Designing Stand-alone Flash websites according to Usability, Accessibility and Searchability Aspects

A Critical analysis leading to the Formulation of a Development Cycle

By

Abhay Rautela

Submitted in partial fulfillment of

the requirements for the degree of

BACHELOR OF ARTS (HONOURS) MULTIMEDIA ARTS

SAE Institute (Singapore)

in association with Middlesex University (UK)

BAMA0404 Research Project

October 2005

ABSTRACT

The hypothesis of my research states, It is possible to create stand-alone Flash websites for front-end presentation while maximising its degree of usability, accessibility and searchability.

Applying SSM (Soft Systems Methodology) as a research approach to the soft problem identified of stand-alone Flash websites not being designed according to important success factors such as usability, accessibility and searchability aspects despite Macromedia Flash s capability to do so, and using website evaluation and document review as primary and secondary data collection methods whose critical analysis leads the thesis to end with the creation of a development cycle that aids in the effective and efficient construction of stand-alone Flash websites optimized in usability, accessibility and searchability aspects without sacrificing visual creativity or making the process extraneously tedious.

TABLE OF CONTENTS

CHAPTER 1
Introduction

You're in good shape if you can use Flash without sacrificing accessibility, readability, navigability, usability, searchability, and ability to update.

Meryl. K Evans, contributing editor, Digital Web Magazine

The above quote best describes the need for websites on the internet today to take into consideration more factors to make a website succeed than just visual design. Out of all aspects Evans has mentioned, they all generally boil down to just three, namely, usability, accessibility and searchability. Studies[1], as discussed under the literature review later, have suggested that these three factors are crucial to the success of websites on the internet. More so, most seasoned and successful web designers choose a mix of technologies (HTML, CSS, PHP and Flash, to name a few) to deliver websites rather than just utilizing HTML to build them in order to deliver the best of both presentation and structure. Chris MacGregor, renowned information architect, stresses on this fact saying, It s important to remember that HTML and Flash aren t mutually exclusive options- many of the best sites around today use a careful mix of the two In situations where Flash cannot be best used to display certain content, it s always worth considering how it might be mixed with HTML to get the best out of both

[1] Sarah S Parker, *What makes a successful website?,* January 2003, < http://www.dk-media.co.uk/services/Accessibility/Dissertation/accessibility.htm> (14 January 2004).

technologies. Many sites offer good examples of this approach, not least of which is Macromedia s own (www.macromedia.com). [2]

Before going further, it is essential to offer an understanding of the terms usability, accessibility and searchability. While the following terms are put to definition in varied ways, to put them in simplest terms, *Usability* is the ease with which someone can use (or interact with) a system, whether it s a Flash movie, a plain HTML website, or something completely different like a VCR or a washing machine[3]. Web accessibility or *Accessibility* is about making a website accessible to all Internet users, both disabled (such as the blind, physically handicapped, low vision users, cognitively impaired, etc) and non-disabled[4]. The optimization of a website in regards to being better indexed by a search engine crawler, thus obtaining a better rank in search engines is known as search engine optimization. In this thesis, we shall refer it as *Searchability.*

While it is not uncommon to find websites, for example HTML or mixed technology websites (those made mixing HTML, Flash, DHTML, etc.), designed according to usability, accessibility and searchability considerations, I observed that it was rare to come across stand-alone Flash websites designed according to these three aspects. While this observation is further reinforced through the *literature review* available in the next chapter, I also conducted a detailed website evaluation of random three stand-

[2] Chris MacGregor et al., Ben Renow-Clarke, *The Flash Usability Guide: Interacting with Flash MX* (USA, Friends of Ed, 2002), 7-98.
[3] Chris MacGregor et al., 7.
[4] *Web accessibility: The basics*, (n.d), < http://www.webcredible.co.uk/user-friendly-resources/web-accessibility/basics.shtml > (17 June 2005).

alone Flash websites from the 2004 archives of the esteemed *showcase* section in the Macromedia website whereby the results suggest the same. The results of this evaluation are available in *appendix A.*

Considering the importance of usability, accessibility and searchability as website success factors and the rarity of stand-alone Flash websites on the internet designed according to them despite the fact that Flash is capable of producing such content introduced a rather soft or situational problem in contrast to a hard or well defined problem. If Flash as an authoring tool was incapable of creating usable, accessible and searchable content, the problem would have been well defined whereby I could follow an action research approach towards finding how Flash could be made to produce usable, accessible and searchable content. However, since it is already capable of doing so, the problem appeared situational where in the situation of stand-alone Flash website design, websites were not being built according to usability, accessibility and searchability considerations despite Flash being capable of producing such content. Therefore, I needed to adapt Soft systems methodology as my research approach in order to tackle the soft problem at hand.

Taking into account the importance of these three aspects in determining the success of a website and the fact that Macromedia Flash as authoring software is capable of producing usable, accessible and searchable Flash content, I was encouraged to take up the topic of designing stand-alone Flash websites according to these considerations as my research thesis where the final result of thesis is the presentation of a development

cycle that aids in the construction of stand-alone Flash websites that are optimized in usability, accessibility and searchability aspects without sacrificing visual creativity and artistic appeal.

CHAPTER 2
Terms of Reference & Literature Review

RESEARCH HYPOTHESIS

It is possible to create stand-alone Flash websites for front-end presentation while maximising its degree of usability, accessibility and searchability.

SCOPES AND BOUNDARIES

While most of the terms represent a unified meaning across different contexts, I would like to define their scope in reference to the thesis.

Stand-alone Flash website

According to the Webster s online dictionary, *standalone* in reference to electronics means capable of operating independently[5]. In reference to web design, *stand-alone Flash website* means a website which is done entirely in Flash and only uses HTML as a means of embedding it in the web document and providing a background color or image.

Front-end

According to *searchvb.com*, a *front-end* application is the application users interact with directly. A "back-end" application or program serves indirectly in support of the

[5] *Definition: Stand-alone*, (n.d), <http://www.websters-online-dictionary.org/definition/stand-alone> (17 June 2005).

front-end services, usually by being closer to the required resource or having the capability to communicate with the required resource[6]. In relation to web design, *front-end* means the website available for interaction as visible to the user on their browser. In the case of the thesis, Flash shall be the *front-end* which might interact with a number of technologies in the back-end such as PHP, XML or CGI, for example in order to retrieve data as appropriate.

Usability

The definition for this term remains the same as to any other context and is defined in the introduction.

Accessibility

The definition for this term remains the same as to any other context and is defined in the introduction as well as in the project activity section.

Searchability

To avoid ambiguity, I would like to state that searchability in reference to the thesis refers to the search engine friendliness a website shows to search engines on the World Wide Web and does-not refer to intra website searchability (a search engine within the Flash website to let users search for content within it).

---

[6] *Definition: Front End*, (n.d), < http://searchvb.techtarget.com/sDefinition/0,290660,sid8_gci293919,00.html> (27 July 2005).

Also, further defining the boundaries of the thesis, I would like to point out to the fact as cited under the literature review, while Flash usability can match and most definitely surpass the usability of a traditional HTML or a mixed technology website, it can-not mach the accessibility and searchability that the latter can offer. Thus, the aim of this thesis is to operate within the boundaries of looking for a solution which addresses the problem of designing stand-alone Flash websites keeping usability, accessibility and searchability in mind. The solution shall be in the form of an optimized development cycle that *maximises* usability, accessibility and searchability for stand-alone Flash website design rather than trying to measure up to the effectiveness of accessibility and searchability an HTML counterpart could offer.

RELATED QUESTIONS

The hypothesis raises the following research questions:

1. Why are usability, accessibility and searchability important factors to consider while designing websites regardless of technology used to implement them?
2. What is the present state of support that Macromedia Flash as an authoring tool as well as plug-in offer at present in regard to the creation of usable, accessible and searchable content?
3. What reasons can be attributed to the rarity of stand-alone Flash websites that are usable, accessible and searchable?
4. What are the implementation processes and issues that are associated with the creation of usable, accessible and searchable content for stand-alone Flash websites?

5. How can stand-alone Flash websites that enable usability, accessibility and searchability be created in an optimal sense of time and effort?

LITERATURE REVIEW

The literature review offers the following pieces of literature as means to establishing the situational problem perceived which in turn suggest the adoption of SSM as an appropriate research approach for this thesis.

Usability, accessibility and searchability as Success Factors

In evidence of the fact that usability, accessibility and searchability are crucial factors in making a website successful, Sarah Scott-Parker, a bachelors student in multimedia design and digital animation at Cumbria Institute of the Arts presented a report covering the fundamental issues relating to the design and construction of successful websites and the criteria used to evaluate them. The report covered quantitative and qualitative research into current approaches by industry professionals, as well as case studies about accessibility.

Parker concluded her thesis stating that, The success of a website is dependant on more factors than merely the construction and design There are certain steps that can be taken to maximise and maintain the potential audience , thereby listing searchability, accessibility and usability as the steps required to be taken in order to make a website successful. She ended her report concluding, The specifics for actually

coding a site will change but the need for it to be accessible, usable and easily found will not. [7]

The above report stresses the importance of developing websites (including stand-alone Flash websites) according to these factors as they are crucial in determining the success of a website. It also prompts me to do a detailed study on these factors in relation to Flash website design in order to understand them well and consequently address the related questions of research.

Capability of Flash to produce Usable, Accessible and Searchable content

Based on the following, we can see that Flash, itself and through external factors can be used to create usable, accessible and searchable content.

Usability and Accessibility

In 2002, the release of Flash MX and Flash player 6 marked the official arrival of Flash as a tool that allowed for the creation of usable and accessible Flash content. In support of the fact that Flash MX is an effective tool over its predecessor versions for usability and accessibility, Nielsen, who was involved in making this version of Flash accessible and usable said, The version of Flash introduced in 2002 (Flash MX) has solved many of the technical usability problems in previous versions of Flash. Among other things, Flash MX supports accessibility and the "Back" button in the browser. A very important usability improvement is that Flash now ships with a **standard set of**

[7] Parker, 2003.

interaction controls (author s bold): finally, no more random scroll bars made up at the whim of a Flash designer. [8] MacGregor agrees too that the Flash MX UI components serve the double purpose of speeding up development time and making Flash UI elements behave the same across different designer s content.[9]

In regard to Flash accessibility, MacGregor says, Contrary to what people may assume, Flash content can be made just as accessible as HTML content. As long as we re aware of the accessibility capabilities of the Flash authoring environment there s no reason why *all* (author s italics) content created in Flash shouldn t be made available to a*ll* (author s italics) web users. [10]

According to Joe Clark, Macromedia s authoring environment , Flash MX, and the new Flash 6 player offer substantial, real and only slightly incomplete screen-reader support. Among other things, you can assign text equivalents (similar to *alt* and *longdesc* in HTML) to buttons, input fields, movies and a few other items, all of which screen readers can find and read out. Text per se is automatically exposed to screen readers, meaning that many parts of many existing Flash sites are made instantly accessible if you re using Flash 6 and the right adaptive technology. Authors don t have to lift a finger. [11]

---

[8] Jakob Nielsen, *Flash: 99% Bad,* October 2000, <http://www.useit.com/alertbox/20001029.html > (6 February 2005).
[9] MacGregor et al, 25.
[10] MacGregor et al, 345.
[11] Joe Clark, *Building Accessible Websites,* (USA, New Riders, 2002), 328.

Searchability

According to Shari Thurow, marketing director at Grantastic Designs, in an article she wrote on Flash searchability, since crawler-based search engines were primarily designed to index HTML text, web sites built with Flash may be difficult or impossible for crawlers to read. Earlier on, search engine crawlers could only see pure text and were unable to recognize text on an image or text that appeared as a graphic in a Flash movie. However, by 2003, FAST search which used to power www.alltheweb.com and Lycos became the first web search engine to support the Flash file format using the Macromedia SDK. Thurrow quotes Tim Mayer, Vice President of Web Search at FAST saying, "FAST is the first web search engine to support the Flash file format using the Macromedia SDK. This will increase the coverage of the FAST search index as well as making Flash sites visible to the end user via a search engine. This enhancement makes both the text and the links within the Flash file visible to the FAST crawler." Thurow adds, Google is another search engine that can, at least partially, index Flash sites. [12]

Besides search engines including the ever popular Google able to index Flash content on websites, Macromedia Flash itself includes a publish template mechanism which aids in optimizing Flash for searchability considerations. According to Macromedia, Since Macromedia Flash 4, Flash has had a mechanism that will export the text within a movie into the HTML file published with a SWF file. This information, contained in the HTML of the page embedding the Macromedia Flash SWF is what a search engine looks for when indexing the page. Macromedia also suggests, The majority of search

[12] Shari Thurow, *Optimizing Flash for Search Engines,* February 2003, < http://searchenginewatch.com/searchday/article.php/2161851> (5 April 2005).

engines search for a specific set of information located in the META tag of an HTML file. Site developers can use a text editor to add/edit this information in the HTML file that embeds the Macromedia Flash SWF file.

Therefore, we can see that not only are more and more search engines indexing Flash content but Flash as an authoring tool itself allows for the creation of content that can be indexed by search engines.

Stand-alone Flash websites built according to Usability, Accessibility and Searchability considerations are rare to come across

In an article on speculation of current day Flash website usability, Jim Kukral, Director of Emarketing/Brand Manager for KowaBunga Technologies suggests that stand-alone Flash websites are still mostly unusable even today, despite Flash being capable of producing usable content. He quotes an earlier article written by Nielsen saying, In October 2000, usability guru Jakob Nielsen published an article on his Web site entitled, "Flash: 99% Bad." He stated that, "Although multimedia has its role on the Web, current Flash technology tends to discourage usability for three reasons: It makes bad design more likely; it breaks with the Web's fundamental interaction style; and it consumes resources that would be better spent enhancing a site's core value. It's obvious that Flash technology has changed a lot since 2000. Flash MX actually helps solve the problems once associated with Flash and usability with its new features and range of uses. However, I believe there's still validity to Nielsen's three points. He just

might want to update his article title from "Flash: 99% Bad" to read "Flash: 50% Bad."[13]

WebAim, one of the world s leading providers of web expertise internationally, admit that although there are strategies to make Flash accessible, Flash websites on the internet today are rarely designed accordingly thus making them rather inaccessible. According to Jared Smith, Director of Education Initiatives and accessibility trainer for WebAim, Flash content is rarely designed to include all strategies (to make Flash accessible) at the same time, thus making it inaccessible.

Sandra Waggett, founder and principal designer of MSW Interactive Designs, suggests the rarity of stand-alone Flash websites on the internet by saying that, The problem is that search engines don t like Flash at least not sites that are 100% Flash. Flash handles text differently than a standard HTML page, so most search engines have a hard time properly indexing 100% Flash. Think about it when was the last time you did a Google search and the #1 ranked site you found was a Flash site? [14].

[13] Jim Kukral, *Is Flash more usable than it was in 2000?*, September 2003, http://builder.com.com/5100-31-5073254.html>, (29 May 2005).
[14] Sandra Waggett, *SEO - Three Actions that May Improve Your Rankings*, (n.d), < http://ezinearticles.com/?SEO--Three-Actions-that-May-Improve-Your-Rankings&id=74427 > (18 June 2005).

CHAPTER 3
Methodology

The research approach employed in this thesis is SSM (Soft Systems Mythology) as developed by Peter Checkland of Lancaster University. The research family utilized is majorly qualitative and minorly quantitative research. Document review has been used extensively as the secondary data collection technique while website evaluation has been used for primary data collection. Since this research thesis is based on critically analysing a collection of secondary data in the form of document review where most material could be gathered from the Singapore National Library or the internet, it is based upon deskwork in contrast to fieldwork.

RESEARCH FAMILY

This research employs qualitative research as the major research family and quantitative research as the minor research family. Quantitative research was utilized in the form of stand-alone Flash website evaluation which was used to further lend support towards the observation and literature review that it is indeed rare to come across stand-alone Flash websites built according to usability, accessibility and searchability considerations. While qualitative research is concerned with the opinions, experiences and feelings of individuals producing subjective data where understanding of a situation is gained through a holistic perspective, quantitative research depends on the ability to identify a set of variables.

According to Bouma, qualitative research is concerned with answering questions such as What is it like to be a member of that group? , What is going on in this situation? , and What is it like to experience this or that phenomenon? Qualitative data is therefore better to describe the qualities of events under study and serves as an excellent strategy to understanding feeling and emotions behind a phenomenon.[15] Leedy[16] describes qualitative research as a warm approach and goes on to confirm Bouma s description by relating this approach to interpersonal relationships, personal values, meanings, beliefs, thoughts and feelings. The document review analysed in this research mainly deals with the issues and practices related to the implementation of usability, accessibility and searchability related to stand-alone Flash website design where industry experts offer their opinions on related methods and their thoughts on possible issues and therefore most of the material is of qualitative nature. Qualitative data can often provide an understanding which would not emerge from a purely statistical analysis and is the most suitable form of providing an understanding of issues for this thesis.

Bouma says qualitative research is concerned with answering questions such as How much? , how many? , and how often? where data is usually expressed as number, percentages or rates.[17] Qualitative research is more towards creating clear cases through numbers. Leedy describes qualitative research as warm in contrast to quantitative

[15] Gary D. Bouma, *The Research Process*, (Melbourne, Oxford University Press, 2000) , 19-20.
[16] Paul D. Leedy, *Practical Research Planning and Design*, (New York, MacMillan Publishing, 1993), 142.
[17] Bouma, 19.

research which is referred to as cold .[18] The stand-alone Flash website analysis yields data of quantitative nature which is used to express in percentile form the enablement of usability, accessibility and searchability of such websites.

According to Patton, there are twelve major characteristics of qualitative research, namely:

1. Naturalistic inquiry
2. Emergent design flexibility
3. Purposeful sampling
4. Qualitative data
5. Personal experience and engagement
6. Empathic neutrality and mindfulness
7. Dynamic systems
8. Unique case orientation
9. Inductive analysis and creative synthesis
10. Holistic perspective
11. Context sensitivity
12. Voice, perspective, and reflexivity[19]

[18] Leedy, 142.
[19] Michael Q. Patton, *Qualitative Research and Evaluation Methods,* 3rd ed. (USA, Sage Publications), 40-41.

Out of these 12 characteristics, characteristics 1, 2, 4, 6, 9 and 10 are strongly indicative of the approach that I follow for this research.

1. **Naturalistic inquiry**-Since my research study is concerned with an area where findings unfolded naturally as I continued to study it in a non-manipulative and non-controlling way, my research is indicative of naturalistic enquiry. More so, having to allow openness to the results that emerge indicates this further.

