to complete this application.
Activity definition	This is a more specific list of activities required to complete this system.
Time chart	We then build a time scale from these activities to better manage the development.
Scope definition	These combined elements form the scope of the project, which is summarised here.
System modelling	To remove as much risk from development as possible, we model our application development using UML (Unified Modelling Language).
Use case	This is the initial diagram which focuses on each point of interaction. As applications are a combination of functions to deliver results to interactions, this is an ideal starting point.
Sequence diagram	Even though we like to believe that applications are intelligent, each function whether executed synchronously or asynchronously are executed in a simple sequence, which is detailed here.
Communication diagram	To help balance the application between client and server, we map the communication between our numerous nodes.
Interface Design	Once this is complete we have a detailed understanding of the proposed system, however exactly how this will look is yet to be decided.
Design language	This section focuses on the colours, UI elements and navigation methods used in the application.
UX Constraints	Design is constrain driven, we use this time to highlight all UX constrains to aid design and development.
UML based design	We then bring the last two sections together to design each UML Use Case.
System development	The time has come to create the system.
Module development	We develop each module asynchronously throughout our development team.
Integration	We then select key milestones to bring it all together. These milestone swill be further defined at the UML stage.

Activity	Definition
Testing	Once a module is complete, we test it and note any needed amendments before client sign-off.

2d. Scope Definition

This project is designed to offer interactive methods to support learning as well as providing a handbook for continual improvement. This application will be self-managed by our client and must therefore also offer a comprehensive administrative panel. The scope of this project will be better defined by the UML diagrams.

To manage scope creep we will be continually referring to this document, as well our change management documents.

Key milestones for client sign-off

We will be requesting sign-off from Austin Dunne throughout this project to ensure we are aligned with the clients requirements, and that once complete, the project meets this outline. Without these sign-offs we will be unable to progress to the next milestone;

Research Summary (This Document)
Functionality Hierarchy (This Document)
Technical Modelling
Interface Design
Combined Functions
Completed Application

What now?

This document only summarises our research and developments, much of this is used mainly for internal use, and is thus not expressed here. The next major step is to take the functionality hierarchy above, and model this into UML to define system details before development. This can only be conducted once the functionality has been decided upon.

Change request management

As this project progresses we will keep you apprised of our progress, with weekly updates every Thursday afternoon. However, as we reach key milestones and they are signed-off as complete, you may wish to add extra modules of functionality, or change something we agreed upon previously.

This would fall outside of *this* agreed scope, and would thus need to go though our change request form. These are designed to keep a history on the change in scope from the initial agreed outline, from which we will quote any additional work at our standard hourly rate of £60.

Change Request Form

Document Title:

Change Details:

Change Reason:

Document Sign-off

Once you have read through this document, and you are satisfied with its content, please sign below and return it to us. If their are any changes you wish to make, please email (phil@sparkrevolutions.com) with the format above:

Signature: _____

Name: Austin Dunne

Company: Infrared Institute

Date __/__/____