

Automatic Creation of Homepage



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Shenal Jayaratne: Automatic Creation of Homepage

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Abstract

In the era of technology development possession or ownership of a webpage has become mandatory to businesses and self-employed individuals. These webpages act as a mode of marketing as well as a point of access to certain businesses that have no physical presence. However, the demand for more webpage development, a lack of adequately skilled professionals at affordable costs and time-factor obstacles have resulted in the innovative creation of online website builders to cater to the need of the hour. One of the crucial focuses of these website builders now is to speed up the process of webpage creation via these builders. This thesis is an attempt to adopt an online website builder (*Quick Sites*) integrated with the Mopsi database of the University of Eastern Finland (UEF) to allow Mopsi users to create a simple yet functioning Homepage while the same time exploring the efficiency of non-Mopsi users using the same application. The thesis focuses on an overview of Homepages and website builders, an introduction to Mopsi services, a discussion of the research and creation of the online web application *Quick Sites*, the benefits, limitations and future potential of *Quick Sites* and the conclusive findings backed by an empirical research, an online survey and development of the real time application (*Quick Sites*) in an attempt to bring out the efficacy of webpage building when integrated with an existing database, in this case the Mopsi database.

Keywords: website builder, Mopsi website builder, quick sites, Mopsi quick sites

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List of abbreviations

ATM	Automated teller machine
CMS	Content Management Systems
CS SERVER	Computer Science Server
CSS	Cascading Style Sheets
GPS	Global Positioning System
HTML	Hyper Text Markup Language
IDEs	Integrated Developer Environments
MOPSI	Mobile Location-based platform
NON-IT	Non-Information Technology
PHP	Hypertext Processor
UEF	University of Eastern Finland
URL	Uniform Resource Locator
US	United States
WWW	World Wide Web

Table of figures

Figure 1. Process of creating <i>Quick Sites</i>	9
Figure 2. Examples of photos and routes from Mopsi user collection	16
Figure 3. Recommendation system results on website	17
Figure 4. Mopsi keyword photo search option	17
Figure 5. <i>Quick Sites</i> homepage	19
Figure 6. User pathway diagram	20
Figure 7. Category selection.....	21
Figure 8. User registration	22
Figure 9. User login	22
Figure 10. Password change	23
Figure 11. Logged in homepage of user	25
Figure 12. Importing Mopsi data	26
Figure 13. Mobile number authorization.....	26
Figure 14. Category selection.....	27
Figure 15. Mandatory details.....	28
Figure 16. Completed homepage.....	29
Figure 17. Selecting an address.....	30
Figure 18. Saving the demo page.....	31
Figure 19. User profile details	31
Figure 20. Webpage editing	32
Figure 21. Viewing created webpage.....	32

List of tables

Table 1. Comparison of website builders.....	33
Table 2. Summary of user trial timing.....	35
Table 3. Classification of survey questions	43

Contents

1.Introduction.....	1
1.1 Problems	2
1.2 Purpose	3
1.3 Research questions.....	4
1.4 Approach	4
2. A literature review of website builders	5
3.Creation of Quick Sites.....	9
3.1 Theoretical research on homepages and online website builders.....	9
3.2 Online survey	11
3.3 Model automatic homepage developing application.....	12
3.4 Limitations of the methodology	13
4. Mopsi.....	15
5.Quick Sites	18
5.1 User actions	22
5.2 Search engine optimization.....	23
6. Creating a homepage	25
6.1 Mopsi user homepage using automated method	25
6.2 Non-Mopsi user homepage using semi-automated method	27
6.3 Demo homepage	30
6.4 User profile and editing	31
6.5 View webpage	32
6.6 Domains and hosting	32
7. A comparison between Quick Sites and other builders	33
8. Benefits and limitations of Quick Sites.....	38
9.Future developments	41
10.Online survey on website builders	43
11.Conclusion	50
References.....	52

Appendices

Appendix 1: Online survey form (3 pages)

Appendix 2: User trials information and feedback form (2 pages)

1. Introduction

'The World Wide Web' (WWW) began as a project proposal by Sir Tim Berners-Lee in the year 1989 and was developed as a management proposal in 1990 in collaboration with Robert Cailliau. This was built using *Hyper Text Markup Language* (HTML) (Stover, M. and Zink, S.D., 1996) and is considered by far the most successful and popular *hypertext* creation. However, the content of the WWW does not only comprise of text but also displays text, pictures and graphics. Hence, in essence the WWW is a digital expression of hypermedia as opposed to hypertext.

