

(Research Article)

A Proposed Methodology for Web Development

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Abstract

The purpose of this paper is to study the area of developing websites for the World Wide Web and to provide a methodology to help with this process. Techniques have as well as others who criticize the limitations and rigidity of prescriptive frameworks. It is hoped that the technique given here will serve as a useful framework for directing the process rather than being a universal solution to all of the issues associated with web development.

Keywords: Web development, Information Analysis, Design Testing, Cost Analysis.

1. Introduction

Since the early 1990s, when the web first appeared, it has been nearly impossible to ignore the advancement of the Internet. Businesses and organizations view the Web as the new frontier for cross-border marketing and commercial transactions, which has nearly created a "siege mentality" [1]. Businesses race to acquire domain names as they struggle to be "online," demonstrating how they believe the web offers them almost limitless potential in the hope of getting that elusive competitive edge [3]. The role of the web developer lies within all of this confusion. They are under tremendous pressure to create high-quality websites quickly, but they have a very limited number of formal web development approaches to select from. There is a common misconception that enormous teams of individuals, each playing a separate role in the development process, create websites. Contrary to popular belief, research reveals a wide range of individuals who create websites, many of them come from outside the traditional IS function and lack the practice of adopting a structured process [4]. In fact, a lot of web developers are creating new techniques "on the fly" [4] in the hopes that the final product would satisfy the requirements of the organization.

It has been determined that creating a website requires extremely distinct skill sets than creating a multimedia application [5]; as a result, the development process requires quite diverse skill sets [6]. It appears that the requirement for meticulous planning, foresight, and a systematic design technique has been "trivialized" [7] with the introduction of

seasy-to-use Web authoring and site administration tools. However, it is acknowledged that the web development process differs dramatically from conventional IS development and calls for new methodologies [8].

The article is set up as follows. The application of current IS development approaches to the process of web design is discussed in the next section. The third section examines a variety of web techniques now in use, highlighting both their benefits and drawbacks. The methodology itself is presented in Section 4 while an evaluation of the methodology is covered in Section 5. The study ends with a few observations about the application and adoption of a methodology.

2. Traditional Methodologies and Web Development

According to research, many traditional IS development approaches are founded on antiquated ideas from the 1970s [9]. These approaches are being utilized to create websites, but as is to be expected, they have their limitations because they were never meant to be used in this way [10]. It is worthwhile to think about conventional IS techniques and their applicability to this process before moving on to propose a methodology for web development. Table 1 presents several of these techniques and outlines their advantages and disadvantages in respect to the web development process.

WIS facilitates work and frequently integrates closely with other non-WISs like databases and transaction processing systems. WISs differ from conventional information systems in other ways as well. They need innovative design and development strategies, have the ability to engage a far larger audience, and are frequently the outcome of grassroots

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initiatives. These distinctions present management and technical difficulties.

Table 1. Traditional development methodologies

Methodology	Development process
Waterfall	In the waterfall methodology, the development process is broken down into a sequence of cascading processes with minimal iteration in between. The rigidity of its structure and lack of iteration between any stages other than neighboring stages are the main issues with adopting the waterfall methodology to construct web sites (and also IS). As has been mentioned, the Web is a dynamic environment where new technologies are becoming accessible virtually on a daily basis. Any methodology employed in the creation of websites must be adaptable to change.
Structures Systems Analysis and Design Method (SSADM)	This technique was created for the creation of conventional, sizable projects. It does not cover every stage of a development project's lifecycle, focusing instead on the analysis and design phases in an effort to prevent later-on costly mistakes and omissions. Given the emphasis on analysis and design, some SSADM components could be "tailored" into a web development technique, which should ideally lower the risk of costly code changes.
Prototyping	Instead of evaluating a description of an envisioned future system, prototyping aids in evaluation of a functional version of a system. It is especially helpful in the creation of "interactive applications," when the user is more interested in the design of the screen than in how the system really works. At first glance, it might seem that prototyping would be perfect for creating a website. However, there could be issues if prototyping were to be employed for the creation of websites. First of all, prototyping has a propensity for project "creep," in which users add components to the prototype that go beyond the initial system requirements.
Rapid Application Development (RAD)	By creating a number of small "throwaway" prototypes for the system and discarding them once they have been analyzed, RAD differs from traditional prototyping techniques in that the prototype is never developed into the full system. As the proper site eventually emerges from the process, RAD requires repeatedly developing the incorrect location.
Incremental prototyping	In order to prevent delays between definition and delivery, incremental prototyping enables huge systems to be developed in stages. First, the system's most crucial elements are fully created, and only then are the system's less crucial aspects added. This shortens the project's implementation period. In the dynamic environment of the Web, the incremental development method might be helpful. Web sites expand in both size and capability, thus a methodology that used this incremental approach may not only hasten the development process and aid in the addition of new features as the enabling technologies arise, but also aid in managing the issue of web-site sprawl.