2. **Emergent design flexibility**- Since Flash usability, accessibility and searchability operates at a different level in comparison to its HTML or non-Flash counterparts in web design, this research requires openness to adapting inquiry for a web designer as researcher as understanding deepens where I needed to avoid getting locked into passing already known and available methods and techniques, which might be based on non-Flash methods, without questioning their validity, efficiency or workability. This attitude helped me uncover a number of flaws offered in white papers as well and has been crucial in helping me deliver a just thesis and helped me pursue new alternatives to these problems as they arose.

4. **Qualitative data**- This thesis is based on critical analysis of document review, which was a means of gathering qualitative data required to be thick and detailed in description. Since my research required focus on the richness and depth of the data, it was an appropriate approach to follow in regards to this thesis where it was important

that I explore and understand usability, accessibility and searchability in relation to stand-alone Flash website design in as much detail as possible.

6. **Empathic neutrality and mindfulness**- All the material available to me for documentary analysis came from authoritative sources. Since authoritative material is tough to disagree with, where everything in them seems right, maintaining a neutral stance towards the principles of usability, accessibility and searchability was required. Across the study, there were many instances where credible sources have bended information to as and when it suited the article. Maintaining a neutral stance and mindfulness in turn helped me uncover many aspects in relation to the three factors I was studying where.

10. **Holistic perspective**- It is understood on my part that usability, accessibility and searchability have been addressed to individually in relation to Flash design but not together. Adding them up as they exist does not lead to a solution to creating websites which consider these three factors but as I have learned over the course of this research, creates a complex system that is more than just the sum of these parts. This perspective has helped me focus on finding complex interdependencies and interferences within the collation of the methods used to create usable, accessible and searchable Flash content.

RESEARCH APPROACH

SSM has been utilized as research approach to be followed for this thesis. Judging the problem as a soft or situational problem required the utilization of SSM as opposition to Action Research which would have been suitable if the problem was hard or well defined.

Further offering an understanding of why SSM was an appropriate choice for research approach, a brief understanding of systems development is needed. Out of the two approaches towards systems development, hard systems approach is based on systems engineering and systems analysis where people are treated as passive observers of the system development process. The approach that encompasses all the stakeholders of the system is soft system approach. SSM is a methodology that adopts such 'soft system approach'. SSM is an appropriate approach when the problem at hand is ill-defined rather than well-defined.[20]

In the case of this research, the problem of websites not being designed according to usability, accessibility and searchability considerations was found to occur not because Flash was incapable of producing such content but because of the fact that web designers and developers perceptions and attitudes towards using Flash for other purposes which makes the problem situational where in the situation that Flash is used to design stand-alone Flash websites, they are not designed according to usability,

[20] Vanita Shroff, *Soft Systems Methodology – Summary,* December 2000, < http://sern.ucalgary.ca/~shroff/seng613/Assignment5/SSMSummary.html> (13 July 2005).

accessibility and searchability considerations which are important factors that determine the success of a website. SSM is a rather goal-driven approach where the primary focus is on the *people* involved with the situational problem which is therefore suitable to look for a solution to the perceived problem of Flash not being utilized to build stand-alone Flash websites according to usability, accessibility and searchability considerations.

Outlined below are the advantages and disadvantages of SSM[21]. The advantages listed below also serve as further justification of adopting SSM as an appropriate research approach for this thesis.

Advantages of SSM

- SSM useful in solving unstructured and poorly delineated systems where goals are not properly defined or debatable.
- The methodology can be tailored to fit a particular situation.
- It aims at finding the best possible solution to benefit to all those who are involved.
- SSM is suitable for software process improvement. We learn what wrong is in the current software process and try to find the solutions to improve.
- SSM stages can be used in any order that is appropriate.

[21] Shroff, 2000.

Disadvantages of SSM

- SSM does not actually tell you how to build a system.
- Problems not structured but fuzzy and subject to change because people are involved.
- Requirements emerge from a discussion and bargaining process.
- There is no way of telling whether an SSM project is a success or a failure.
- It produces models of system activity that are largely informal and therefore subject to misunderstanding.
- It ignores issues of power. It is based on the idea that all people involved in the system can openly discuss their problems and needs.

The Seven Stages of SSM

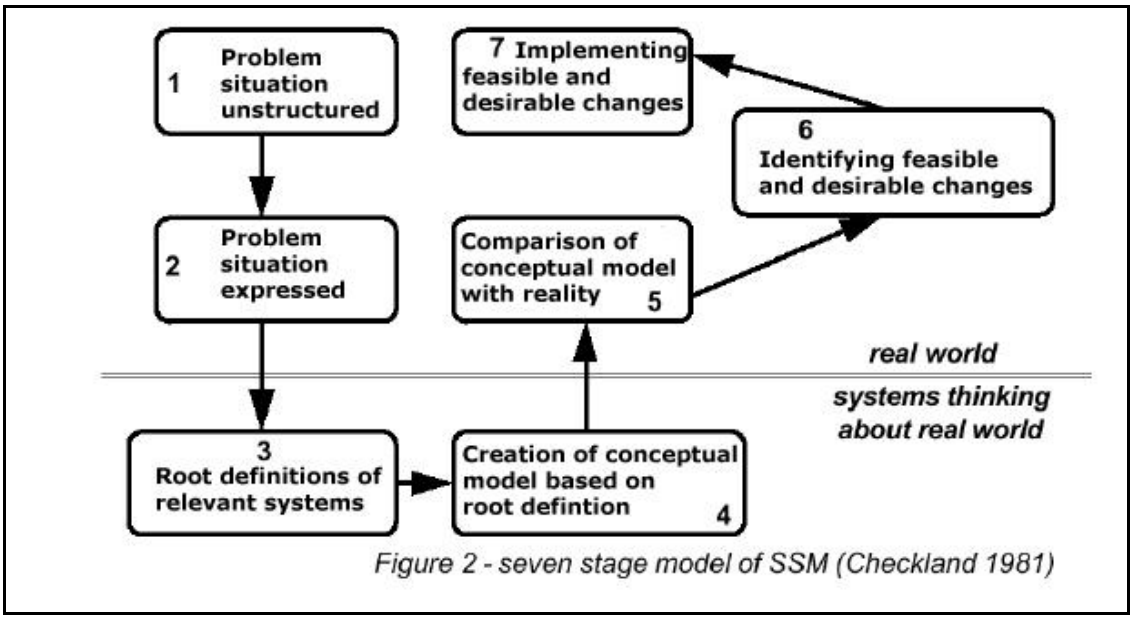


Figure 2 - seven stage model of SSM (Checkland 1981)

Seven Stages of SSM as used in Thesis

Chapter 1: Introduction briefly explains the problem identified and explains why the problem is a soft or situational problem rather than a well defined or hard problem. In Chapter 2: TOR and Literature Review, the literature review helps establish that usability, accessibility and searchability are important factors to consider for the success of a website and that it is rare to find stand-alone Flash websites that are built according to these aspects. It also establishes through literature that Macromedia as an authoring environment is capable of producing usable, accessible and searchable content. Chapter 3: Project Activity then studies reasons given by industry experts as to why Flash is not being used to create stand-alone Flash websites according to these three aspects (which is known in SSM as *problem situation expressed*). Following the isolation of these reasons, the problem is expressed using rich pictures and CATWOE analysis was applied to derive root definitions of relevant systems according to the soft systems methodological approach which thereafter help in the creation of a conceptual model based an ideal system of views. This conceptual model is then compared to the problem situation expressed which is comparing the ideal system to the real world problem that actually exists which helps in evaluating the model itself. This then leads to looking for feasible and desirable changes. Following this, a critical analysis of usability, accessibility and searchability in relation to Flash design through a document review is given which has been used the major form of secondary data collection in this research. This analysis is the critical point which helps look for solutions to the problems isolated. Incorporating these solutions, we are led to the final outcome of the thesis which is the solution to the perceived situational problem, the presentation of a

development cycle that aids in the construction of stand-alone Flash websites that are optimized in usability, accessibility and searchability aspects without sacrificing visual creativity and artistic appeal.

DATA COLLECTION TECHNIQUES

Website Analysis

Primary data collection occurred in this research through website analysis which was used to reinforce the observation along with the literature review that it is indeed rare to come across stand-alone Flash websites that are built according to usability, accessibility and searchability considerations. Choosing to evaluate stand-alone Flash websites specifically from *macromedia.com* s *showcase* section was a conscious decision because unlike other web design showcases which include websites based on a rather unprofessional criteria mainly judging them based on their wow factor and not considering usability, accessibility and searchability aspects, the Macromedia *showcase* section features original web design projects based on strong visual aesthetics, technical execution, usability and accessibility which are only included in this esteemed showcase after they are understood to offer cross browser and platform compatibility, apart from offering reasonable download time, even for low-bandwidth users[22]. Due to the non-availability of an evaluation method in the web design industry for evaluating specifically the usability, accessibility and search ability enablement of stand-alone Flash websites , I conducted the stand-alone Flash website evaluation using an

[22] Macromedia, *Customer Showcase Submissions: Showcase Submission Guidelines*, (n.d), < http://www.macromedia.com/cfusion/showcase/index.cfm?event=submit&loc=en_us> (23 June, 2005).

evaluation method created as part of my specialised application project by which I could evaluate these aspects for specifically stand-alone Flash websites. The results of this evaluation are available in *appendix A*.

Document Review

The examination of pre-existing documents and data sources is known as document review.[23] This research utilizes document review as its primary form of secondary data collection technique. The document review was required to conduct an in depth study and critical analysis of usability, accessibility and searchability in relation to creating Flash content and stand-alone Flash websites. The document review followed the method as outlined by Sarah Earl et al. in the book Outcome Mapping: Building Learning and Reflection into Development Programs.[24]

Accordingly, my procedure for document review was based on the following steps she describes which have been explained in relation to my research:

1. **Identification of written and electronic documents** - These documents were identified as those which contained information on practices and related issues to the creation of flash and stand-alone Flash usable, accessible and searchable websites. The written and electronic documents which I chose to review are given under the topic *Documents Reviewed* further below. The criteria of

[23] Mary Church, *Comprehensive School Reform Evaluation*, April 17, < http://www.prel.org/programs/rel/presentation.ppt> (3 May, 2005).
[24] Sarah Earl et al, *Outcome Mapping: Building Learning and Reflection into Development Programs*, (Ottawa, International Development Research Center, 1971), Appendix B, 9.

selection for these documents were based upon credibility of authors and organisations, out of which almost all are leading authorities in their respective areas. Hence, document review as a form of secondary data collection proved more useful in terms of reliability and credibility of information gathered rather than utilizing forms of primary data collection such as interviews and surveys which, in the case of this thesis, would have not yielded the same quality of information gathered in terms of expert opinion and viewpoint analysis of the problem at hand. Care was taken not to include documents of less credible nature in order to strengthen the factual nature of qualitative information retrieved from these documents.

2. **Identification of relevant information** Relevant information in these documents were identified as information which discussed either the practices and issues related to design of usable, accessible and searchable flash or stand-alone Flash websites or content or information which discussed personal insights by authoritative figures and industry people on their take of the situation.

3. **Historical perspective of the issue** This step has been omitted from the document review and instead occurs at appropriate places in sections prior to the document review as an attempt to try maintaining a natural logical flow of relevant information which is more suited to being assimilated while reading the thesis.

4. **The relevant documents exist and are accessible-** All documents utilized for the purpose of document review were easily available in either electronic format or written and are easily accessible for verification through the internet or public libraries.

The results of utilizing document review as a major form of secondary data helped remove the constraints identified that acted as a barrier to allowing web designers and developers from using Flash to create usable, accessible and searchable content.

Advantages of document review

- Data already exists
- Information is objective
- Inconsistencies can be detected
- Gives good insight to the inner workings of the system
- Available information seems more accurate than primary data collection methods
- Low cost
- Typically unobtrusive
- Relatively unbiased [25]

[25] Mary Church, 2000.

Potential drawbacks of document review

- Can be labor-intensive and time-consuming
- There may be ”too much” information
- Can be limited in scope
- Lack of quality control

CHAPTER 4
Project Activity

SSM STAGE 2: EXPRESSING THE PROBLEM SITUATION

As explained in the methodology, step 1 of SSM which is known as *problem situation unstructured* took place in the introduction and literature review which established that usability, accessibility and searchability are important aspects that determine the success of a website and even though Flash is capable of creating usable, accessible and searchable content it is rare to come across usable, accessible and searchable stand-alone Flash websites. Further proof to support the above facts can be referred to in *appendix B* and *appendix C* which offers a guided explanation of the importance of usability, accessibility and searchability to website design and Flash s capability of creating usable, accessible and searchable Flash content.

Progressing to step 2, *problem situation expressed,* it is now important to look into reasons and opinions by established web designers as to why is it that stand-alone Flash websites are not created according to usability, accessibility and searchability considerations. This collection of information helps in providing a description and understanding of the problem situation which is also expressed through a rich picture that shows the flow of ideas and relationships within the complex system that is the World Wide Web.

Views extracted to express problem situation

A study for opinion and reason to shed light to explain the rarity of stand-alone Flash websites on the internet that are usable, accessible and searchable was gathered from available material online and offline from books, interviews and online discussions through Chris MacGregor, acclaimed usability consultant, Bobby van der Sluis, designer/developer working at the award winning new media company, Blast Radius, Joshua Davis, renowned creative web designer of www.praystation.com fame, BBC s interpretation of Davis s comments of an interview with him and Bob Regan s (senior product manager of accessibility at Macromedia response to another interview in reference to Davis s own website, the following could be gained. The citations offered with explanation are offered in appendix D.

Two main reasons gathered defined here as constraints are given below:

Constraint 1: Implementation of usable, accessible and searchable stand-alone Flash websites is time-consuming and tedious

If usability, accessibility and searchability are important considerations for website development, then deployment of mixed technology websites is the best solution to be implemented as stand-alone Flash websites are tougher to implement according to these aspects than compared to mixed technology websites.

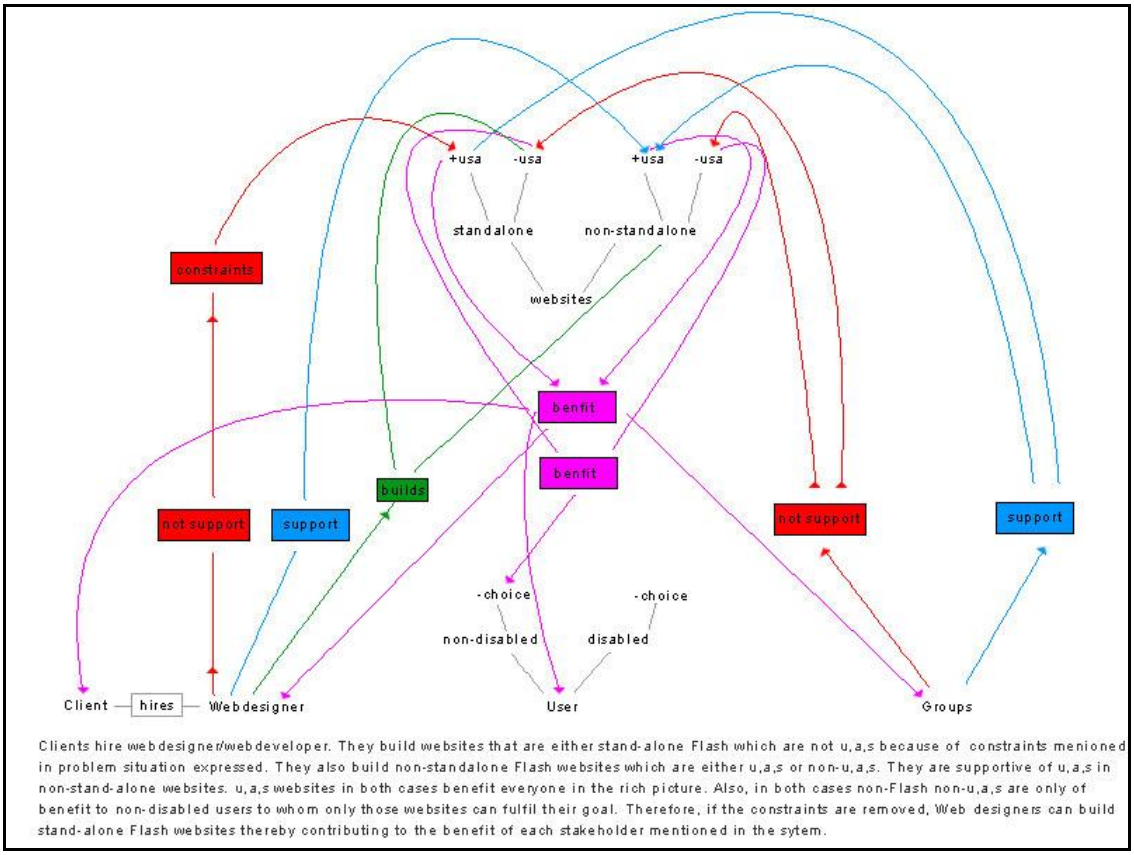
Constraint 2: Restriction on creative design

These aspects which create many rules and boundaries to be followed in turn stifle creativity and the spirit of artistic innovation for the web.

Expression of problem situation through rich picture

The rarity of such websites with their reasons extracted creates a complex picture of relationships when looked at from the point of view of a system that is the World Wide Web where websites have been looked at from the point of stand-alone Flash websites and non-stand-alone Flash websites. The stake holders identified as part of the system have been limited to the client, web designers, users- disabled and enabled, and interest and advocate groups that support usability, accessibility and searchability. Rich pictures are used to provide a model for thinking about the system and to help the analyst gain an appreciation of the problem situation.[26] Therefore, in order to get as full a view of the factors involved in the problem situation, a rich picture has been constructed.

[26] Dale Couprie et al. *Soft Systems Methodology*, (n.d), < http://sern.ucalgary.ca/courses/seng/613/F97/grp4/ssmfinal.html> (June 2).



u,s,a = usable, accessible and searchable

SSM STAGE 3: ROOT DEFINTIONS OF RELEVANT SYSTEMS

A root definition is expressed as a transformation process that takes some entity as input, changes or transforms that entity, and produces a new form of the entity as output. The purpose of the root definition is to express the core purpose of some purposeful activity system. Properly written root definitions provide a much simpler insight into building system models.[27]

[27] Dale Couprie, (n.d).