According to Kathleen Falcigno and Tim Green as cited in Stover, M. and Zink, S.D. (1996) the WWW hypertext document is a collection of homepages that are linked internally and also sometimes to external sources. Homepages (Stover, M. and Zink, S.D., 1996) are the front-end gateways of a website. In simple terms this is the page that loads on the User Interface once the Uniform Resource Locator (URL) of a website is searched on a browser. Hence, a 'Homepage' is the first page of a website whereas a 'Website' is a collection of such homepages. The modern user however refers to homepages as web homepages or webpages whereas a collection of webpages is labeled a website.

In an attempt to draw a parallel in lay terms, I think a homepage is like the living room to which the front-door of a house (the URL in this case) opens and the living room in turn leads the way to the other rooms which are set aside for specific purposes (these are the pages providing various functions in a website). The website on the other hand is the entire house comprising the living room and all other rooms. HTML is the command language used to create homepages and all elements of the homepage including the headings, body and the appearance of the page are designed using these HTML codes or *tags*. (Plaud, J.J., 1996)

The webpage at the European Organization for Nuclear Research popularly known as CERN was the first ever homepage developed and is still been maintained at CERN as it is a historic milestone of the birth of a new era¹. This invention was subsequently followed by wave over wave of inventions and developments as the WWW was an

¹ <https://home.cern/science/computing/birth-web/short-history-web>

open-source platform and its founder had made a public invitation for developers to assist in its development. But it was only after the launch of the *Web 2.0* version that homepages and subsequently websites began playing a major role in the commercial world².

The advent of digital marketing thereafter (Butler, P. and Peppard, J., 1998) resulted in firms using homepages to create awareness of their products and services and encouraging consumers to purchase their products. Further, not just firms but individuals also started using homepages to express their artistic capabilities and to promote their services. Homepages enabled firms to gain a competitive advantage by using them as a marketing tool. However, homepages or webpages were only available to large firms with high profits as there were only a handful of experienced web developers and they were less accessible. This became a threat to new startups and individual service providers as e-commerce began stealing away their local business.

1.1 Problems

By the year 2001 at least 10,000 new webpages were published daily (Calongne, C., 2001) and there was a frenzy over owning web space to promote one's products or services. According to Bång, A. and Roos, C. (2014), homepages are the most used and demanded electronic tools used in digital marketing. However, a high cost had to be incurred to create a webpage as according to Nielson and Tahir, users observe the first page of the website (homepage) before deciding whether to go ahead with the seller (Kang, S. and Lee, E., 2002). Moreover, in order to create an effective homepage it is important to provide a good *user-experience* (Wang, X. and Huang, W., 2009) and this is easily said than done.

Garett (2003) as cited in Wang, X. and Huang, W. (2009) defines the concept *user experience* as how a product behaves and is used in the real world whereas Hile Kuniavsky (2003) also cited in Wang, X. and Huang, W. (2009) argues that the term a *Good User Experience* differs from individual to individual, product to product and task to task but includes features such as *functionality, efficiency and desirability* to the audience could assure a good *usability experience*. Thus, developers have to take

² <https://github.com/expressjs/multer>

much care and planning into its design (Kang, S. and Lee, E., 2002) and have a good grasp of not just developing skills but also a marketing perspective to create a webpage that provided a good user experience and enticed the user to purchase the product or the service that is marketed.

This is a rare combination in a developer as skilled developers lacked perspective and a marketing vision whereas visionaries may lack in skills (Cunliffe, D. ,2000). The introduction of online website builders was a timely solution to many of these issues that created a friction between the customer requirements and developer capabilities. At present there are various website builders that assist users to create their very own webpage in the least possible time³. Yet, as technology and smart devices improve and users become more knowledgeable advanced features are required to achieve user satisfaction.