3. Web-site Development Methodologies

Techniques for web development has been proposed in numerous research work. However, a closer look reveals that these are really only suggestions for the "look and feel" of a website that are best practices. There are innumerable articles on topics like how to make an image smaller, how to use colour efficiently, and the "pros and cons" of animation, for instance. While many of these suggestions are undoubtedly helpful, they do not address the more general problem of how to construct a website.

A number of design techniques are, however, being employed for the creation of websites, according to the literature review. The following lists a few of these approaches. To aid in the creation of the fresh recommended approach, each methodology will be reviewed.

Each of the mentioned techniques takes on a certain aspect of the Web development issue. Of all the approaches mentioned above, Russo and Graham's methodology [4] has shown to be the most practical and has served as a solid foundation for the creation of a new methodology. In order to propose a new

methodology, which is detailed below, information from the literature review and the author's own experience as a web developer have been combined.

This literature analysis has shown that many techniques have drawbacks and that there are issues that are particular to the creation of websites.

Because of this, any methodology created must be general and adaptable enough to take into consideration the distinctiveness and individuality that are particular to websites, while also being succinct enough to complete the development process. Therefore, it is thought that any methodology, or even a combination of methods, requires some level of method tailoring in order to be used.

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any methodology, or even a combination of methods, requires some level of method tailoring in order to be used. The suggested methodology will almost surely have limitations in the future, if not today.

4. Agile Approaches in Web Development

Most customer requirements were quite stable during the early years of software development, and plans were followed without many substantial deviations. However, since software development involves more complex and dynamic industrial initiatives, new difficulties have emerged in line with the expansion of businesses. During the early stages of software development, the majority of customer needs were very stable, and plans were generally followed without many significant modifications. But as firms have grown, new challenges have appeared as a result of the more complex and dynamic industrial endeavors that go into software development. The agile manifesto prefers usable software against voluminous documentation. The company's philosophy is to release numerous functional versions of the programme in brief intervals, then update it in response to client feedback. By implementing this idea, traditional software development methodologies' difficulties are addressed by meeting customer requirements, accelerating development, and providing users with a system that precisely matches their expectations in the end [11].

Agile methodology is combined with current approaches like XP and RUP to create software systems that are tailored to the customer's shifting requirements. Agile methods consist of:

- Extreme programming
- Agile modeling
- SCRUM
- Crystal methodologies family
- Feature-driven development
- Adaptive software development

Agile development aims to assist in the early and speedy development of functional code in accordance with client requirements.

Agile proponents assert that code is the only significant product, however agile challengers discovered that emphasizing code can lead to memory loss since there is not enough documentation and modelling.

5. The Proposed Methodology

A methodology was created using the information in the literature as well as the expertise of one of the authors who is actively involved in the creation of websites. With regard to experience in the field, there are clear advantages to this, but it can also be problematic. How such an "Involved-Researcher" might contribute the advantages of their experience to aid the study process is described by Walsham [12]. Winter [13] notes

that this might also have the drawback of relying on pre-existing notions and having certain expectations regarding the research findings.

5.1 Phase one - Analysis: The formulation of a web strategy and an examination of how a website might implement this plan are the topics of phase one. In [15], the lack of top management support for a project and an incorrect grasp of the system requirements are the two main causes of software project failures. By establishing some strategic goals and objectives and then creating a system to attain them, Phase One tries to lower these risks.

An organisation's choice to create a web presence should ideally be a part of its corporate information strategy. If the fallacies about the Web being the information panacea for an organization are to be debunked, it is essential that the website developer be involved in the creation of this plan at its inception.

Additionally, the developer or consultant might describe the total cost of ownership associated with maintaining a website, which may greatly exceed the expenditures of initial development.

5.1.1 Step one - Development of a web strategy: The developed plan will be put into practice in a strategic planning document that defines three key components that define the site's objectives. These components are helpful in directing the remaining stages of the development process.

These components are listed by Robson [15] as follows:

- A clear description of the organization's goals.
- An evaluation of the organization's current state.
- A concise action plan outlining how to move from the "now" to the "where"

This process is iterative since the management plan may have inflated expectations, which is why hiring a web developer or consultant can help you save time and money throughout this stage).

This stage of the process is possibly the most important, as errors or omissions here could have expensive consequences afterwards.

5.1.2 Step two - Specifying goals: The methods by which the development will accomplish these objectives may now be determined once the organisation's web strategy has been decided upon and a strategic planning document has been created.

The web developer should be aware of the most recent Internet and web technologies at this point because they will be directly involved in carrying out the project's goals. The result of this step is an objectives document that lists the site's goals along

with any additional elements that can help the developers determine whether the site will remain viable after deployment.

5.1.3 Step three - Goal-oriented analysis: The above-mentioned objectives and the available resources are examined in this step to determine their level of attainability. There are six tasks that make up this analysis, and they are as follows:

- Technology analysis identifies the technological elements and equipment needed to build, house, and maintain the location.
- Information analysis identifies any data the user needs, whether it is static (on a web page) or dynamic (supplied "live" from a database server).
- Skill analysis identification of all the various skill sets needed to accomplish the project through skill analysis.
- User analysis identification of all planned site users through user analysis. Compared to traditional development, this is a far more complicated process because of the wide range of users and the potentially different technologies those users employ.
- Cost analysis – a cost estimate is calculated for the site's development, or an estimate of what is feasible within a predetermined budget.
- Risk analysis: a study of any significant risks related to the development of the site.