CATWOE Analysis

According to the rich picture, I could build 6 root definitions by using CATWOE analysis based on the participants or stake holders in it. CATWOE is mainly used for the purpose of analysing the analysis of root definition sentences, but may be used as a building block for to derive the root definition sentence if we know the CATWOE elements.[28]

The acronym expansion of CATWOE is given below.

C=Customer: everyone who stands to gain benefit or suffer from the relevant system is considered as a customer of it.

A=Actor: The actor performs activities defined in the relevant system.

T=Transformation process: This is shown as the conversion of input to output.

W=Weltanschauung: The German expression for world view. This world view makes the transformation process meaningful in context.

O=Owner: Every system has some proprietor, who has the power to start up and shut down the system.

E=Environmental constraints: Elements that restrain the activities from taking place.

In *appendix E* are derivations of six root definitions, namely, root definition relevant to client, root definition relevant to web designer, root definition relevant to search engines, root definition relevant to non-disabled users, root definition relevant to disabled users and root definition relevant to other support groups.

[28] Dale Couprie, (n.d).

Comparing the root six definitions, noticeable in all cases is that the A(ctor) who is the web designer/developer is ultimately responsible for determining whether or not to build stand-alone Flash websites that are usable, accessible and searchable. It was thus possible to express all six root definitions under a single root definition for the reason that it was possible to combine them all and express the view of all stake holders together.

Combining all the root definitions to form a singular root definition led to the following root definition:

Removing the constraints of the web designer/developer, the web designer/developer can create stand-alone Flash websites that are usable, accessible and searchable on the request of the client (who agrees on stand-alone flash for website deployment) of which benefit covers a large gamut of the constituents of the World Wide Web such as the non-disabled and disabled user, client itself and the web designer/developer, search engines, usability/accessibility/searchability advocates and the W3C itself whose aim is to try and contribute to the overall wellness and goal of the World Wide Web.

C: Client, web designer/developer, W3C, usability/accessibility/searchability advocates, all users, search engines

A: Client, web designer/developer

T: The need for a stand-alone Flash website on request of the client is transformed into the creation of a usable, accessible and searchable website, whether stand-alone Flash website or not.

W: Because usability, accessibility and searchability are important factors for a website s success and benefits the entire C(ustomers), doing so for stand-alone Flash websites is ideal.

O: Client, web designer/developer

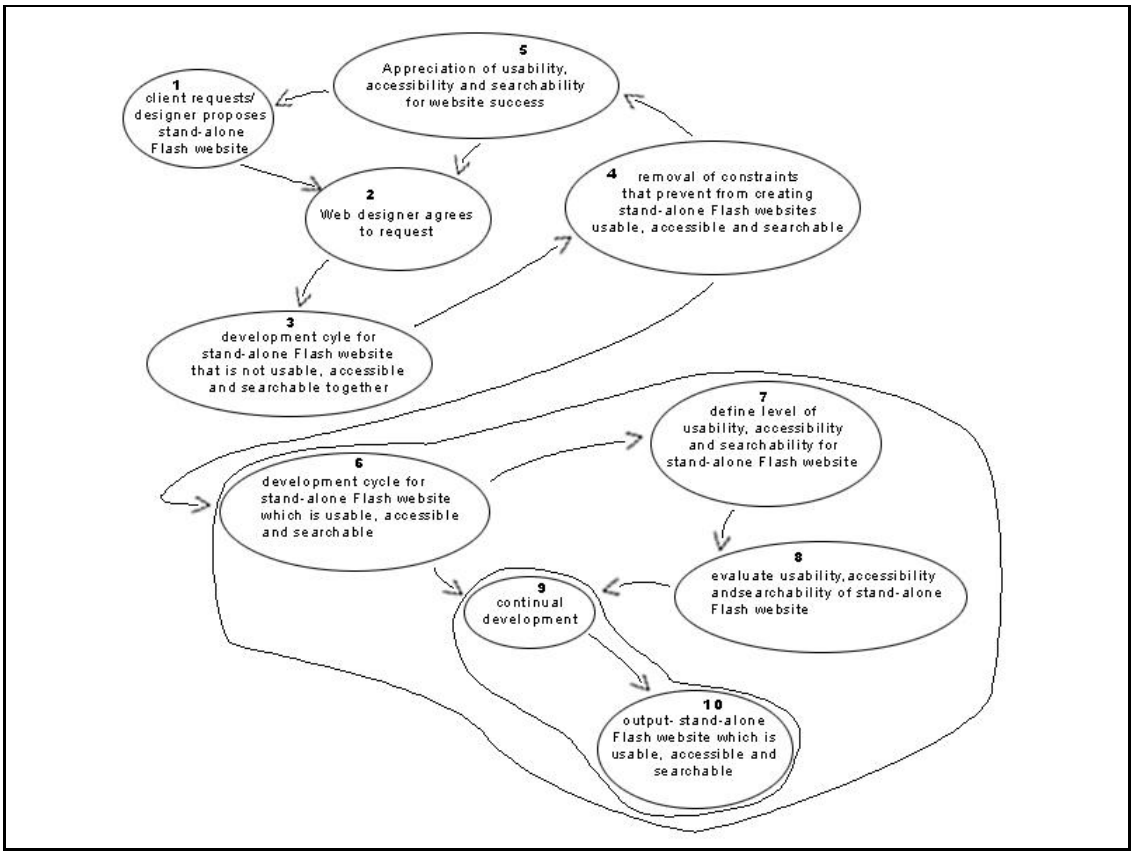
E: Constraints of the web designer/developer

As is noticeable, the creation of websites in the final root definition has been restricted to stand-alone Flash websites in (T) and constraints (the two views extracted to express problem situation) of the web designer/developer in (E). This is because the problem the thesis is concerned lies within the area of stand-alone Flash websites which is the area to b investigated for a solution to be found. Also, the web designer/developer s constraints are the reason because of which the other constraints in the other five root definitions (refer appendix b) occur. The solution to removing the constraints of the other five root definitions as understood through the final root definition lies in removing this very constraint. Therefore, the web designer/developer is defined as the ultimate stakeholder upon whose decision finally could a stand-alone Flash website be made usable, accessible and searchable.

SSM STAGE 4: CONCEPTUAL MODEL

Following the understanding gained through the final root definition, a conceptual model can be constructed. The conceptual model has a very simple notion the activity itself is shown as a bubble, with the activity named and a line that links it with the

other activities.[29] Through the conceptual model, it was possible to propose an ideal view of the activities that should be followed in order to realise that perspective. I could now build a conceptual model built as the "ideal" system to solve the problem.



According to the conceptual model

1. The client requests/ designer proposes a stand-alone Flash website.
2. Web designer/developer agrees to building a stand-alone Flash website (not usable, accessible and searchable all together though).

[29] Malcom Eva, *Soft Systems Methodology,* January 2004, < http://www.acca.org.uk/publications/studentaccountant/1073535?view=Standard> (12 June, 2005).

3. To build the website, the web designer/developer will implement their development cycle for creating stand-alone Flash websites (not usable, accessible and searchable all together).

4-5. If the constraints of the web designer/developer can be removed which prevent them from creating usable, accessible and searchable stand-alone Flash websites, then the web designer/developer is in appreciation of the same and they convey to the client the benefits of such a website which is appreciated by the client as well now.

6. The web designer/developer will then implement a development cycle for creating usable, accessible and searchable stand-alone Flash websites.

7. The level of usability, accessibility and searchability will be defined at the beginning.

8. This will be used to evaluate the website as it develops.

9. The development of the website will continue while it is being evaluated till the time it reaches a stage of satisfying the evaluation criteria.

10. The developed stand-alone Flash website which is usable, accessible and searchable will then be deployed.

SSM Stage 5: Comparison of Conceptual Model with Problem Situation Expressed

Comparing the conceptual model with the problem situation expressed, we can see that since Flash is capable of producing usable, accessible and searchable websites, the web designer/developer can utilize it to make stand-alone Flash websites that are usable,

accessible and searchable *in the case that the two constraints preventing them from creating the same be removed.* The constraints expressed by in the section views extracted to express problem situation were:

Constraint 1: Implementation of usable, accessible and searchable stand-alone Flash websites is time-consuming and tedious.

Constraint 2: Restriction on creative design.

Therefore, as indicated in the conceptual model, for it to work, these constraints have to be removed. In order to remove these constraints, the following can be done for view 1 and view 2 respectively:

1. Usability, accessibility and searchability should be as easy (or as easy it can possibly be made) to implement as in the case of mixed technology websites.
2. Creation of a usable, accessible and searchable stand-alone Flash website should not interfere with creative expression during stand-alone Flash website development.

SSM STAGE 6: IDENTIFYING FEASIBLE AND DESIRABLE CHANGES

As shown in the conceptual model, it is the development cycle which actually leads to the transformation of the client s request into a website. According to the conceptual model and the constraints, it seems that solutions to the two constraints lie in creating a development cycle that accommodates these solutions.

Therefore, if the development cycle will allow for an optimal process in terms of time and effort for the creation of usable, accessible and searchable stand-alone Flash websites as well as takes measures to avoid usability, accessibility and searchability techniques from hindering creative expression, then the web designer/developer will be able to create the same. In this regard, the feasible and desirable changes are to create a development cycle which will optimize the process of creating usable, accessible and searchable stand-alone Flash websites that remove the perceived extraneous effort and time which would otherwise occur as well as ensure that these aspects do-not interfere with the creative process involved in creating the website.

In order to create such a development cycle, two things are required:

1. An in-depth study and critical analysis of usability, accessibility and searchability in relation to creating Flash content and stand-alone Flash websites in order to look for solutions to remove the two identified constraints.
2. Once the solutions are found, adoption of a reliable industry strength development cycle used to create Flash websites which utilizes inferences gained from the above point to incorporate necessary changes to create an effective and optimized development cycle.

The in-depth study and critical analysis based on the document review of usability, accessibility and searchability in relation to creating Flash content and stand-alone Flash websites is given in the *appendix F* as it could not be accommodated under the allowed word count of the thesis. The summary of inferences gained from the critical

analysis of the document review on the above is however given below which reveals some very interesting data.

Critical Analysis of Document Review- Inference and Summary

The critical analysis on the document review for stand-alone Flash usability, accessibility and searchability is available in appendix E. I strongly suggest referring to it in order to get a clear understanding of the issue and technical terms associated with them. The purpose of the document review was to investigate whether it would be possible to remove the two constraints indicated in the conceptual model. In order to remove these constraints, the following could be thought of for view 1 and view 2 respectively:

1. Usability, accessibility and searchability should be as easy (or as easy it can possibly be made) to implement as in the case of mixed technology websites.
2. Creation of a usable, accessible and searchable stand-alone Flash website should not interfere with creative expression during stand-alone Flash website development.

As mentioned above, the document review underwent a critical analysis and the results were profoundly useful from discovering the underlying relationship specifically for stand-alone Flash implementation of these three aspects. The summary and inferences drawn which also include solutions to the identified constraints are discussed:

Solution found to Constraint 1

While I admit that the inferences gained through the document review was not suggestive of the fact that implementing Flash usability, accessibility and searchability was easier than implementing the same for mixed technology websites, I discovered an incentive equally worthy of luring such designers to design Flash websites with these three aspects. The document review revealed that there is a relation between implementing usability, accessibility and searchability for stand-alone Flash websites. It was a pleasant finding that implementing usability for a stand-alone Flash website itself reduces the effort one has to then make to enable accessibility to an appreciable extent. Also found was that if accessibility is well implemented, implementing SEO becomes not only easier but more effective. The commonalities amongst these three aspects show that it if all the three aspects, usability, accessibility and searchability, are implemented for stand-alone Flash websites, it is indeed cheaper and easier for the web designer/developer to develop such websites.

In order to clearly explain this finding, presented below are commonalities that occur on implementation of different features of these three aspects.

Commonalities- Usability and Accessibility

In all cases, the features given below have to be implemented only once, as it satisfies the overlapping requirements of both aspects thereby removing the perceived notion of usability and accessibility being time consuming to implement.

Back Button Navigation

Enabling Back button navigation is important for usability because according to Nielsen, users happily know that they can try anything on the Web and *always* be saved by a click or two on *Back* to return them to familiar territory.[30] For accessibility, it is important for cognitive impaired people because like breadcrumbs, they will have access to their previously visited documents in a manner that acts as a memory aid. Therefore, once implemented, it serves the dual purpose of a usability and accessibility consideration.

Shortcuts and Keyboard Navigation

According to MacGregor, shortcuts are an important usability consideration because they speed up user activity.[31] For accessibility, it is important because many physically impaired people cannot use the mouse for navigation assistance and use the keyboard as an alternative. Again, a single time implementation of this feature takes care of both usability and accessibility considerations.

Moving Animation

Moving animation is avoided for a singular reason- to avoid distraction from the primary information presented on the page, which is usually textual information. While this is a usability consideration as it aims at focus on primary information, it is more importantly an accessibility consideration because when moving animation is avoided,

---

[30] Nielsen, *The Top Ten New Mistakes of Web Design*, May 1999, < http://www.useit.com/alertbox/990530.html> (June 23).
[31] MacGregor, The Keys to Improving Flash Usability, August 2001, <http://www.flazoom.com/news/shortcut_08032001.shtml> (April 24).

it assists users with learning and cognitive impaired people in assimilating and recalling information better as it reduces distraction.

Sound

While sound can be distracting if no warning is given for regular users and is therefore a usability consideration, it is more important to provide audio controls as an accessibility consideration as it can be a big hassle as it interferes with the screen reader audio.

Color and Contrast

Color and contrast should be wisely decided in color scheming as it is an accessibility requirement in the case of color blind people as well as low vision users. Also, it is a usability requirement as for enabled people, a more appropriate color scheme means a more pleasing interface as well as higher visual clarity.

Commonalities- Accessibility and Searchability

Control Reading Order and Publish Template Mechanism

One of the three methods available for controlling reading order (refer to appendix d), for screen readers and physically disabled users requires that all objects over the lifetime of the Flash movie have an instance name. Since it is not possible to provide an instance name to static text objects, it is to be avoided at all costs else the reading order shall revert to its original uncontrolled state. Avoiding static text not only allows the designer to successfully control the reading order of objects in the Flash movie but

also allows for more effective implementation of the *publish template* mechanism used for SEO purposes. Since *publish template* outputs dynamic text and input text rather than static text in the HTML from the Flash file, implementing control reading order totally by avoiding static text optimizes the *publish template* mechanism in the sense that the designer/developer hence will not have to bother about the issue of replacing static text objects with dynamic text in the Flash movie for the purpose of outputting optimal text into the HTML file.

Commonalities- Usability and Searchability

Bookmarking and E-mail to a Friend and Creating separate pages for each section versions

Bookmarking and e-mail to a friend are great features which further stretch the usability of a stand-alone Flash website as it allows for the same freedom and control user s possess when they possess while browsing HTML sites. This can be enabled in two ways. One would be the tougher *flashvars*[32] method for a stand-alone Flash website that is embedded into a single HTML page and the other simpler method would be to create separate flash files for each section embedded in their own HTML pages. If the latter is done, as is described in the Searchability document review, creating separate Flash files for separate sections is also the most effective methods of SEO for stand-alone Flash websites. Therefore, if the latter is implemented for either SEO purposes, it lets the designer/developer easily implement bookmarking and e-mail to a friend

[32] Scott Gilbertson, *Optimizing Flash for Search Engines,* November 2004, < http://webmonkey.wired.com/webmonkey/04/44/index4a.html?tw=programming> (22 May 2005).

without having to bother about the tougher flashvars method. This method was also incidentally the one presumably, Bobby was talking about (refer appendix D). His view formed the first constraint as listed in the *views extracted to express problem situation* section). A good example of the maxim, killing two birds with one stone , this can be seen as a simple solution that takes care of both usability and SEO (search engine optimization) considerations.

Solution found to Constraint 2

Through the document review, I could infer with certainty that enabling usability, accessibility and searchability will not affect the creative design. While it is a problem, I have come up with two methods to remove the perceived problem.

One example is that there are restrictions on animations, UI design, color scheming apart from small text sizes and creative ways to construct user interaction with the interface. The answer is simple- like the audio controls, let the user choose to enable or disable them. Similarly in the above cases, all the designer has to do is provide an option to the user whether they want to enable complete animations, non-standard UI design, and creative interactions as opposed to direct and simple interactions. For color scheme, the designer can provide an option where the user chooses between the one provided for visual clarity and the one which the designer thinks would go well instead.

The other example is the avoidance of tween animations in a movieclip s timeline which loads dynamic textual data or the main timeline itself in order to avoid screen readers

from refreshing. Here, we could not set this movie clip to inaccessible because textual info is dynamically loaded and we also could not feed the information through the *description* filed in the accessibility panel. In such a case, every frame progressed by the tween will cause the screen reader to refresh. Therefore, in a case like this, a definitive solution I could think of would be placing a script in the first frame of the main timeline (top level) which detects through MSAA (Microsoft Active Accessibility) the presence of a screen reader using the *Accessibility.isActive ( );* function. Using this in conjunction with an if-else statement, in the case it returns a true value, the script can be used to make the particular movieclip to go straight to the frame instead of spanning across that movieclip's timeline for tweens or fade used for visual extravagance purposes thereby avoiding the screen reader from refreshing. If the value returned is false, then the script does nothing and since there is no screen reader, we do not have to worry about the screen reader refreshing.

As we can see, solutions to the two main cases I could uncover with my experience with Flash and also through the document review and literature review have been offered above. They have definitive solutions but do require an extra effort on the part of the designer or developer in order to allow them realise their creative vision for the website while also maintaining a high level of usability and accessibility.

With solutions offered to both constraints, we can now proceed to the creation of an optimized development cycle which can be used to create stand-alone Flash websites without the problems described in the earlier problem situation expressed section .

CHAPTER 5
Project Findings

SSM STAGE 7: ACTION TO IMPLEMENT THE FEASIBLE AND DESIRABLE CHANGES

In order to create an optimized development cycle for the development of usable, accessible and searchable stand-alone Flash websites, one which is the aim of the thesis and probably one which is non-existent, it was necessary to adopt an industry standard development cycle which in some way was more focused towards Flash development than HTML website or one that was rather applicable to web development of all types of technologies. With regard to this, I adopted the Juxt Interactive process over the development process outlined by Ani Phyo of Smart Monkey Media[33] and that of Kelly Goto, principal of GotoMedia and Emily Cotler[34], founder and creative director of Waxcreative Design. The reason for choosing the Juxt process over the latter was because firstly Juxt specialises in Flash-enabled design and their development process is more inclined towards Flash development and besides the other two development cycles are generic cycles of web development which may modified and applied to any type of web development. Therefore, the former is more in-depth while the latter are cover more width which is not required for the development cycle I have to create.