1.2 Purpose

Though users are becoming updated day by day there are still users with average skills but entertain fantasies of owning their own webpage or website to promote their services and products. Hence the focus on this thesis has been to empower the average skilled user in achieving his dream webpage within the least possible time frame while granting him freedom over its design features.

However, in an attempt to explore the efficiency perspective further it is assumed that most users of this application are members of a common network called Mopsi.

Mopsi is an online social networking application that allows its members a range of functions which are described in detail in Section 4. Some recent developments include approximate photo searching (Akter, T., 2020), user permissions granted to add new businesses or services (Mariescu-Istodor, R., 2013) and automatic *user-recommendations* (Mariescu-Istodor, R. et al., 2019). Thus, Mopsi shall provide an efficient and effective platform for both individual and institutional Mopsi users such as startups and self-employment ventures to market their products and services by creating their own homepage.

³ <https://www.techradar.com/news/the-best-website-builder>

Therefore, in this thesis I attempt to explore the ability of the average IT skilled Mopsi user to automatically create a homepage within the least possible time frame.

1.3 Research questions

The questions below are formulated in line with the above research purpose:

1. Is there a demand for automated homepage creation among users in the general public?
2. How can the creation of a homepage be made more efficient to the Mopsi user in comparison to the ordinary user?
3. How will the faster creation of a homepage assist in improving Mopsi user experience?

Within this study we shall answer these 3 questions by using a multidimensional approach of theoretical studies, surveys and web application development.

1.4 Approach

A three-fold approach is followed in this study where we initially examine the theoretical research data related to homepages, the Mopsi application of the University of Eastern Finland (UEF) and Online website builders (Section 2) to gain an insight into the core purpose of this work. This is followed by an Online Survey (Section 10) distributed among selected individuals from both *IT* and *Non-IT* fields and different countries so as to eliminate cultural biases and study the impact on a purely worldwide platform. Finally, an online application *Quick Sites* is developed to test the solution (Section 5). This is followed by the user trials carried to test *Quick Sites* and a comparison with other popular website builders is made in Section 7. The benefits and limitations of *Quick Sites* are discussed in Section 8 followed by future developments of the application (Section 9).

The research questions of this thesis revolve around the impact and necessity of an efficient web-page builder focusing mainly from the perspective of a Mopsi user, hence a major portion of this thesis shall comprise of discussions concerning the application, benefits, limitations and potential improvements to *Quick Sites*.

2. A literature review of website builders

HTML is the command language used to create homepages. It is not a programming language in itself but a simplified manner of using code to create an effective homepage and all elements of the homepage including the headings, body and the appearance of the page are designed using these HTML codes or *tags*. (Plaud, J.J., 1996)

Nielsen, J. (2002) refers to homepage as the '*face to the world and the starting point for most user visits*'. However, Kathleen Falcigno and Tim Green as in Stove, M. and Zink, S. (1996) argue that the term 'Homepage' should not be confused with the term 'Webpage' as the term 'Webpage' describes the generic WWW hypertext document whereas a 'Homepage' is a collection of linked homepage documents.

Shemberg, M. (2000) on the other hand compares web homepages to an index or a table of contents as they are the starting point for a user who is navigating through what Shemberg describes as '*a maze of internally connected webpages*' located either on the same web server or elsewhere so as to find what the user requires. But, Zhao, W. et al. (2003) is critical about this black and white opinion and states that even though homepages are defined as the first page or computer screen the user sees when accessing a website in exceptional instances where the first page only provides limited information and provides a *hyperlink* to link users to the main information pages this second page is treated as the website's homepage.

As it is apparent that restricting the definition of a homepage to fixed parameters has proven to be problematic it is crucial that web developers have sufficient understanding as to its features before developing a successful homepage. Bleckman (1995) and Graham (1995) state that the features of a successful homepage include *simplicity, brevity, functionality and a lack of dependence on graphics* (Plaud, J.J., 1996) while Kang, S. and Lee, E. (2002) proves in his research that there are six elements in an e-commerce homepage; *Site Identity, Navigation, Content, Advertising, Negative Space and Layout*. Moreover, an empirical research carried out by Geissler, G. et al. (2001) has unraveled that consumers prefer 'well-organized, easy-to read, aesthetically pleasing, interactive and moderately complex' homepages and both consumers and website

developers suggested that this could be achieved by focusing on elements of a homepage such as the web homepage length, number of graphics, number of links, amount of text and the use of animation.