After this analysis is finished, a more specific set of goals can be recorded. Any goals that cannot currently be achieved are included in the objectives document. This will later be included in the iterative process during the methodology's subsequent cycle.

5.2 Phase two – Design: The development process can proceed to the design phase after the analysis phase is finished, which is guided by the objectives document. Websites can easily become unmanageable as they develop gradually and frequently lack a sound design architecture. The website should be created with the understanding that it will likely undergo additions over its lifespan as needs change and new technologies are developed. The iterative procedure used in the methodology accounts for this.

5.2.1 Step one – Design: The two key duties involved in the website's design are as follows:

- Information design could require creating a database or a CGI (Common Gateway Interface) script to handle more complicated data structures or processes, or it could be as simple as creating a group of hyper-linked Web sites.
- Graphic design, where the "look and feel" of the application are tailored to the target market. During this stage, all screen layout, colour schemes, image and animation designs, etc., are created.

The result of step one is a comprehensive design document that details the structure of the website, the data structures of any databases that need to be developed, and the purposes of any necessary CGI scripts.

5.2.2 Step two - Design testing: Testing at the early phases of development is significantly more cost effective than testing the coded software [16-17], and so for this reason the design is now tested to detect any inconsistencies or errors. This comprises testing the website design against the aims and objectives mentioned in the earlier three processes outlined above, in order to ascertain whether the system can acceptably deliver the information requested by the user.

Phase two consists of two iterative stages that result in a polished design document. The design of a system to achieve the goals outlined in the objectives document would be far too complicated or expensive, so phase one will be reviewed to reevaluate these goals [18]. This creates an iterative loop between phases one and two. The wish list will be updated with any objectives that are deleted from the objectives document.

5.3 Phase three – Generation: The methodology's third phase, which is guided by the design document, focuses on creating the website.

5.3.1 Step one - Resource selection: During this phase, all the resources required to build the site, including the required staff, communications lines, hardware, and software, will be chosen. It can be necessary to integrate a variety of servers and applications, therefore it's important to check the technical requirements.

5.3.2 Step two - Design evaluation: To make sure the design can be implemented with the resources chosen, Step two compares the design document from phase two with those that were accessible in step one. The design phase and resource selection are examined if incompatibilities are discovered. Phase one can be revisited if issues occur because this is an iterative process.

5.3.3 Step three - Code generation and installation: All of the site's associated software is created during the coding phase and installed on the appropriate web servers. This might just entail publishing the website to a web server, but it might also need more difficult operations, such connecting databases.

5.3.4 Step four – Testing: One of the most challenging and complicated aspects of any web project is testing. Since web applications are frequently designed for a large group of users (often unknown) in various technological contexts, it is considerably more complicated than with a traditional IS. To reach the widest possible audience, the website must be tested in as many of these settings and technology configurations as feasible.

5.4 Phase four – Implementation: The implementation phase is ongoing and lasts the entire duration of the website's existence. Despite being one of the simplest, this phase is undoubtedly one of the most crucial. A website must be noticeable and its content must be regarded as valuable if it wants to attract repeat visitors.

5.4.1 Step one – Implementation: The target audience of the website must be aware of it in order for it to be completely implemented. The website should be registered with the top search engines at this time, along with any further promotion strategies like alerting pertinent newsgroups and printing the website's domain URL on stationery and business cards, among other things.

5.4.2 Step two – Maintenance: Particularly with regard to websites, many are always being maintained with fresh content being added virtually every day. The price of maintenance will be high as the site gets bigger. An online resource's content must be current. For this reason, it's crucial that the website is routinely checked to make sure that the content, especially the external connections, are up to date.

5.4.3 Step three - Review of objectives: Web developers evaluate new technologies as they become available as part of an ongoing process. These can be evaluated in relation to the goals specified in phase one, especially any goals that couldn't be implemented at the time and were listed on the wish list.

The same procedure can then be repeated to add any new features and increase the functionality of the website. Phase four illustrates how nonlinear iteration and use are essential components of any website development technique. Phase three would have been the ideal time to conduct the objectives review and revisit the wish list. This would have meant going back to phase one of the development process. Phase four illustrates how nonlinear iteration and use are essential components of any website development technique. Phase three would have been the ideal time to conduct the objectives review and revisit the wish list. This would have meant going back to phase one of the development process.

6. Evaluation

Methodologies possess their uses and limits, whether they are used to traditional system development or online development. They operate as a comfort factor to reassure participants that 'proper' practices are being followed, which is a good practice because they give a beginning developer a helpful basis to work. Additionally, the project management facility offers an audit trail, assisting in ensuring the managerial viability.

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