The credibility of the Juxt process can be justified considering that it happens to be an award-winning interactive branding and marketing agency which specialises in Flash-

[33] Ani Phyo, *Return on Design: Smarter Web Design that Works*, (USA: New Riders, 2003),22.
[34] Kelly Goto and Emily Cotler, Web Redesign 2.0, (USA: New Riders, 2002), 18.

enabled design and technologies and has created strategically planned and designed internet communication assets for clients such as Macromedia, Toshiba, Fujitsu and Billabong among many others.

The Juxt development process is given below:

1. Strategy

1.1 Strategy

1.2 Information Architecture

2. Design Phase

2.1 Brainstorming

2.1 Specification

2.2 Concept Plan

2.2 Content Plan

2.3 Focus Group

2.4 Design Development

3. Development

3.1 Shell Development

3.1 Database Development

3.2 Transition Implementation

3.3 Optimization

3.3 Experience Test

3.4 Alpha Testing

4.0 Delivery

4.1 Beta Testing

4.1 Documentation training

4.2 Delivery

5. Maintenance

5.1 Maintenance

Each step has been explained in brief below:

Strategy

Strategy is the step where client s needs are analysed, target market, assets, brand, competition and objectives

Information Architecture

Here is where the site s content is broken down and primary navigation, flow, dynamic application interaction, content management and site content is looked at. Because the flash interaction model is far more flexible in terms of creativity, it also introduces a greater element of structural complexity into a project. Because of the technical complexities involved in developing a project, the information architecture stage becomes key to the successful outcome of any project.

Brainstorming

Brainstorming involves putting together with the project design team to get ideas flowing.

Specification

A specification is a document that outlines project components using wireframe diagrams and text. Three kinds of specifications include the most basic document which is a content specification (wireframe for each screen, laying out navigation model and content alongside page objectives and simple interaction data), functional specification covers all bases of the content spec but in addition include all

interactive behaviour, fields, hidden fields, links and expected behaviour of each screen. The functional spec is much more complex and thoroughly explains the user experience that the site provides. A technology spec is required if the project employs a back-end system which covers the database structure, relationships and business rules. It also explains how the data coming from the front-end is processed on the back end, returned and sent to the enterprise server.

Concept development

Involves visual design development of draft nature where up to three versions of the mockups may be made.

Content Plan

Following the design and technical specifications, a content plan is developed which marks the milestones and delivery dates for key elements for content, as necessary for development of the site. This includes photography, copy, illustrations or any aspects which complete the site. It is important to know how content will be generated so that the site can be developed and delivered on schedule.

Focus Group

After the client approves a concept, it is a good idea to take them out in the real world and test them.

Design Development

The conceptual design approved by the client is taken added with the focus group feedback and then is begun the process to layout the interfaces within the site, the actual pieces of the project begin to take place at this stage. The draft layouts are made proper prepared in Freehand is transferred to Flash.

Shell Development

This step includes taking freehand layouts and converting them to flash and turning stuff into symbols, structured and organised in layers and movie clips. Motion design, database development and actionscripting occur in tandem with the shell design.

Database Development

This step involves laying out tables in the database and creating relationships for the backend system in the case there were a CMS (Content Management System).

Transitional Implementation

This is where since people are all working on different portions of the website which are actually not connected to each other, to actually experience how all components of the project move from one screen to another in a fluid manner. It also involves setting up the .swf files that load into the project when a user clicks on the button.

Optimization

Optimization should be from inception to completion but since some optimization issues don t surface before all pieces are fully integrated, this is the right time to look for optimize file size.

Experience Test

This is the final piece in actual creative development phase where the art director sits down and walks through the experience created, double checking to ensure that it matches the intended version.

Alpha Testing

Every one in the team goes through and checks it internally within the company to make sure its working all right.

Beta Testing

Before delivery, the front end and the back end need to be tested and also server environment. This involves making sure that content is being uploaded properly, evaluating how it uploads, serves, displays and interacts.

Documentation training

This involves the creation of documents used to communicate to the client how to develop and upload the content into the site for launch, as well as long-term site maintenance information.

Delivery

Involves delivering the final output to the client

Maintenance

Part of this step is determining how the site will evolve and who will be responsible for that evolution.

Creation of Optimized Development Cycle

In order to create stand-alone Flash development cycles that are usable, accessible and searchable, towards the end of the thesis, I realised that it was rather important to first create a framework which excluded certain elements from being used in the project such as use of static text and definitions of areas of site structure which if once planned in the beginning would allow for speedier development avoiding the need to undergo revision which could be avoided at an earlier stage itself.

Based on the critical analysis of the document review on stand-alone Flash website design for usability, accessibility and searchability, below is a list of important inclusions to the above development cycle on which the development cycle will rely for effective and efficient creation of usable, accessible and searchable stand-alone Flash websites.

1. Define usability, accessibility and searchability requirements.

2. Define whether the website will be a single Flash movie embedded in an HTML page or whether different sections will be embedded into separate HTML files. This decision will further define whether back button navigation through Flash is required and accordingly how *email to a friend* feature will be implemented. Also here will be decided whether necessary pages will have print versions as well or not. If separate pages for each section, then searchability benefits immediately, so do designers as there is no need for *flashvars* implementation for bookmarking and *email to a friend*.
3. Define parameters on how the Flash file is to be embedded into HTML such as *scaling* and *allow context menu*. Based on this definition, it will be known on whether there will be a requirement for inbuilt mechanism for scaling text for readability concerns which is a usability and accessibility aspect.
4. Define interactions. Essential interactions with interface which are required to access information apart from those placed to enhance visual experience must be able to be carried out through the keyboard as well. In other words, navigation must be able to be carried out through keyboard as well. Interactions such as dragging are not known to have a keyboard alternative and must not be used for any interactions that are part of the navigation requirements. They however may be used for tertiary visual experience and pleasure only. Also keyboard shortcuts and navigation should be defined. All though shortcuts are not of much use at present as no screen readers support it, declaring shortcuts announces to screen readers what the shortcuts are and it is a good practice to enable them for future ease.

5. Audio controls must be included. Static text cannot be used. Graphics must be assigned as movie clips through the property inspector so they can be assigned instance names.
6. All animation used for enhancing visual experience must be able to be turned off by the user. In addition to this, all animation must appropriately use the if-else method for screen reader detection if it is not possible to *make child inaccessible* in order to avoid screen reader from refreshing unnecessarily.
7. All objects created should be instanced and appropriately be assigned tab orders and have appropriate *name* and *description* fields filled up. If data is being loaded up dynamically, then actionscript will be required to assign name and description fields. A track of tab orders should be kept or a third part software such as Hi-Soft s *ACCrepair* may be used for this purpose. It must also be understood as to which nested objects are to be allowed to *make child accessible* and which not.
8. If strobing or flashing elements are going to be used, it must be understood that a warning note before the website is loaded will notify users of this effect being used in the website after which they will be presented with an option whether they would like to turn it off or not (or do they suffer from photo epilepsy or not).
9. The color scheme if out of gamut of the color blind safe color palette can be used provided there is an option to change the website color scheme to one that is color-blind friendly as well as low vision friendly (high contrast color scheme).

10. The designer will have to create context for blind people apart from visual contexts so they can understand it through the screen reader.
11. All necessary video and audio will require captioning and it will have to be decided which way captioning should be incorporated out of the three ways available.
12. It will be required to think which child elements are to be hidden to avoid screen reader refreshing. Also important to consider is to either leave no empty frames to avoid screen refresh or if there is for the designer s sake of understanding and keeping the timeline neat, then use *goto s* to jump the empty frames and reach the right one.
13. Auto redirection is to be avoided since its consequence of use is not officially declared by search engines as useful rather than fatal (getting banned by the search engine from inclusion into search engine database).
14. A list must be made in the beginning for SEO purposes on how many inbound links will possible. Also a list of search engines for submitting the website must be made. Since static text is going to be avoided, the designer will only have to make note of text which is rather broken apart or even an image so once the website is completed, then this information can be manually included into the ←*text used in movie*→ tag in the html file. In the case that there is textual data which is loaded dynamically loaded through actionscript then this will also have to made note of and included manually later in the ←*text used in movie*→ tag because this is not included automatically by Flash

These points should allow the designer/developer/team to work in an efficient and effective manner which should allow them to produce stand-alone Flash websites that are usable, accessible and searchable without being too cumbersome as was thought to be and shall not hinder creativity because of the measures taken to overcome these problems and the discovery that an implementation of usability, accessibility or searchability for Flash makes the other two much easier and faster to implement.

Based on these above points, the Juxt process needs to be tweaked to allow for optimal development of stand-alone Flash websites. Presented below is the final development cycle which can be used to aid in optimal development of stand-alone Flash websites which are usable, accessible and searchable.

Phase One: Planning

Step 1: Strategy

Strategy, as defined in the Juxt process, is the step where client s needs are analysed, target market, assets, brand, competition and objectives.

Step 2: Initial specifications

After this, it is important to set a framework which defines two broad parameters of the project. Creating a framework that defines the projects needs is like an architectural blueprint for a building which is most essential as a first step without which the project cannot be completed efficiently and effectively:

1. *Flash project specifications*

Define publish settings which includes flash player versions to be targeted, action script version, movie compression, jpeg quality, audio settings, flash detection mechanism, movie dimensions (pixels or percent, match movie), playback settings (most importantly out of them is display context menu) and scale settings (no border, exact fit, no scale). Out of these considerations, flash detection has direct consequences on Flash usability. Using the inbuilt Flash detection is known to create the problem of not loading the movie in some browsers such as Firefox. Since the website being designed is stand-alone Flash, it is rather better to use another Flash plug-in detection method else users may never be able to browse the website at all.

It is also useful to consider whether to use actionscript 1.0 or actionscript 2.0 for programming as the latter may not run in older Flash players. For example, Flash Player 6 classes such as *loadVars*, callback functions and dynamic loading of jpeg images are not supported by older Players. This is important to think of at the beginning.

That is why it is important to consider whether the website will be a single Flash movie embedded in the HTML file or rather each section has its own HTML page. If a single page is being used, then *Loadvars* might be important to use for book marking purposes. Therefore choosing multiple or single page depends upon market survey and target audience understanding which was gathered through step one, strategy.

Further more, enabling context menu or not again is a usability and accessibility consideration. If it is not present, then there is no automatic way to scale the movie for low vision viewers. In such a case, it would now be understood that the project would require a mechanism manually built to allow scaling of text for low vision users.

So first decide multiple html pages or single page. If single and you want to enable bookmarking then you have to use actionscript 2.0. Again before this you have to as described in what strategy is, survey target audience and potential audience to decide this.

2. *Usability, accessibility and searchability specifications*

In tandem with the above, the usability, accessibility and searchability requirements should be defined. This means to choose to what extent will the website stretch in terms of usability and accessibility features and searchability. Choosing multiple pages over a single page would mean a large increase in SEO.

The importance of defining these two requirements is a step taken to ensure smooth work throughout the project since the framework of the Flash project and its usability, accessibility and searchability have been defined thereby avoiding any sort of confusion or roll back from a later step. This crucial initial step will save the project from an unsmooth progress and shall allow for rapid progress through the next steps.

Step 3: Information Architecture

The next step would be to define the information architecture for the project which includes breaking down the site s content and primary navigation, flow, dynamic application interaction, content management and site content is looked at. Because the flash interaction model is far more flexible in terms of creativity, it also introduces a greater element of structural complexity into a project. Because of the technical complexities involved in developing a project, the information architecture stage becomes a key step to the successful outcome of any project. At this stage, it is important to consider how dynamic data will flow through from the front-end to the back-end and how will it affect accessibility of screen readers. This will decide whether to use actionscript for naming instances and which method would best be deployed for controlling tab order. Once the tab order implantation method is decided, the team may be briefed to work accordingly so it may be implemented usefully. One of the toughest accessibility means to enable, its definition and understanding at an early stage allows the team to incorporate necessary amendments to their design and development thereby removing the chances of errors which would later waste much time due to rollback where the team would need to rework all objects in the movie to allow for successful control of tab order.

Step 4: Final Specifications

The final specification includes one more step actually which came from the IA which was understand most importantly how the accessibility design is to be based. If there is a lot of dynamic data, then actionscript would have to be employed rather than

manually feeding in *name* and *description* fields. This final specification would take care of preventing rollbacks to an earlier stage later as there would be no confusion on how to progress through the project. For instance, the procedure of implementation would be different for controlling tab order if there was much dynamic data continually loaded in rather than static data for which another method of implementation for controlling tab order could be used.

Step 5: Concept Development and Content Plan

Concept development will involve outlines of project components which will involve laying out the navigational model, decide the rough content and objects in each screen, decide the interactions which will occur (simple interaction data). This will all occur at a conceptual level rather than implementational level to the least.

The functions, relationships, interactions, back-end and front-end and objects will all be discussed. The importance of this step is that in this step again for accessibility, the designers would know which elements are to be made accessible and which not.

Further, which movieclips would require *make child accessible* and which not and which movie clips could be explained through a common description rather than individual descriptions that would be tougher to interpret. This is the final accessibility concern to take in.

Also, it is important to take into consideration what text would be important for SEO purposes. Since static text will totally be avoided, it is important that it be decided as to what text might be broken apart for some animation purposes, and all text which is important for SEO purposes will be required to be listed when used so they can be entered into the ←*text used in movie*→ tag in the html code after the project is completed and ready to be placed into the html file(s).

After this step would begin the actual design and development of the project which would be possible in an efficient manner which realizes the considerations to be incorporated into the design according to usability, accessibility and searchability aspects.

Content Plan will take care of providing content and external assets required by the team which will be marked against milestones and delivery dates so there is no delay in productions marks the milestones and delivery dates for key elements for content, as necessary for development of the site. This includes photography, copy, illustrations or any aspects which complete the site. It is important to know how content will be generated so that the site can be developed and delivered on schedule. Also included here will be the textual content plan for SEO purposes which will include updating the list of text to be included later into the html code in the tags <noscript>, <meta> and <object> apart from ←text used in movie→.

Phase Two: Design and Development

Step 6: Design/Database Development

Here onwards, the team will work inside the framework set by the planning stage of the project. While the planning took care of foreseeing usability, accessibility and searchability considerations, the team may now design and develop accordingly keeping in mind the parameters set and production can carry out in a manner that is ensured by the planning stage of least error through a clear flow decided. All throughout the project, testing should occur whenever possible. Important design considerations include button design, providing a skip button to intro animation, preloader design, usage of symbols, streaming of content, use of vector graphics as opposed to raster graphics and use of sans-serif over serif fonts. The significance and suggestions pertaining to the handling of these design considerations has been detailed in *appendix F.*

Once the project is completed and ready for being placed in the HTML file(s), then it is time to implement publish template mechanism for maximising searchability. Along side the automatic process, text gathered throughout the project that may be broken text or that generated through actionscript or called from a database may be included manually in the ←text used in movie→ tag. Search engine submission may begin later after usability, accessibility and searchability testing occurs.

Phase Three: Testing and Optimisation

Step 7: Optimization

As mentioned in the Juxt process, testing and optimisation should be from inception to completion but since some optimization issues don t surface before all pieces are fully integrated, this is the right time to look for optimize file size and stuff.

Step 8: Final Testing

This will involve checking the stand-alone Flash website to make sure that it is working properly without errors including testing for usability, accessibility and searchability.

Step 9: Final Optimization and project fixes

Small errors which might have crept through discovered after final testing will be fixed at this stage thereby ensuring the website free of error and that it is functioning properly.

Phase Four: Website Deployment

Step 10: Site goes live

In this step, the website is finally put online and any errors such as streaming problems which might have not been detected in a server testing environment will have to be fixed here.

Step 11: Search engine submission, inbound links

Once the website is online, it is time to submit the website address to appropriate search engines and include create inbound links as a final measure to externally increase the search engine visibility for the website.

CHAPTER 6
Conclusions & Recommendations

This research started out with the identification of the soft or situational problem of stand-alone Flash websites not being designed according to usability, accessibility and searchability considerations despite the importance these aspects play in relation to making a website succeed the success of a website and the fact that Macromedia Flash is capable of producing such content.

Using Soft Systems Methodology as a research approach, the two constraints identified as cause of the problem were that usability, accessibility and searchability were easier to implement in the case of non stand-alone Flash websites, usually mixed technology websites and that these aspects also hinder the element of creative design. Isolating these problems, solutions found included the commonalities between implementing usability, accessibility and searchability for stand-alone Flash websites which suggested that implementing the three together meant reduced effort to create such websites. Further more, it was also found that using appropriate methods, creativity need not be hindered while creating such websites. The thesis finally went on to the creation of a development cycle which was presented as a means to speed and optimize the development of stand-alone Flash websites built according to usability, accessibility and searchability considerations thereby proving the hypothesis statement true that it is possible to design stand-alone Flash websites according to usability, accessibility and searchability considerations.

CONCLUSIONS

The purpose of this research was to study flash usability, accessibility and searchability with the intention of finding a solution to the perceived problem of stand-alone Flash websites not being built according to usability, accessibility and searchability aspects. With solutions found to the constraints identified that hinder web designers from creating Flash websites according to usability, accessibility and searchability considerations and a development cycle based on the critical analysis of Flash usability, accessibility and searchability, it can be concluded, in consistence to systems thinking that that it is possible to create stand-alone Flash websites that are usable, accessible and searchable.