On the other hand, Calongne, C. (2001) adds that when deciding a webpage, the developer needs to primarily place attention to usability over the mastery of the tools. She points out that identifying the audience that a homepage is intended for plays a crucial role in helping the developer decide a range of factors such as the motivation of the user, the *color sensitivity*, cultural background, software knowledge and experience and even the font styles and multimedia components of the user. She also points out that it is important to understand the type of website or homepage as factors such as load time and quality of multimedia differ based on this requirement. For instance, if the purpose of the site is to market and sell a product attention will have to be drawn to reducing load time by reducing the burden of the multimedia components. This may even affect aesthetic aspects such as the color and desktop publishing layout decisions.

Based on a survey by Akan (2006) in Wang, X. and Huang, W. (2009) the properties of design, navigation, technology and content were found to be important to the success of a website whereas Kreg (2006) focuses only on one aspect and states that *user-friendly* websites have good navigation features where the user does not have to understand why and how he/she should proceed. Thus, we could see that there are various opinions, theories and factors that different scholars consider important.

Some other popular concepts that some developers incorporate when creating a website or webpage are Peter Cochrane's *Three-clicks from Content Rule* and the principle where the *Return to homepage button* is not more than seven buttons away (Stover, M. and Zink, S.D., 1996). Yet, these have been criticized by some like White, M. in his article '*Intranets and Content Management*' (2004). But in general, these principles act as good guidelines for new developers to this day.

At present homepages are 2 types; Individual homepages that are personal in nature and reflect the artistic and or literary taste of the individual, and Organizational homepages that are connected to business organizations and perform marketing functions (Stover, M. and Zink, S.D., 1996). According to Nielson (2006), 40% of users

begin their search for information from the homepage and regularly return to it whenever they intend to start a new search (Calongne, C., 2001).

In order to measure the efficiency and effectiveness of these homepages (Wang, X. and Huang, W., 2009) methods such as *usability testing*, *user feedback* and *user data* are commonly used. Among these, (Jefferies et al., 1991) many independent researchers have proved that *heuristic evaluation* is a very efficient usability engineering method.

Nielson (1993) as cited in Wang, X. and Huang, W. (2009) states that '*Heuristic analysis*' is a classical method of usability testing via expert review that is based on established web design and functionality principles and standards. In addition to the *usability evaluation*, it helps in web evaluation using attractiveness, aesthetic design and content. However, Nielson (1992) also points out that Heuristic evaluation cannot practically be conducted by a single person and perhaps for the same reason it is a very effective method of homepage evaluation.

With the revolution of *digital marketing* and globalization together with a drastic change in the work patterns and life styles modern consumers increasingly appear to opt for online shopping or e-commerce for all their basic needs. Bellman Lohse and Jonson (1999) as cited in Li, N. and Zhang, P. (2002) state that individuals who use the internet on a routine basis as well as individuals who are time constrained prefer shopping online. Thus, as Stover, M. and Zink, S. (1996) and Shemberg, M. (2000) set out homepages are used by business organizations as a powerful form of advertising and marketing and is considered the gateway to the website of an organization (Singh, S., Dalal, N. and Spears, N., 2005). The benefit to businesses of maintaining an effective webpage is further backed by the discovery of the new trend by Ho, C. and Wu, W. (1999) as seen in Li, N. and Zhang, P. (2002) where a positive relationship between online shopping and five other factors that include website's technological characteristics and homepage presentation.

Initially homepages were designed based on HTML, *Cascading Style Sheets* (CSS) and *Hypertext Preprocessor* (PHP) which are generally time consuming and require expert knowledge and experience to handle. Yet with the introduction of *Content*

Management Systems (CMS) such as *WordPress* and *Website builders* the process has been made less complex.

Website builders are applications software that enable the user to develop a website with almost zero prior knowledge about coding, programming and all the other myriad software knowledge generally associated with its creation (Forbes, J., 2019). David Bohnett from Beverly Hills, California was the inventor of the first ever online website builder, *Geo Cities* (Milligan, I., 2017) which allowed users to create a free webpage by themselves. By mid-1998 it spread widely to the extent that it attracted 18,000 new users a day (Motavalli, 2004) but *Geo Cities* was removed from circulation after its acquisition by Yahoo in 1998.