RECOMMENDATIONS

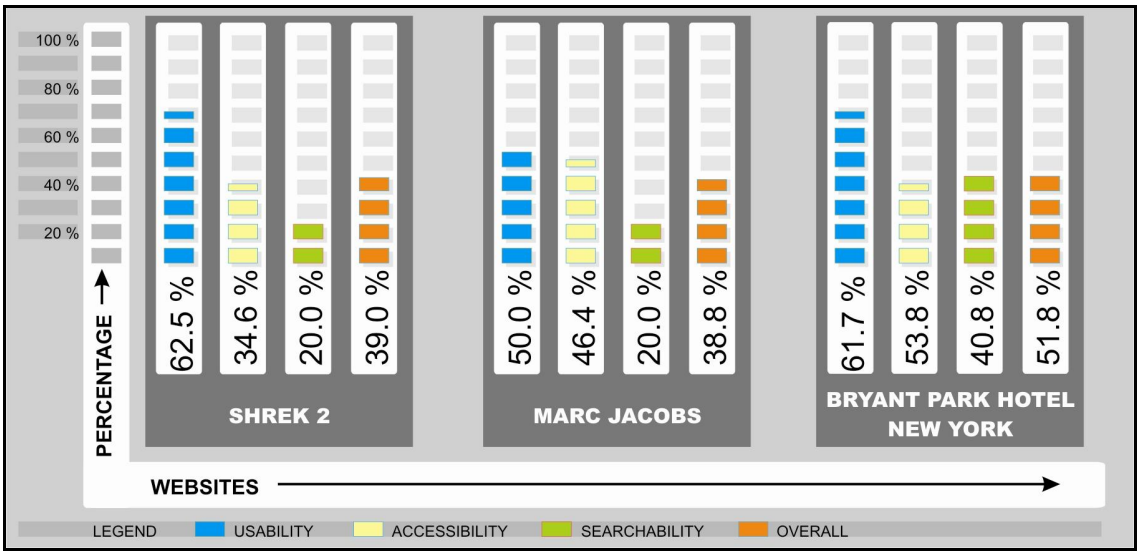
According to a Soft Systems perspective, the development cycle and solutions offered will aid in achieving the goal of creating usable, accessible and searchable stand-alone Flash websites. As the development cycle and solutions offered to the constraints have developed out of a systems thinking approach and have not been tested but rather offered, further research using an action research approach involving the testing of the development cycle and solutions offered by building a usable, accessible and searchable stand-alone Flash prototype according to them will serve the purpose of proving the development cycle and solutions worth in practice. A case study research may then further be done comparing the creation of such a prototype against that of a non stand-alone Flash website with the aim of testing the effectiveness of the development cycle against that of non stand-alone Flash one.

APPENDIX A

Website Analysis

WEBSITE EVALUATION OF STAND-ALONE FLASH WEBSITES FOR USABILITY, ACCESSIBILITY AND SEARCHABILITY ASPECTS USING EVALUATION CHECKLIST

Website Analysis Summary:



	Website URL	Overall Score
Shrek2	www.shrek2.com	39.03%
Marc Jacobs	http://www.marcjacobs.com	38.8%
The Bryant Park Hotel	http://www.bryantparkhotel.com	51.8%

Shrek 2

Website URL: www.shrek2.com

Showcased: May 2004, Site of the Day Archive[35]

Developers: Blue 22 Studios

Category: Media and Entertainment

	Usability	Accessibility	Searchability
Checkpoints applicable to website	16 out of 20	13 out of 14	5 out of 5
Score	20/32	9/26	2/10
Percentage	62.5%	34.6 %	20%
Overall Score: (62.5+34.6+20) / 300 = 97.1/300 = 39.03 %			

[35] < http://www.macromedia.com/cfusion/showcase/index.cfm?event=sotdarchive&year=2004&month=5&loc=en_us>

Marc Jacobs

Website URL: http://www.marcjacobs.com

Showcased: October 2004, Site of the Day Archive[36]

Developers: Create the, llc

Category: Consumer and Goods Services

	Usability	Accessibility	Searchability
Checkpoints applicable to website	14 out of 20	14 out of 14	5 out of 5
Score	14/28	13/28	2/10
Percentage	50%	46.4 %	20%
Overall Score: (50+46.4+20) / 300 = 97.1 / 300 = 38.8 %			

[36] < http://www.macromedia.com/cfusion/showcase/index.cfm?event=sotdarchive&year=2004&month=10&loc=en_us>

The Bryant Park Hotel

Website URL: http://www.bryantparkhotel.com

Showcased: September 2004, Site of the Day Archive[37]

Developers: Plot Design Group

Category: Travel, transportation and hospitality

	Usability	Accessibility	Searchability
Checkpoints applicable to website	17 out of 20	13 out of 14	5 out of 5
Score	21/34	14/26	4/10
Percentage	61.7%	53.8 %	40%
Overall Score: (61.7+53.8+40) / 300 = 97.1 / 300 = 51.8 %			

[37] < http://www.macromedia.com/cfusion/showcase/index.cfm?event=sotdarchive&year=2004&month=9&loc=en_us>

Website Evaluation Checklist Form 1: Shrek 2

www.Shrek2.com May 2004, Site of the Day Archive **Developers**- Blue 22 Studios **Category**- Media and Entertainment			
Checkpoint	**Yes/No**	**Score (0-2)**	**Comments**
Usability			
Visibility of system status			
1. Effective use of preloaders to show that system is loading content.	Yes	2	Preloader shows visually percentage loaded
2. Visual cues to indicate relevant content	Partial	1	Most sections don t have headings which reveal to user the current section they are

			browsing
Navigation			
3. Navigation design including buttons and links must differentiate from non-clickable content in order to be immediately identifiable	Yes	1	
4. Navigation design should be consistent throughout the website and reflects user tasks on your site?	Yes	2	There is consistency in design which reflects the elements of the animated film as well as user tasks
5. Usage of standard UI elements else UI elements bare strong resemblance to standard UI elements	Arguable	1	UI elements reflect animated film theme
6. Buttons with have good hit area (Fitt s law) to enable easy clicking	Yes	2	
7. Buttons and links to attention the	No	0	Buttons while

user about their respective functions before they are clicked upon			metaphorically arguably effective require a roll over to reveal the purpose of that button
User control and freedom			
8. Features bookmarking/ custom URL s	No	0	
9. Features custom printing	Not applicable	-	
10. Features back button	Yes	2	
11. Allows text selection	No	0	
Help			
12. Help offered if the interface involves non standard methods of browsing or interaction or special application	Yes	2	Help pops up now and then to guide novice users across the website which

			can be turned off
13. Search available if website is information intensive	Not applicable	-	
14. Sitemap offered if website is information intensive	No	0	
Visual Clarity			
15. Sufficient contrast between background and foreground elements (also accessibility requirement)	Yes	2	
Animation			
16. Skip intro link provided to animation introductions.	Yes	2	
Sound			
17. Availability of option to disable background sound and/or sound effects else prior attention message indicating non-availability of such	Yes	1	Available but not through keyboard access

a feature (also accessibility requirement)			
Forms			
18. Recognizable buttons and input boxes, selected form element must be highlighted, information must be available to guide user at each step for steps that are not self-evident	Not applicable	-	
19. Tabs correspond to stages in a logical order	Not applicable	-	
Download time			
20. The site streams content without having the user to wait for the whole website to download or shows some content without making user wait	Yes	2	
Accessibility			

Visually Impaired / Physically impaired			
21. Text equivalent for non-textual content	No	0	
22. Logical reading order	No	0	*Control reading order* has not been implemented
23. Context for screen readers as alternative to visual cue context for sighted users	No	0	
24. Avoidance of color blind color combinations	Yes	2	Red, green and blue colours are of different intensities
25. Links distinguishable without color as a differentiating variable	No	0	
26. Enablement of keyboard access where all mouse based interactions can be done by keyboard as well	Partial	1	Audio controls require mouse dragging
27. Reading legible by either allowing a text resizing mechanism, enablement of the context menu	No	0	

or must by default be of large enough to read. (also usability requirement)			
28. Allowance of tabbing in and out of Flash movie in the HTML file	No	0	
29. Many movie clips should not be made accessible such as the progress bar preloader or it should be set to *.silent*	No	0	No accessibility concern for preloader
Hearing Impaired			
30. Open or closed captions for audio and video	Not applicable	-	
Cognitive problems			
31. Avoidance of constant motion on screen where there is much textual content	Yes	2	
32. Usage of clear and simple language	Yes	2	
33. Avoidance of pop-ups (also usability requirement)	No	0	

Photo epilepsy			
34. No objects blink more than 2 times a second	Yes	2	
Searchability			
35. Use of publish template (<!--url's used in the movie-->,<!--text used in the movie-->)	No	0	
36. Use of keyword descriptive meta <meta> tags	No	0	
37. Use of information descriptive <title> tags	No	0	
38. Placement of content in <noscript> tags	No	0	
39. Placement of content in <object> tags	No	0	
40. Different flash page for each section	No	0	
Score			
Usability: **62.5%**			

Accessibility:	34.6%
Searchability:	20%
Overall Score:	39.03%

Website Evaluation Checklist Form II: Marc Jacobs

http://www.marcjacobs.com/ October 2004, site of the day archive **Developers**- Create the, llc **Category**- Consumer Goods and Services			
Checkpoint	**Yes/No**	**Score (0-2)**	**Comments**
Usability			
Visibility of system status			
1. Effective use of preloaders to show that system is loading content	Partial	1	Preloaders present in most cases
2. Visual cues to indicate relevant content	Yes	2	Not only headings but breadcrumbs as well
Navigation			

3. Navigation design including buttons and links must differentiate from non-clickable content in order to be immediately identifiable	Yes	2	
4. Navigation design should be consistent throughout the website and reflects user tasks on your site	Yes	2	
5. Usage of standard UI elements else UI elements bare strong resemblance to standard UI elements	No	0	
6. Buttons with have good hit area (Fitt s law) to enable easy clicking	Yes	2	
7. Buttons and links to attention the user about their respective functions before they are clicked upon	Yes	2	
User control and freedom			
8. Features bookmarking/ custom URL s	No	0	
9. Features custom printing	Not	-	

	applicable		
10. Features back button	No	0	
11. Allows text selection	No	0	
Help			
12. Help offered if the interface involves non standard methods of browsing or interaction or special application	No	0	
13. Search available if website is information intensive	Not applicable	-	
14. Sitemap offered if website is information intensive	No	0	
Visual Clarity			
15. Sufficient contrast between background and foreground elements (also accessibility requirement)	Yes	2	
Animation			

16. Skip intro link provided to animation introductions	Not applicable	-	
Sound			
17. Availability of option to disable background sound and/or sound effects else prior attention message indicating non-availability of such a feature (also accessibility requirement)	Not applicable	0	
Forms			
18. Recognizable buttons and input boxes, selected form element must be highlighted, information must be available to guide user at each step for steps that are not self-evident	Not applicable	-	
19. Tabs correspond to stages in a logical order	Not applicable	-	
Download time			

20. The site streams content without having the user to wait for the whole website to download or shows some content without making user wait	Partial	1	
Accessibility			
Visually Impaired / Physically impaired			
21. Text equivalent for non-textual content	No	0	
22. Logical reading order	No	0	*Control reading order* has not been implemented
23. Context for screen readers as alternative to visual cue context for sighted users	No	0	
24. Avoidance of color blind color combinations	Yes	2	
25. Links distinguishable without color as a differentiating variable	Yes	2	

26. Enablement of keyboard access where all mouse based interactions can be done by keyboard as well	Partial	1	Viewing collection side scroller does not have keyboard equivalents to view content
27. Reading legible by either allowing a text resizing mechanism, enablement of the context menu or must by default be of large enough to read (also usability requirement)	Yes	2	While text size is arguably small, the right-click context menu is enabled which lets users zoom in using it if required
28. Allowance of tabbing in and out of Flash movie in the HTML file	No	0	Not in the case of Mozilla browser out of Mozilla and Internet Explorer tested

29. Many movie clips should not be made accessible such as the progress bar preloader or it should be set to *.silent*	No	0	No accessibility concern for preloader
Hearing Impaired			
30. Open or closed captions for audio and video	No	0	
Cognitive problems			
31. Avoidance of constant motion on screen where there is much textual content	Yes	2	
32. Usage of clear and simple language	Yes	2	
33. Avoidance of pop-ups (also usability requirement)	No	0	
Photo epilepsy			
34. No objects blink more than 2 times a second	Yes	2	

Searchability			
35. Use of publish template (<!--url's used in the movie-->,<!--text used in the movie-->)	No	0	
36. Use of keyword descriptive meta <meta> tags	No	0	
37. Use of information descriptive <title> tags	No	0	
38. Placement of content in <noscript> tags	No	0	
39. Placement of content in <object> tags	No	0	
40. Different flash page for each section	No	0	
Score			
Usability- **50%**			
Accessibility- **46.4%**			
Searchability- **20%**			
Overall Score- 38.8%			

Website Evaluation Checklist Form III: The Bryant Park Hotel

http://www.bryantparkhotel.com/ September 2004, Site of the Day Archive **Developers-** Plot Design Group **Category-** Travel, transportation and hospitality			
Checkpoint	**Yes/No**	**Score (0-2)**	**Comments**
Usability			
Visibility of system status			
1. Effective use of preloaders to show that system is loading content	Yes	2	
2. Visual cues to indicate relevant content	Partial	1	While visual cues are present, they come in only when the mouse is on a particular area of the screen making them rather ineffective as

			visual cues to indicate present location of content to user
Navigation			
3. Navigation design including buttons and links must differentiate from non-clickable content in order to be immediately identifiable	Yes	2	
4. Navigation design should be consistent throughout the website and reflects user tasks on your site?	Yes	2	
5. Usage of standard UI elements else UI elements bare strong resemblance to standard UI elements	Partial	1	No mouse over to announce active links
6. Buttons with have good hit area (Fitt s law) to enable easy clicking	Yes	2	

7. Buttons and links to attention the user about their respective functions before they are clicked upon	Yes	2	
User control and freedom			
8. Features bookmarking/ custom URL s	No	0	
9. Features custom printing	Not applicable	-	
10. Features back button	No	0	
11. Allows text selection	No	0	
Help			
12. Help offered if the interface involves non standard methods of browsing or interaction or special application	Partial	1	Help available for form
13. Search available if website is information intensive	Not applicable	-	
14. Sitemap offered if website is information intensive	No	0	

Visual Clarity			
15. Sufficient contrast between background and foreground elements (also accessibility requirement)	Yes	2	
Animation			
16. Skip intro link provided to animation introductions	Not applicable	-	
Sound			
17. Availability of option to disable background sound and/or sound effects else prior attention message indicating non-availability of such a feature. (also accessibility requirement)	Yes	1	Available but not possible through only keyboard access
Forms			
18. Recognizable buttons and input boxes, selected form element must be highlighted, information must be available to guide user at each	Yes	2	

step for steps that are not self-evident			
19. Tabs correspond to stages in a logical order	Yes	1	One issue to note is that while form functions properly, it is placed in a Flash interface that does not allow keyboard navigation to other elements apart from form in screen such as calendar to check dates there by nullifying the accessibility of it
Download time			

20. The site streams content without having the user to wait for the whole website to download or shows some content without making user wait	Yes	2	
Accessibility			
Visually Impaired / Physically impaired			
21. Text equivalent for non-textual content	No	0	Some text is however read through the screen reader though in only a few cases. Buttons have no text equivalent.
22. Logical reading order	No	0	*Control reading order* has not been implemented
23. Context for screen readers as alternative to visual cue context	No	0	

for sighted users			
24. Avoidance of color blind color combinations	Yes	2	
25. Links distinguishable without color as a differentiating variable	Yes	2	
26. Enablement of keyboard access where all mouse based interactions can be done by keyboard as well	No	0	Tree like automatic pull down menu relies on mouse over to expand sub-menu which is not possible to do through keyboard access
27. Reading legible by either allowing a text resizing mechanism, enablement of the context menu or must by default be of large enough to read. (also usability requirement)	Yes	2	While text size is arguably readable across ages, the right-click context menu is enabled which lets users zoom in using it

			if required
28. Allowance of tabbing in and out of Flash movie in the HTML file	No	0	
29. Many movie clips should not be made accessible such as the progress bar preloader or it should be set to *.silent*	No	0	No accessibility concern for preloader
Hearing Impaired			
30. Open or closed captions for audio and video	Not applicable	-	
Cognitive problems			
31. Avoidance of constant motion on screen where there is much textual content	Yes	2	
32. Usage of clear and simple language	Yes	2	
33. Avoidance of pop-ups (also usability requirement)	Yes	2	

Photo epilepsy			
34. No objects blink more than 2 times a second	Yes	2	
Searchability			
35. Use of publish template (<!--url's used in the movie-->,<!--text used in the movie-->)	No	0	
36. Use of keyword descriptive meta <meta> tag	Yes	2	
37. Use of information descriptive <title> tags	Yes	2	
38. Placement of content in <noscript> tags	No	0	
39. Placement of content in <object> tags	No	0	
40. Different flash page for each section	No	0	
Score			
Usability: **61.7%** 11			
Accessibility: **53.8%**			

Searchability: 40%
Overall Score: 51.8%

APPENDIX B

Usability, Accessibility and Searchability

THE IMPORTANCE OF USABILITY, ACCESSIBILITY AND SERACHABILITY TO WEBSITE DESIGN

Why is usability important?

According to Jakob Nielsen, Kara Pernice Coyne and Marie Tahir of the Nielsen Norman Group, usability is often the most neglected aspect of Web sites, yet in many respects the most important. They suggest that because the Web offers users freedom and choice, users will leave a website and not become customers of it if they cannot use it. They will not suffer a poorly designed site given the opportunity that they can fulfill their goal at another website.[38] In support of the same, Usablenet, a distinguished web productivity company, provides the logical reason that when users can do the same thing with two different websites, they will choose the one that is more effective, efficient and satisfactory. This example itself suggests the importance of website usability. Further implying the important role of usability in the business case of an e-commerce website and web identity, Usablenet suggests making such websites usable offers the following benefits:

- Better sales through increased efficiency in user tasks.

[38] Jakob Nielsen et al. *Make it Usable, February 2001,* < http://www.pcmag.com/article2/0,4149,33821,00.asp> (June 12).

- Higher rate of successful transactions (at same cost of hardware and software) through reduced errors and more effective user activities.
- An enhanced image indicative of better brand building through increased satisfaction which leads to increased trust.
- The above benefits lead to the fourth benefit of increased customer loyalty thereby increasing the rate of repeat customers (who, on the average, spend more than first-time customers).
- A better user experience.[39]

While the above might suggest that usability is an important commercial consideration, a closer look reveals that the commercial benefit is a result of benefit to the user itself. For example, in the case of a website portal, design according to usability principles will allow users to find what they need with ease and would form a positive inclination towards that portal amongst others. In my opinion, even if a website was totally non-commercial, for example, an artistic showcase websites, if it was unusable where the over artistic interaction design confused or interfered with the users interactive experience in pursuing their goal (which would be to browse the artistic works of the website), the user would ultimately get frustrated and try and look for other such similar websites that would be more user friendly. Therefore, we can see that website usability benefits users as a result of which it benefits the website, be it of any kind, unless the goal of the website is to frustrate users or drive visitors away.

[39] Usable Net, *Why Usability is Important?,* April 2004, < http://www.usablenet.com/accessibility_usability/why_usability.html> (June 13).

Last but not least, many usability issues are also related to accessibility. In general, a usable web site is also more accessible. Disabled users (including those using low-bandwidth technology like cellular phones, PDA s, black and white screens, speaking browsers via telephones, screen readers) are not excluded from using it. *This itself lends another argument as to why maybe flash is not being made accessible. Unlike html, Flash usability does not make a site accessible in the sense of cross-modality where mobile devices can-not benefit like they can from HTML.*

Why is accessibility important?

Website accessibility is a humanitarian concern as well as a legal concern. It can be seen as discriminatory when a website is accessible to all sans the disabled. The discrimination is that of disallowing access of information to a group of people despite the fact that the website could enable access of information to such people.

Viewing this aspect from a perspective of responsibility, considering that the first and foremost goal of the World Wide Web is that of enabling human communication, commerce, and opportunities to share knowledge where these benefits be available to all people, whatever their hardware, software, network infrastructure, native language, culture, geographical location, or physical or mental ability[40], creating websites that are not accessible to all is directly against contributing unification to the system that is the World Wide Web.

[40] W3C, *Web for Everyone*, July 2005, <http://www.w3.org/Consortium/mission> (23 July 2005).

The World Wide Web Consortium (W3C) describes many benefits of providing website accessibility in business, technical and other aspects beyond the straightforward benefits to people. Out of them all, I have listed the ones pertinent to Flash website design: [41]

Increase Market Share and Audience Reach

According to the WHO, seven to ten percent of the world's population has a disability, which means that there may be more than 500 million people with special needs.[42] The W3C suggests that since the proportion of people with disabilities can range up to 20 percent in some populations, a significant portion of those people with disabilities add to the websites user base therefore, increasing its market share and audience.

Reduced Legal Liability

In many countries around the world, discrimination laws require governments, educational institutes, corporations and businesses to provide equal opportunities for people with disabilities which may include equal access to electronic information and services in the same way that physical access to facilities is required. While these laws vary from country to country, having the web designer/developer incorporate WCAG 1.0 checkpoints into a Web site is protection from legal liability.[43] In my opinion, considering that there are rigid laws for accessibility in architecture that have to be followed strictly, it might not be long before the accessibility laws for websites become

[41] W3C, *Auxiliary Benefits of Accessible Web Design*, March 2002, < http://www.w3.org/WAI/bcase/benefits> (July 23).
[42] WHO, *WHO Director-General urges comprehensive agenda on disability,* <http://www.who.int/inf-pr-1999/en/pr99-68.html> (July 3).
[43] W3C, 2002.

as stringent and broad. Providing accessible Flash websites could therefore be seen as future proofing a company website against legal liability that might be incurred in the future.

Increase image of company and goodwill

An accessible website is indicative of humanitarian consideration, therefore enhancing the company s reputation differentiating it positively from the competitors.

Benefits applicable to HTML and not to Flash are contributing to a semantic web, search engine readiness, mobile device readiness and ease of updating content.

Why is searchability important?

Searchability is a term which shares the same meaning as search engine optimization (SEO). SEO means ensuring that your web pages are accessible to search engines and focused in ways that help improve the chances they will be found.[44]

In the book, Brand building on the Internet, Martin Lindström and Tim Frank Andersen show studies that state that 80 percent of all companies with representation on the Internet are there because of their competitors.[45] This is not surprising considering the large amount of traffic that is directed towards a website through search engine

[44] Danny Sullivan, *Intro to Search Engine Optimization*, October 2002, < http://searchenginewatch.com/webmasters/article.php/2167921> (May 2005).
[45] Lindstrom, Martin & Andersen, Tim Frank. *Brand Building on the Internet,* (Dover, Kogan Page Limited, 2000).

searches. In 2003, Webside Story, a leading digital marketing service provider reported that the percentage of search engine referrals worldwide had increased significantly over the past year where search sites accounted for more than 13.4 percent of global referrals compared to 7.1 percent the previous year[46].

The study and report together make clear the importance of website searchability by two things that come to mind. That the traffic generated by search engine referrals is increasing every year and that a large percentage of users come to known about a website through search engines. Therefore, searchability is an important aspect of website design considering the large percentage of user traffic that is generated from it.

[46] Websidestory, *Search Engine Referrals Nearly Double Worldwide, According To WebSideStory*, March 2003, <http://www.websidestory.com/pressroom/pressreleases.html?id=181> (April 2005).

APPENDIX C

Flash Usability, Accessibility and Searchability

CAPABILITY OF FLASH TO PRODUCE USABLE, ACCESSIBLE AND SEARCHABLE CONTENT

Based on the following, we can see that Flash, itself and through external factors can be used to create usable, accessible and searchable content.

Usability and Accessibility

In 2002, the release of Flash MX and Flash player 6 marked the official arrival of Flash as a tool that allowed for the creation of usable and accessible Flash content. In support of the fact that Flash MX is an effective tool over its predecessor versions for usability and accessibility, Nielsen, who was involved in making this version of Flash accessible and usable said, The version of Flash introduced in 2002 (Flash MX) has solved many of the technical usability problems in previous versions of Flash. Among other things, Flash MX supports accessibility and the ”Back” button in the browser. A very important usability improvement is that Flash now ships with a **standard set of interaction controls** (author s bold): finally, no more random scroll bars made up at the whim of a Flash designer. The many usability improvements in the basic Flash technology is proof that *it works* (author s italics) to evangelize usability and point out

usability problems. Even a big software company will listen to the insights provided by leading usability experts. [47]

MacGregor states that Flash MX offers a number of UI components which serve the double purpose of speeding up development time and making Flash UI elements behave the same across different designer s content.[48] In regard to Flash accessibility, MacGregor says, Contrary to what people may assume, Flash content can be made just as accessible as HTML content. As long as we re aware of the accessibility capabilities of the Flash authoring environment there s no reason why *all* (author s italics) content created in Flash shouldn t be made available to a*ll* (author s italics) web users. [49]

Even though Flash cannot be made as accessible as HTML and the WCAG guidelines were written specifically for HTML content, a paper by Dr Sofia Celic and Dr Andrew Arch of Vision Australia Foundation shows that multimedia developers can adopt WCAG 1.0 as a basis for addressing accessibility to a significant extent.[50] As has been said earlier on, incorporating WCAG 1.0 guidelines is an effective way to display website accessibility. According to Joe Clark, Macromedia s authoring environment , Flash MX, and the new Flash 6 player offer substantial, real and only slightly incomplete screen-reader support. Among other things, you can assign text equivalents (similar to *alt* and *longdesc* in HTML) to buttons, input fields, movies and a few other items, all of

[47] Jakob Nielsen, *Flash: 99% Bad,* October 2000, <http://www.useit.com/alertbox/20001029.html > (6 February 2005).
[48] MacGregor, 25.
[49] MacGregor, 345.
[50] Sofia Celic, *Multimedia Accessibility- Flash and the Web Content Accessibility Guidelines*, (n.d), < http://ausweb.scu.edu.au/aw03/papers/arch__with_celic_/paper.html> (July 1).

which screen readers can find and read out. Text per se is automatically exposed to screen readers, meaning that many parts of many existing Flash sites are made instantly accessible if you re using Flash 6 and the right adaptive technology. Authors don t have to lift a finger. [51]

Searchability

Optimizing stand-alone Flash websites is tough compared to non-stand-alone Flash websites. According to Shari Thurrow, since crawler-based search engines were primarily designed to index HTML text, web sites built with Flash may be difficult or impossible for crawlers to read.[52] Earlier on, search engine crawlers could only see pure text and were unable to recognize text on an image or text that appeared as a graphic in a Flash movie. However, by 2003, FAST search which used to power www.alltheweb.com and Lycos became the first web search engine to support the Flash file format using the Macromedia SDK[53]. Moreover, it soon became known that the most popular search engine, Google had begun to index Flash websites as well via its own SDK[54]. Therefore, as of now, Flash searchability has increased tremendously compared to the situation earlier on and even though it is not as searchable is HTML, it is indeed commendable that Flash can be optimized for search engines to a large extent.

[51] Clark, 328.
[52] Thurow, 2003.
[53] Thurow, 2003.
[54] Mark Angeletti, *How to Optimize Flash*, April 2004, <http://www.seopapers.com/article/134 > (April 4).

FAST search which used to power www.alltheweb.com and Lycos in 2003 was the first web search engine to support the Flash file format using the Macromedia SDK.[55] Moreover, Google is able to index Flash websites as well via its own SDK[56]. Even though there a will soon be more and more search engines which shall slowly start indexing Flash, stand-alone Flash websites still can-not match the SEO as that of non-Flash websites, especially those which use HTML majorly.

Concerned with the problem of Flash SEO, in august 2002, Macromedia released the Flash search engine SDK which provided search engines with the means to search and index Macromedia Flash (SWF) movies. Concerned with the problem of Flash SEO, Macromedia released the Macromedia Flash Search Engine SDK in 2002 provided search engines with the means to search and index Macromedia Flash (SWF) movies. The SDK includes a utility called *swf2html* which extracts text and links from a Macromedia Flash SWF file, and outputs it as *stdout* or to an HTML document. This way, a search engine utilizing this SDK would allow users to locate relevant Flash content when searching by keyword or file type in a search engine. Besides that, since Flash 4, Flash has had a mechanism that has exports text within a movie into the HTML file published with the SWF file. This information is used by search engine spiders when they come across such pages[57].

[55] Thurow, 2003.
[56] Angeletti , 2004.
[57] Macromedia, *Flash and Search Engines,* May 2005, < http://www.macromedia.com/cfusion/knowledgebase/index.cfm?id=tn_16603> (July 2005)

APPENDIX D

Views on creating Usable, Accessible and Searchable stand-alone Flash websites

REASONS EXTRACTED TO EXPLAIN RARITY OF STAND-ALONE FLASH WEBSITES THAT ARE USABLE, ACCESSIBLE AND SEARCHABLE

VIEWS

The first view which seemed to be the most popular and followed in the web design industry has been voiced by almost every web design expert. Out of them all, I provide the example of MacGregor who stresses in relation to enabling usability, accessibility and searchability in his co-authored book Flash Usability: Programming Macromedia Flash MX , that, Mixing HTML and Flash content together on the same page can provide designers with an effective way to make the best of both technologies. Many designers have keyed into this technique, and the users of sites that mix the two technologies can certainly benefit when each format is used for its strengths Many sites offer good examples of this approach, not least of which is Macromedia s own (www.macromedia.com) .[58] It s no longer good enough for designers to publish a cutting-edge piece of electronic art and expect it to be embraced by their audience simply because it looks so fantastic. If the users can t do what they came to the site to do, then no matter how cool it looks, the project is a failure. [59]

[58] MacGregor, 79, 103.
[59] MacGregor, 1.

The best example to illustrate the industry view on using mixed technology instead of stand-alone Flash to implement websites when taking usability, accessibility and searchability into consideration was found on a discussion started by D. Keith Robinson on his popular Web publishing and user-centered design blog, Asterisk. Replying to the topic about personal views on Flash, Bobby van der Sluis, designer/developer working at the award winning new media company, Blast Radius lent his experience with an experiment to create a 100% Flash 6 website.

Sluis stated, As an experiment I tried to create a 100% Flash 6 site with all usability and accessibility bells and whistles available: preloaders, an architecture that loads small movies, obvious navigation, accessibility options used, embedded pixel fonts, Robert Penner s back button functionality, etc.
I ended up with a very complex architecture which was hard to maintain and limited to extend. I still had to build functionality for deep linking and bookmarking and figured that some issues like crawlability could only be resolved by duplicating content in normal HTML. During the process of developing this prototype I got frustrated by a series of Flash bugs I had to work around.
My conclusion was that this was an unnecessary complex way to create websites. Why should I spend my time duplicating functionality that is already available in regular HTML design? I think that for the casual Flash designer 100% Flash sites are a bad practice, because it is way over their head to develop them in a correct way.
My advice to other web designers is to keep web design simple and just see Flash for what it is: one or more objects embedded in an HTML page. The challenge is to use it

appropriately and embed it as seamlessly as possible with other page elements like text, images and links. [60]

The second view which completes the circle of views is that of designers who opine that such aspects are a hindrance to creativity that Flash offers over other web technologies.

According to Joshua Davis of www.praystation.com fame in reference to considerations such as rules of usability and accessibility says, Now some people might say that the only way to reach (such) a large audience interactively is to apply some standards. That s a pretty weak argument for standards- and one that ignores the role of the artist and designer in moving both art and technology forward.
It also ignores the world s entire history of art and design. How can we forget that so much of what we consider masterpieces - illuminated manuscripts for prayer books in the Middle Ages, jeweled Faberge eggs, Handel s Water Music , the gardens of Fontainebleau, and even the Taj Mahal- are all works of art originally created for an audience of one? Forget standards. Let s keep going. It s just getting interesting![61]

By this we can gather Joshua s hint that standards indicative of rules and aspects such as usability, accessibility and searchability seem to be a hindrance to creativity and therefore they might as well be left out in order to focus on delivering a truly interactive experience to the user. Further strengthening this hint it the BBC who in an

[60] *Flash- Your Take,* January 2004, <http://www.7nights.com/asterisk/archive/2004/01/flash-your-take> (May 25).
[61] Joshua Davis, *Flash to the Core: An Interactive Sketchbook*, (USA, New Riders, 318).

interview with Joshua Davis interpreted that Davis feared Nielsen's advocacy of set rules on how the internet should look will stifle creativity and force everyone to travel at the speed of the slowest.[62]

More over, even Bob Regan, senior product manager of accessibility at Macromedia, responded to the question of whether it was possible for www.praystation.com , Joshua Davis s own website, to be accessible to the blind by saying that, The web is still a primarily visual media. I think Praystation is an interesting example Yet I think it would be a great loss to the world if Josh Davis were somehow limited from specific forms of visual expression in the name of accessibility[63].

[62] BBC, *Keep the Web Simple, Stupid,* February 2002, < http://news.bbc.co.uk/1/hi/in_depth/sci_tech/2000/dot_life/1779849.stm> (April 2005).
[63] Bruce Lawson, *Interview with Bob Regan, Senior PM of Accessibility, Macromedia*, (n.d), <http://www.dmxzone.com/showDetail.asp?TypeId=28&NewsId=5515&LinkFile=page4.htm> (May 26).

APPENDIX E

Derivation of Root Definitions

DERIVATIONS OF 6 ROOT DEFINITIONS USING CATWOE ANALYSIS

Root Definition Relevant to Client

Web designers must build me a website that I can get benefit from within the money and time that is feasible for me to spend on it.

CATWOE Analysis

C: Client

A: Web designer/developer

T: Request of website transformed to creation of website

W: The website should fulfill my goal of getting returns from it

O: Client, web designer/developer

E: Web Designer, money, time

Root Definition Relevant to Web Designer

We will build websites that are usable, accessible and searchable so that the website can be successful in benefiting the client except in the case of stand-alone Flash websites, because of the cost and time involved which neither the client neither we are ready to sacrifice and also the hindrance to creativity comes in such a case.

CATWOE Analysis

C: Web Designer/developer, client

A: Web Designer/developer

T: Request of website transformed to usable, accessible and searchable website

W: The website should be usable, accessible and searchable apart from other aspects but not stand-alone in that case

O: Client, web designer/developer

E: Constraints that prevent creating stand-alone Flash websites that are usable, accessible and searchable

Root Definition Relevant to Search Engines

Web designers/developers must build websites that are searchable so we can index them with ease because only the least of us can index non HTML websites like Flash, not all of us can.

CATWOE Analysis

C: Search engine

A: Web Designer/developer

T: Non-search engine friendly websites should be made search engine friendly

W: All websites should be easily indexable

O: Web Designer/developer

E: Non HTML content is tougher to index though not impossible

Root Definition Relevant to Non-Disabled Users

Web designers/developers must build websites that are usable because many times, we get frustrated by the bad usability of a website and cannot complete our goals

pertaining to our action of browsing a particular website. Websites should also be search engine friendly because if they are so, when we are looking for relevant information, there would be more of a chance that the website with relevant information would pop up in the search engine query results. And probably websites should be accessible as well so disabled users could then access them like us.

CATWOE Analysis

C: Non-disabled user

A: Web Designer/developer

T: Request for websites should be transformed into websites that are user friendly or usable, which can easily be located through relevant search and it would be nice if they were accessible too

W: Websites should be usable and searchable

O: Web Designer/developer

E: Websites exist which are not usable and searchable

Root Definition Relevant to Disabled Users

Web designers/developers must build websites that can be accessed by us because of our disabilities which prevent us from accessing many websites partially or completely. Besides this most important point, they should be accessible and searchable as well for the same reasons non-disabled users offer.

CATWOE Analysis

C: Disabled user

A: Web Designer/developer

T: Request for websites should be transformed into websites that are most importantly accessible besides being usable and searchable

W: All websites must first and foremost be accessible, also usable and searchable

O: Web Designer/developer

E: Disability to access relevant non-accessible websites

Root Definition Relevant to other Support Groups

Web designers/developers must build websites that are usable, accessible and searchable in order to contribute to the greater good of equality, universal design and human-centric design which is what the ethos of the World Wide Web are based on because there are too many websites on it as of now which violate our view.

CATWOE Analysis

C: W3C, usability/accessibility/searchability advocates

A: Web Designer/developer

T: Request of websites must be transformed to usable, accessible and searchable websites

W: Usable, accessible and searchable websites contribute towards order and an easier to use World Wide which is based on the ethos of the World Wide Web

O: Web Designer/developer

E: Besides stand-alone Flash websites, there are innumerable websites that are not usable, accessible and searchable

APPENDIX F

Document Review

DOCUMENT REVIEW OF FLASH USABILITY, ACCESSIBILITY AND SEARCHABILITY

FLASH USABILTY- CRITICAL ANALYSIS

What is usability?

The Usability Professionals Association (UPA) refers to usability according to the International Standards Organisation (ISO) definition as:

(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 user. [ISO 9241-11][64]

As pointed out by Nielsen, usability has multiple components but basically is traditionally associated with these five usability attributes:

- **Learnability:** The system should be easy to learn so that the user can rapidly start getting some work done with the system.
- **Efficiency:** The system should be efficient to use, so that the user has learned the system, a high level of productivity is possible.

[64] UPA, *What is Usability*, (n.d), < http://www.upassoc.org/usability_resources/about_usability/definitions_of_usability.html> (24 April 2005).

- **Memorability:** The system should be easy to remember, so that the casual user is able to return to the system after some period of not having used it, without having to learn everything all over again.
- **Errors:** The system should have a low error rate, so that users make few errors during the use of the system, and so that is they do make errors they can easily recover from them. Further, catastrophic errors must not occur.
- **Satisfaction:** The system should be pleasant to use, so that users are subjectively satisfied when using it; they like it.[65]

How is Flash Usability Achieved

Usability is more than just a set of techniques that can be applied to a Flash interface. Rather, it is a process that revolves around understanding user s needs and thereby designing a website according to them. Therefore, I have outlined the process and included specific methods which can be applied generically to almost every website which have been included in the process sections and subsections they are relevant to. One, is where the usability process is the same for any website and two is where specific flash usability techniques can be applied to websites. Instead, I am presenting the process ahead in a way that pertains to Flash, most of the steps are the same for non-Flash websites as well.

[65] Jakob Nielsen, *Usability Engineering*, (USA: Morgan Kauffman Publishers, inc., 1993), 26.

1. Understanding the Audience

1.1. Gather information on target audience

A usable website is the outcome of understanding user s needs. As MacGregor conveys in a simple manner, Usability is thinking of the user first, last and always .[66]
Therefore any website usability begins with understanding the audience.
In the book, The Flash Usability Guide , MacGregor says that Flash designers need to begin projects by profiling the type of user which will interact with the Flash content.
Understanding the audience requires more than speculation. According to Kelly Goto and Amily Cotler, principal of Gotomedia and founder/creative director of Waxcreative design and co authors of the book Web Redesign 2.0, the target audience for a website can be collected by requesting clients for existing research about target audience.
MacGregor suggests the same. Ani Phyo, author of the book, Return on Design offers that information on users may be dug up from managers and employees or the owner of the site-owning organisation, customers of the organisation, other companies who are related to the business organisation, journalists and analysts who specialise in understanding such organisations as well as the broader community of people who are affected by the organisation.[67]

[66] Chris MacGregor, *Developing User-Friendly Macromedia Flash Content*, (n.d), 2 < http://www.flazoom.com/usability/usability_I_1.shtml>, (April 2005).
[67] Ani Phyo, *Return on Design: Smarter Web Design that Works*, (USA: New Riders, 2003), 32-33.

1.2. Develop User Profiles

Once information about website user audience is gathered, user profiles can be made based on the gathered information. This is an important step to creating a useable Flash website as MacGregor enlightens that the designer would then be able to know what interface would work best with the user and the information architect would know how best to organise content.[68] That many user profiles should be developed that should all collectively represent the user audience information gathered. In order to develop user profiles that satisfy the above, MacGregor suggest establishing dichotomies such as young or old? or internet newbies or experienced surfers? After establishing dichotomies and creating user profiles, the designer could then start thinking about interface needs.[69]

1.3. Information Architecture or Storyboarding

According to MacGregor, half the battle of delivering usable Flash content is in the *organisation of the information* making up the content.[70] Information architecture and storyboarding are two ways methods to organise information structure. According to Nielsen, The most important factor is really to understand the users tasks and the things they are trying to accomplish because if you are solving the wrong problem you may have a great solution but, at the end of the day, be helping no one. The big improvement comes from understanding user behaviour in the first place. [71]

---

[68] MacGregor, 134.
[69] MacGregor, 135-136.
[70] MacGregor, 218.
[71] Dan Oliver, *Jakob Nielsen told me to do it,* February 2002, < http://www.netmag.co.uk/opinion/default.asp?pagetypeid=2&articleid=10303&subsectionid=500&subsubsectionid=184> (4 May 2005).

Information architecture is the organisation and presentation of data to the user in a clear, consistent and intuitive manner. The IA helps users to use the site by providing clear guidelines for information organisation. It is best applied to the overall structure of a website along with the navigational structures of the website. This is the method of addressing organisation unless the website follows an entirely linear approach (for example, in the case of a website which is a game) where in that case storyboarding is the solution.[72] According to Jane Ellen Stevens who teaches multimedia reporting at the UC Berkeley Graduate School of Journalism, storyboarding is a sketch of how to organize a story and a list of its contents.[73]

Since most websites are non-linear and only particular sections involve processes which are linear (such as forms), a combination of both is a good idea.

Based on the structure of the website that has been derived and the user needs and goals, information architecture will begin with creating divisions of information which are to be based upon thinking about how the user would like the information to be available on the website arranged for their own use. Information categories must be organised in a way that they be intuitive to the user. Such a task-based structure tends to work well on information-based and product-based websites.

[72] MacGregor, 184-218.
[73] Jane Stevens, *Storyboarding*, (n.d), <http://journalism.berkeley.edu/multimedia/course/storyboarding/> (6 May 2005).

2. Developing the Flash website

2.1. Usable interactions

The Flash interaction and interface design should be based on the elements described in brief here. According to MacGregor, a good interface should be *clear and unambiguous* so that for the user to use. It also needs to be *consistent* in appearance and behaviour. *Simplicity* in a user interface is reflective of an interface void of unnecessary elements which might increase the complexity of performing a certain task or be a distraction to the user. *User control* in the Flash interface ensures use trust on the system besides helping avoid utter frustration. Examples of enabling user control are in the case of sound volume, control over enabling and disabling music and control over font sizes. *Responsiveness* in interaction is crucial where the user is given feedback of their action by the Flash interface. This also is a reassurance to the user that the user is in control of the Flash content. A most important example of this is preloaders. In the absence of a preloader where the user is not being updated of the actions the Flash system is taking (such as loading a movie), the user will be left to wonder whether the site is functioning or not. Considering *aesthetics*, there is nothing more striking about a good user interface than an elegant design. This is where Flash can excel as a medium for website content deployment over other technologies.[74]

2.2. Navigation

Navigation should ultimately serve to reinforce the mental model of the information architecture behind the website where the navigational elements help users to start

[74] MacGregor et al, 222-228.

figuring out the structure and organisation of contents on the website. In order to create such a navigation that supports the aim of a usable website, all elements which serve a function must clearly be labeled in text or must effectively use metaphors possibly in the form of icons to convey their function. The navigation system must also let the user know where they are currently within the content (example, a bread crumb trail).[75]

2.2.1. Button design

Buttons must be easily clickable and be recognizable as buttons distinguishing themselves from other elements of the interface. Therefore, buttons must well-defined hit areas. I would like to mention that this usability feature is based on Fitt s law which states:

The time to acquire a target is a function of the distance to and size of the target.[76]

This law is based on the formula:

$MT = a + b \log 2(2A/W)$

where

- MT = movement time
- a,b = regression coefficients
- A = distance of movement from start to target center
- W = width of the target[77]

[75] MacGregor et al, 151-175.
[76] Bruce Tognazzini, *A Quiz Designed to give you Fitts,* February 1999, < http://www.asktog.com/columns/022DesignedToGiveFitts.html> (May 8).
[77] Fitt's Law Group, *Fitt's Law- At a Glance*, November 1996, <http://ei.cs.vt.edu/~cs5724/g1/glance.html > (May 8).

This translates to the meaning that the bigger an object is, the easier it will be to click, and that the size of the button as well its proximity to the mouse pointer determines it ease of location.

While it might seem logical, Flash designs often feature badly designed buttons in this sense. With stand-alone Flash website designs that feature buttons with small hit areas, a website s usability is tremendously decreased which can lead to user frustration. According to Chris MacGregor, implementing this feature alone dramatically increases the usability of a Flash website.[78]

However, it may be justly argued by designers that big buttons might not fit the composition of the design. In such cases, using actionscript can be used to overcome such an argument which can be used to dynamically improve the hit area of the button as the mouse approaches it.

2.2.2. Supporting back button navigation

To do this using built-in browser forward and back navigation, Flash movies may be separated into logical chunks and place them on individual HTML pages. Alternatively, Macromedia suggests that the movie may be set up to include a Flash-based Back Button that the user can use to return to a frame or scene that represents a logical previous page.[79] I argue with the alternative suggested by them as it is known that the Flash-based back button technique does not work across all browsers and platforms.[80] However, there are open source techniques which I would suggest as they allow for

[78] MacGregor et al, 231.
[79] Macromedia , *Flash Usability*, (n.d), <http://www.macromedia.com/software/flash/productinfo/usability/ > (24 June 2005).
[80] MacGregor, *An Open Letter to Jakob 'MX' Nielsen*, June 2003, < http://www.flazoom.com/cooler/1023138717,55362,.shtml> (May 10).

reliable cross-platform back button functionality such as Robert Penner s back button functionality technique which makes use of using JavaScript query string, IFRAME and Flash's local Connection[81].

2.2.3. Shortcuts and keyboard navigation

According to MacGregor, since the keyboard is the computer's most frequently used input device, it holds the keys to making your Flash projects far more usable than anything HTML can offer who suggests that by adding keyboard-shortcuts and navigation to the Flash content intelligently, the overall usability is increased dramatically.[82] At this point, I would like to note that this is one of the most important enabling techniques that designers can use to allow physically disabled users to access Flash content and is therefore and accessibility design consideration too.

2.3. Animation

One of the main reasons attributed to poor Flash website usability by usability critics is the gratuitous use of animation on such websites. According to Nielsen, permanently moving animation must never be included on a web page since it will make it very hard for users to concentrate on reading text also present on the page[83]. MacGregor suggests that animation this be used only in cases where it can enhance the presentation of

---

[81] Robert Penner, *Flash 5 Action Script Experiments in Math and Particles,* (n.d), < http://www.robertpenner.com/index2.html> (May 11).
[82] Chris MacGregor, *The Keys to Improving Flash Usability*, < http://www.flazoom.com/news/shortcut_08032001.shtml> (May 13).
[83] Jakob Nielsen, *Guidelines for Multimedia on the Web,* November 1995, < http://www.useit.com/alertbox/9512.html> (May 14).

information and in doing so make it easier for the user to get where they want to be in terms of completing their task.[84]

2.3.1. Avoid unnecessary intros

According to many leading Flash designers, developers, and usability experts, introduction animations often delay the user's access to the information they seek[85]. In further support of their opinion, a survey conducted by E-Media Inc. on what consumers thought about Flash intros showed that 80% of them did not approve of being presented with a Flash introduction before they could proceed to browsing a website.[86]

A simple solution offered to keep both the designer and the user happy is to provide a skip intro link. This gives the user choice on whether they would like to view the intro or simply proceed. Chris MacGregor offers an even more innovative solution where he suggests using cookies and JavaScript along with Flash to skip the intro animation altogether and then give the option of returning to the animation from the destination page[87].

2.4. Sound

Users must be given the ability to turn off sound. A really usable site will take the initiative of providing an alternative to sound to people who are disabled by themselves

---

[84] MacGregor et al, 234.
[85] Macromedia, *10 Usability Tips*, (n.d), < http://www.macromedia.com/software/flash/productinfo/usability/tips/> (May 2).
[86] Marketing Sherpa, *New Survey Results: 80% of Consumers Hate Flash Intros*, November 2003, < http://www.marketingsherpa.com/sample.cfm?contentID=2524> (May 23).
[87] Chris MacGregor, *Bake Cookies for your Visitors in Flash*, July 2000, < http://www.flazoom.com/news/cookie_08212000.shtml> (May 24).

or by the environment (e.g.-absence of speakers) to access information that is conveyed through sound such as for video clips.[88]

2.5. Color and contrast

It is crucial to consider the contrast between foreground and background elements when designing a Flash interface. Colors such as red, green and blue used together in a composition must not be of the same brightness as they could then be indistinguishable to certain colorblind users. Also, picking the right colors is important so as to enhance text readability.[89] To improve text readability, fonts designed especially for on-screen readability should be considered.

2.6. User freedom- Readability, bookmarking, printing and e-mail to a friend

While browsing HTML websites, the user can increase font size based on usage of relative fonts or browser function. Since this is not the case with Flash, desginer/devlopers must allow for a mechanism that allows users to control font size for easy readability. Another easy way would be to not disable the right-click context menu which could be used by the user to zoom into the textual content besides other purposes. This again is an accessibility consideration as well. If the Flash website consists of different HTML pages of embedded Flash movies for each section, sub-sections still would not be able to bookmark unless they themselves had a separate HTML page to themselves. In all these situations, bookmarking might be implemented by generating a special URL by passing a variable to the Flash file through the HTML

[88] MacGregor et al, 235.
[89] MacGregor et al, 239.

the SWF is embedded using a method such as one which employs Scott Gilbertson s *flashvars* technique for bookmarking (which also helps in SEO)[90].

E-mail to a friend may simply use a server script such as Matt s perl script to send a mail about the details of the website and the specific page (with the special URL)

Flash allows designer/developer s to create separate print formatted pages which can be hidden using *.visible* property set to false. These can be sent to the printer using the *print()* command when the user requests so by clicking on the appropriate print button available on the Flash interface for certain document sections or those which house important and useful information.[91]

2.7. Important considerations- download time

2.7.1. *Preloaders*

According to Stephanie Reindel, users are more likely to wait for a Flash site or animation to download when they are provided with a status indicator that shows how long the loading sequence will take to complete.[92] I would like to point out that this is in accordance to one of Nielsen s usability heuristics which is visibility of system status where the system should always keep users informed about what is going on, through appropriate feedback within reasonable time.[93] Therefore, preloaders must be used to provide the user with feedback that a particular section is loading to prevent user frustration.

---

[90] Scott Gilbertson, *Optimizing Flash for Search Engines,* November 2004, < http://webmonkey.wired.com/webmonkey/04/44/index4a.html?tw=programming> (22 May 2005).
[91] MacGregor et al, 209-305.
[92] Stephanie Reindel, *We've got Flash- The Omnious Wow Factor and its Diverse Effect on Usability*, July 2002, <http://www.flashmagazine.com/511.htm> (1 June 2005).
[93] Jakob Nielsen, Ten Usability Heuristics, <http://www.useit.com/papers/heuristic/heuristic_list.html> (2 June 2005)

2.7.2. Symbols

Download times can be reduced by reusing symbols. All objects used more than once should be converted into symbols which can be reused over and over again without adding to file size. In my opinion, the *tint* option in the color tool available in the propert indpector to modify symbol properties must be used to change color of an object rather than duplicating it and coloring it again of it a vector object.

2.7.3. Stream content

Also the Flash movie can be streamed so the user does not have to wait for the content to load completely before they can view anything. In this sense, it is advisable that while publishing the Flash movie to be embedded in a website, the designer/developer select the load order to specify how Flash loads a SWF file s layers for showing the first frame of the SWF file: bottom up or top down. This option controls which parts of the SWF file Flash will load first over a slow network or modem connection.

2.7.4. Vector graphics

Since vector-based images are lower in memory size than bitmap images, vector graphics must be employed to build the interface unless in the case where complex raster images are absolutely needed.[94]

[94] Chris MacGregor, *Developing User-Friendly Macromedia Flash Content*, (n.d), 10, < http://www.flazoom.com/usability/usability_I_1.shtml>, (23 April 2005).

2.7.5. Fonts

In my opinion, since sans-serif fonts are made of lesser curves, their use in Flash therefore reduces file size in the case of embedding fonts as compared to serif fonts. The font used in the thesis, *Rotis Semi Serif*, that you are reading, for example, would take much increase much more file size as compared to an arial or verdana font. MacGregor advices using device fonts decreases the file size however they (as they do not add to the file size of the Flash file instead use the fonts from the user s system) do not display as anti-aliased.[95]

2.7.6. Animations revisited

In my opinion, since animations also increase file size and therefore download time, they must be used by carefully weighing whether they will add to a positive user experience or simply user frustration.

3. Usability testing/ User testing

This process of observing users trying to complete a given set of tasks, according to MacGregor, is useful in finding areas which need improvement as it provides hints about how one can improve the interactions within the interface.[96]

It can be used before the website finally goes live. This provides invaluable feedback from recruited users on usually simple to implement but important changes to the

[95] Chris MacGregor, *Developing User-Friendly Macromedia Flash Content*, (n.d), 10, < http://www.flazoom.com/usability/usability_I_1.shtml>, (23 April 2005).
[96] MacGregor et al, 411.

interface which might have not occurred to the designer/developer while designing the website earlier.

FLASH ACCESSIBILITY- CRITICAL ANALYSIS

What is accessibility?

According to the W3C, web accessibility simply means that people with disabilities can use the Web.[97]

For the Flash designer and developer, the challenge of it is to remove the obstacles that prevent users with disabilities from effectively using a site or application.[98]

Tim Berners-Lee, W3C director and inventor of the World Wide Web said that, The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect. [99]

Out of all reasons to create accessible websites, the **first** reason is responsibility. The above line means that the web is about equal opportunity and equal access. We are not being considerate by not allowing that. We should all be responsible to provide equal opportunity to access of information.

Second, a more personal beneficiary reason would be the commercial aspect. WebAim states that most studies find that about one fifth (20%) of the population has some kind of disability out of which probably half or quarter of this amount have disabilities

[97] W3C, *Introduction to Accessibility,*(n.d), <http://www.w3.org/WAI/intro/accessibility.php> (23 May 2005).
[98] Bob Regan, *Best Practices for Flash Accessible Design,* May 2004,1 < www.macromedia.com/resources/accessibility/best_practices/best_practices_acc_flash.pdf> (23 May 2005)
[99] W3C, *Web Accessibility Initiative (WAI),* (n.d), <http://www.w3.org/WAI/> (23 May 2005)

that affect their ability to access the Internet.[100] This means that 1/10th of the segment, you choose to ignore.

The Disability Rights Commission summed up the business argument in a most compelling way: There are **8.5 million disabled people** in Britain with a combined annual spending power of **£40 billion**. People aged over 50 have a combined annual income in excess of £160 billion. Yet, inclusive design - the idea of reaching this vast market by making products as easy to use as possible for as many people as possible - is still not considered worthwhile by most designers, manufacturers and engineers .[101]

Third is that the law might require it. Another important consideration for organizations is that Web accessibility is required by laws and policies in some cases.[102]

Fourth is that in non-Flash cases such as HTML, accessibility means increasing mobile device accessibility. A point to note is that this is not applicable to Flash however as has been pointed out earlier.

Which disabilities to consider and how these categories access the web

WebAim states that most studies find that about one fifth (20%) of the population has some kind of disability out of which probably half or quarter of this amount have disabilities that affect their ability to access the Internet.[103]

---

[100] Paul Bohman, *Introduction to Web Accessibility*, October 2003, <http://www.webaim.org/intro/> (25 May 2005)
[101] ECRU, *Why is Web Accessibility Important to You?*, (n.d), <http://www.ecru.co.uk/articles/why.html> (25 May 2005).
[102] W3C, *Policies Relating to Web Accessibility,* (n,d), <http://www.w3.org/WAI/Policy/> (25 May 2005).

The range of disabilities is broad and difficult to categorize; however, it is important to have some sense of the scope of the issue. A 1997 report by the U.S. Census Bureau categorizes 19.6 percent of the United States population as having some sort of disability.[104]

Seven to ten percent of the world's population has a disability, which means that there may be more than 500 million people with special needs.[105] This percentage is generally considered to be consistent with worldwide statistics. [106]

According to most reputed authoritative source, these are the major categories of disabilities in consideration to designing accessible websites with. Also indicated is what each category might do to accesses web content and corresponding to that, what strategy to use for designers and developers to make Flash content accessible.

Disability	Includes	How they access the web	How to enable access
Visual impairment	Blindness	Uses the keyboard for input exclusively	Ensure keyboard accessibility Do not interfere with keyboard commands

[103] Paul Bohman, *Introduction to Web Accessibility*, October 2003, <http://www.webaim.org/intro/> (25 May 2005)
[104] Bob Regan, *Best Practices for Flash Accessible Design,* May 2004,1, < www.macromedia.com/resources/accessibility/best_practices/best_practices_acc_flash.pdf> (23 May 2005)

[105] WHO, *WHO Director-General urges comprehensive agenda on disability,* <http://www.who.int/inf-pr-1999/en/pr99-68.html> (July 3).
[106] MacGregor et al, 314.

			Use components
		Does not use the mouse Doesn't use a screen magnifier	Enable keyboard access Enable right-click context menu.
		Receives information about the movie from a screen reader	Do not interfere with screen reader audio commands Ensure screen reader accessibility or provide an accessible alternative Provide textual equivalents for all non-text elements that convey content or provide a function. *Provide screen reader context as an alternative to visual context* *Do-not let background music affect screen reader audio*
		Receives information about the movie from other audio	*Use a sound scheme*

		events	
		May use a refreshable Braille display rather than hearing the information the screen reader gathers.	Enable screen reader accessibility
	low vision	Relies heavily on the keyboard for input	Ensure keyboard accessibility Do not interfere with keyboard commands
		Relies on high contrast and large size	Provide plenty of contrast Allow the Flash content to scale to a larger size
		May use a mouse, depending on the extent of the visual impairment	Nothing required
		May use a screen magnifier and/or screen reader to receive	Do not interfere with screen reader audio

		information about the movie	commands Ensure screen reader accessibility or provide an accessible alternative Provide textual equivalents for all non-text elements that convey content or provide a function. *Do-not let background music affect screen reader audio*
		If using a screen reader, may use a refreshable Braille display rather than hearing the information the screen reader gathers.	Enable screen reader accessibility
	Color blindness	Uses the mouse and/or the keyboard for input Does not need a screen reader or screen magnifier	

		Needs visuals that are usable given specific color limitations.	Use color blind safe color pallete
Auditory impairment	Deaf, hard of hearing	Uses the keyboard and the mouse	Nothing required
		Receives information from the movie in a visual form.	Provide synchronized captions for any audio that conveys content
Motor impairment	inability to use a mouse, slow response time, limited fine motor control	*May* be unable to use the mouse and depend more heavily on the keyboard *or* depend entirely on the keyboard	Ensure the Flash content is keyboard accessible Do not create complex mouse interactions which require equally complex keyboard interactions in relation to the requirement of fine motor skills

		Can receive information about the movie visually.	Nothing required
Cognitive impairment	learning disabilities, distractibility, inability to remember or focus on large amounts of information	Can receive information about the movie visually and audibly. May choose between using mouse and/or keyboard like able users.	Give users control over time sensitive content Provide easy to use controls and navigation schemes Be consistent Use the clearest, simplest language appropriate to the content *Use sound to reinforce association* Enable back button

Analysis of implementation strategies to make Flash accessible

There are solutions to making Flash accessible as much as possible. However, just implementing them as they are brings up many issues in many ways.

Macromedia suggests that content created with Macromedia Flash be evaluated against a series of use cases that includes people with disabilities since it is not a practical method to try and make it comply with existing web standards such as Section 508 Standards or W3C web content accessibility guidelines which were written specifically to support HTML content. Even though there are areas which overlap, Flash and HTML accessibility are based on different approaches of accessibility incorporation.
Based on the previous table s use cases and the how to enable access column in regard to the use cases, a table is presented below on technical solutions to make Flash content accessible along with an analysis of their usage.

Technique	**Implementation**	**Analysis**
Provide Text Equivalents	Through *name* field in th accessibility panel Through actionscript	As easy to do as adding *alt*, *desc* and *longdesc* tags in html
Control Reading Order	Limit size of stage	Impractical solution for stand-alone Flash website design because a stand-alone Flash website is generally created to at least be viewed at a resolution of 640x480
	Through action script	Cannot use static text or graphics because they cannot be instances

		Every instance over the lie of the movie has to have an instance name including invisible elements and those hidden off stage
	Using screen reader detection to pass screen content as inaccessible and pass the tab values to a single column content positioned off stage	Increases file size and performance Screen magnifiers may focus on off screen content leading to a confusing experience
Ensure Keyboard Access	Enable keyboard shortcuts through accessibility panel	At present, no screenreaders support this technique so is practically useless.
	Enable keystroke capture	Works with JAWS but not Window-eyes screen reader. Users need to put focus in Flash movie by clicking mouse to it, cannot tab into it
	Avoid empty hit areas	Easy to implement solution

Control Animation	Hide child object to avoid screen readers from refreshing constantly via accessibility panel or actionscript Settle motion when there is much reading content on screen for cognitively disabled. Avoid Blinking for photo-epilepsy patients	Must be implemented smartly. For example, a preloader could be made inaccessible to avoid constant screen reader refreshing issues. Instead another object can be created with *._visible* property set to false and it can convey to the screen reader that content is loading.
Provide Context	Provide equivalent context for screen readers the way it has for sighted users	Requires smart thinking and nothing else.
Enable Component Accessibility	Enable their accessibility for each component once in the first frame of the movie	There is a known issue with screen readers and the combo box, list box and data grid components. The Macromedia Flash Player 7 is not able to pass information beyond the first instance of one of these objects without entering forms mode. This significantly reduces the usefulness of these components.

		Another interesting revelation on component effectiveness considering actionscript 1.0, actionscript 2.0 and flash players 6 and 7 has been illustrated in second table below this.
Provide Captions	Import already captioned audio and video Place text directly on stage Stream XML caption data	The designer/developer can choose one of the three available methods best suited to their purpose.
Provide Control Over Audio Playback	Allow the end user to control background music/sound so it doesn t interfere with screen reader audio	An easy to implement feature by coding also available as a media component which therefore requires no effort of coding and design
Use Color Wisely	Use a color blind safe color palette	A usability consideration as well
Support Users with	Set movie to 100% Set a mechanism where users can	Easy to implement through actionscript

Low Vision	increase text size *Do not disable context menu*	
Support back button navigation	Many available techniques	I would recommend Robert Penner s back button implementation technique over the Macromedia technique of using named anchors to identify key frames to enable back and forward button because the former is cross browser compatible unlike the latter

Other Problems with no solution

Table 2. Functionality of Flash MX UI Components Used in Flash MX 2004[107]

Publish Format	**ActionScript Version**	**Result**
Flash Player 7	ActionScript 1.0	Components not likely to function as expected
Flash Player 6	ActionScript 2.0	Components possibly not to function as expected
Flash Player 7	ActionScript 2.0	Components not likely to function as expected
Flash Player 7	ActionScript 1.0	Components to function as expected

6		

According to WebAim, those using Mozilla, Netscape 7, or Opera will notice that the Flash content is skipped entirely when navigating with the Tab key (or Q and A keys in Opera). To access the elements within the Flash movie with these browsers, the user must use the mouse to click within the movie. At this point, you will then no longer be able to navigate outside of the Flash movie without using the mouse. You can alleviate this by placing the movie in a Web page by itself so that there is no need to navigate to other items within the page.[108]

Unless you are using version 7 of the Flash player in Internet Explorer for Windows, when Flash receives the focus within a Web page, it maintains that focus. What this means is that once you click in or tab to a Flash movie, you cannot use the keyboard to navigate to other items on the page. The screen readers that support Flash (current versions of JAWS and Window-Eyes) have built in functionality that will change focus back to the Web page after all of the Flash items have been accessed. Common browsers with older versions of the Flash player, however, do not have this functionality.[109]

According to these techniques, I gather the following noteworthy points:

1. Static Text and graphics need to be avoided since they cannot be instanced which is necessary for creating a logical reading/tab order through actionscript. There is a workaround I found however. The graphic may be made a graphic in

the properties but movie clip in the instance property. Also, static text has no advantages over dynamic text except for animating rotation. In such a case, the static text can be vectorised.

2. Text equivalents are the easiest to implement like *alt* text in HTML. They can be avoided for buttons if necessary and don t have to be given to each and every object on screen. The designer does not even have to put them in for decorative elements which might not be required to pass on to screen readers.

3. In my opinion, as should be the case with every developer I reckon, implementing tab order is one of the toughest things to do in flash accessibility. Out of the three ways described above, the first is not applicable according to me. I defend myself by saying that since this is about stand-alone Flash, it is almost certain that the movie dimensions in the case of a stand-alone Flash website which will fill the whole homepage will be more than 300 pixels wide and secondly, all elements are not going to be vertically placed. So this leaves the second and third methods, both of which I think are useful. They say the second is most precise but it is such a pain to have everything to be instanced in the first place. One can t use static text either with the exception that children of a button object or a button movie clip do not have to be included in the reading order.[110] Whether one wants the screen reader to skip information of certain objects through *.silent* or *.visible*, they all have to be included in the tab order. This can be quite a pain. ACCRepair which looks for missing instance

names, coverts static to dynamic text and helps build a tab order is an extension which was developed by HISoftware which sold out to Macromedia. It was earlier free but is now available for purchase through the Macromedia website. The third method is not really great but is suitable according to Macromedia for sites which use highly dynamic content, where a reading order can t be specified since the beginning. In it you use screen reader detection to detect the screen reader, if it is detected, you set the elements on stage to *.silent* and then create another instance of each element on stage off stage and like the first case put them in a single row or column. This method seems a good option in case the second seems too complex and troublesome. However, it is worth considering that it leads to increase in file size and second screen magnifiers which might be used along with screen readers could draw attention to the off stage content leading to a confusing experience for the disabled user.

FLASH SEARCHABILITY- CRITICAL ANALYSIS

What is searchability?

Searchability is a term which shares the same meaning as search engine optimization (SEO). SEO means ensuring that your web pages are accessible to search engines and focused in ways that help improve the chances they will be found.[111]

In order to understand SEO, an understanding of search engines is required. Danny Sullivan is the creator of www.searchenginewatch.com, one of the most credible sources of information on SEO which Macromedia also suggests to its users as the website to refer for SEO understanding purposes[112]. He has written an article on how search engines work[113]. The essence of this article in relation to understanding search engines is presented below:

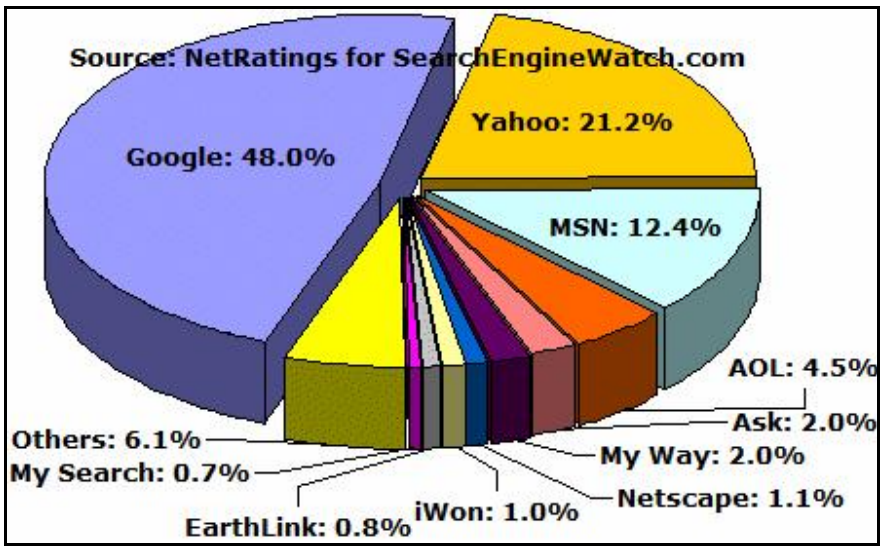
Search engines can be of three types: crawler-based search engines, human-powered search engines and hybrid search engines. A search engine consists of essentially three components: an index, elements which feed the index with content (information found in websites) and search engine software which facilitates in user query against the index.

An index also known as catalog is like a giant book containing a copy of every web page that the object finds. If a web page changes, then this book is updated with new information.

Elements which feed the index can be of two types: either human or code. According to this fact, the term ”search engine” is often used generically to describe both crawler-based search engines and human-powered directories. These two types of search engines gather their listings in radically different ways. The difference lies in the fact that while the former employs spiders or crawlers that visit web pages, read them, and then follows links to other pages within the site to fill their index, the latter relies on humans that review websites submitted by webmasters who would like their websites included in the index of the human-powered directory. Spiders return to already crawled website on a regular basis, such as every month or two, to look for changes. In this sense, changing a webpage effects search engine ranking in crawler-based search engines but not in human-powered directories. The third type of search engine, in the sense that it bases its results on human-powered search engines and/or crawler-based search engines is known as hybrid search engines .

Search engine software is the third part of a search engine which is the program that sifts through the millions of pages recorded in the index to find matches to a search and rank them in order of what it believes is most relevant. In the case of a human-powered directory, the search engine software looks for matches only in the descriptions submitted by humans who have reviewed websites submitted.
According to this article and as is matter of fact, there is not much SEO to be performed for human-directory projects as they work on the principle of receiving websites from webmasters for submission upon which they review and include them in

their directory. Such search engines, the most popular being DMOZ open directory project are utilized much less by users as compared to the other two types of crawlers. I substantiate this claim by producing forth the results of the most popularly used search engines for the month May 2005 which was performed by Nielsen Net Ratings presented on www.searchenginewatch.com.



Out of the ten specifically named search engines, none of them are human-powered search engines. However, inclusion in human-powered search engines is important as many of these search engines listed base their results in a way on human-directory results as well.

Solutions and analysis of techniques to optimize stand-alone Flash websites for search engines and better SERP (search engine ranking position)

1. **Creating separate versions**

The most effective method for optimizing a Flash intensive website for search engines would be to create an alternative HTML website which can then be optimized for search engines. Shari Thurrow says, When in doubt, we create two versions of a Web site: Flash and HTML. On the home page, we allow visitors to select their viewing preference. However, since this thesis is about stand-alone Flash websites and not websites in general, this method cannot be considered. Apart from that, creating an alternate HTML site could cost as much as double the time and money which makes it less suggestible. The most obvious solution is to create an additional version of your website done in HTML.

2. **Auto-redirection**

Auto-redirection also known as cloaking is a method where a detection script is used to direct users to the stand-alone Flash website and search engine crawlers to a keyword rich html page. However, according to Google's terms of service such websites could get banned on charge of spamming.[114]

3. **Invisible frame-sets and invisible divs**

One can place keyword rich text under invisible frame-sets and invisible divs with the css file placed off limits to robots. However, Markel warns that such is a risky practice

which like the above method could lead to getting banned by search engines on the charge of spamming.[115]

4. Publish Template

Out of the two methods Macromedia suggests for getting Flash websites ranked in search engines, one is the publish template mechanism which has been available since Flash 4 exports text within a Flash movie into the HTML file published with a SWF file which allows search engines to search for relevant text in regards to the Flash movie. This information, contained in the HTML of the page embedding the Macromedia Flash SWF is what a search engine looks for when indexing the page. Therefore, it is a guaranteed way to get listed in a search engine but does little in comparison to HTML websites which can exploit a lot more of page formatting to do so.

As is above, Macromedia has omitted mentioning that the above mechanism only works for input text and dynamic text. The above mechanism unfortunately does not work for static text at all which is a common method of choosing text type in Flash. This, however does not make much of a difference considering that for creating a logical reading/tab order as described in the accessibility document review, static text is to be avoided at all costs. Moreover, dynamic text can be used to in every way static text can with the exception being that it cannot be rotated like static text. Also these are not embedded by default like static text but can be done if wanted to. This way there is no difference between the two. While this will render in the Flash authoring environment, it will not do so in the preview or when published. One bug I have noticed in regarding the publish template mechanism in Flash MX 2004 professional is that it works only

when the publish settings are first viewed even though it should just work through executing the publish command from the file menu or via its shortcut.

Also, another problem is that if two fields, whether dynamic and dynamic, input or input or dynamic and input, have totally the same text, then only one of them will be outputted in the HTML. Not only that, if any one of the two have the same content in any one line, it will be outputted only once and the other will be skipped. Therefore, if there is a chance that text be repeated, it better be in the same text field box rather than two or more of them else the html output will not take into account the repeated text.

5. Manually adding information to tags

Since search engine crawlers were designed to index HTML pages, designers and developers must utilise the HTML tags they can while embedding the flash movie while making stand-alone Flash websites. According to Mark Angeletti, the following tags should be utlised:

<noscript>, <object>, <title> and *<meta>*.

An important note at this point is that the only the content or relevant keywords within the Flash file should be placed between these tags in order to avoid getting penalised by the search engine crawlers for spamming. These tags were created to provide alternate content and also aid in accessibility in the sense that and add to the accessibility part of designing such websites.[116]

6. Inbound links

All the links pointing at a particular web page are known as inbound links. Even before Google link popularity was being used by some search engines as part of their algorithm when determining the rankings for any given search term. The arrival of Google saw link popularity become an important consideration for SEO. The advantage of inbound links is that the stand-alone Flash website has nothing to do with such SEO. Rather it is the other websites that link to it that increases the search engine ranking of the stand-alone Flash website.

7. Different Flash page for each section

One of the main reasons why an all Flash website has a difficult time placing well within the results of a search is not because spiders still don't do an adequate job indexing a Flash file, rather because any website, Flash or no Flash, that consist of but a single page will struggle to place well.[117] Because of this reason, one must find ways to ensure a stand-alone Flash website consists of multiple pages after which he other standard optimization procedures (SOP) described here can be applied further.[118]

8. Add URL to search engine sites which allow it

In order to get indexed by websites, Thurrow suggests that the website URL be manually submitted to relevant search engines which provide such a facility such as AlltheWeb and Google (both these search engines index Flash content).