Geo Cities was followed by *Dreamweaver*, *Microsoft Frontpage* up to the more modern website building platforms such as *Wix*, *Weebly* and *Squarespace* (Forbes, J., 2019) as with the increase in ‘*Digimarketing*’ or digital marketing, the demand for webpages by firms increased exponentially.

Website builders revolutionized web development (Forbes, J., 2019) as it enabled users to set up a webpage in 5 simple steps: Make a plan for website structure and content, Register a domain name, Select a website builder and host provider, Optimize it for search engines and Launch the website. Moreover, with the recent introduction of languages such as *JavaScript*, and also libraries such as *jQuery*, *Boot-strap* and *React.js* the taxing task of coding has been made easier, dynamic and webpage loading has become faster. Developer tools such as *Integrated Developer Environments* (IDEs) are also used at present to prevent the need for typing and reduce the time taken by developers to create a website.

However, though most developers focus on improving the speed, efficacy and functionality of website builders there is a lack of published research focused on developing a website builder that enables the creation of a webpage using stored data in a social media platform. Therefore, in this sense *Quick Sites* is a unique approach to automatic webpage creation.

3. Creation of Quick Sites

Despite the fact that online website builders were first introduced in the year 1994 (Milligan, I., 2017) there is an evident and significant lack of academic research and critique on this technology. It appears that most articles and research conducted in this regard are restricted to design features when creating a website or webpage, or how to evaluate the *usability* and *aesthetic perspective* of a successful website. Accordingly, there is a gaping void with regards to the role of online website builders both from an individual as well as a firm's perspective. Thus, this study was carried out in the threefold aspects of theoretical research (3.1), online survey (3.2) and model homepage developer application (3.3) as seen in Figure 1 in an to attempt to cover as many angles as possible.

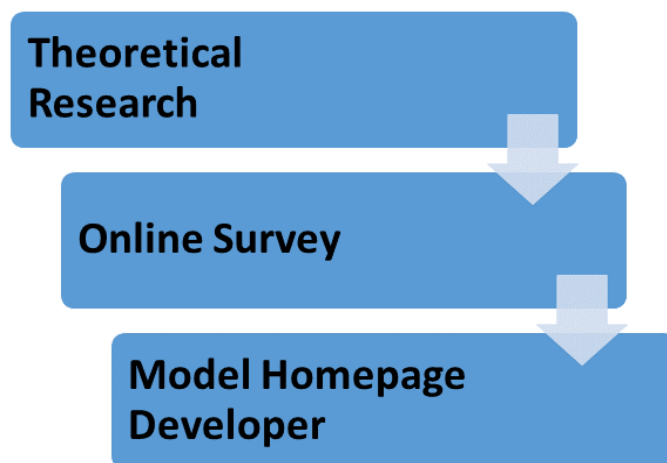


Figure 1. Process of creating *Quick Sites*

3.1 Theoretical research on homepages and online website builders

At the stage of strategic planning, it was decided that both primary and secondary research data would be used in this study. However, in order to gain an initial understanding of the topic and the various concepts involved secondary research was carried out mainly using basic tools such as journal articles, conference papers, blogs, online articles and YouTube videos and tutorials.

At the onset focus was mainly on gathering simple but clear information pertaining to the topic. Therefore, most of the initial sources of information comprised of blogposts and webpages. Once I had a considerable grasp of the layout the search was made more title specific and journal articles and YouTube videos and reviews about the various website builders assisted in gaining an insight into how the automated process is structured. Some of the areas researched include;

- i. What is a homepage?
- ii. The historical development of homepages
- iii. How are homepages created?
- iv. The relationship between individuals and businesses homepages
- v. Features of a successful homepage
- vi. Problems of creating homepages with web developer assistance
- vii. What are online website builders?
- viii. What are the popular website builders at present?
- ix. Features and functions of present website builders
- x. Limitations of existing website builders
- xi. How online website builders may or may not substitute web developers

As the final stage was to design an online webpage building application the next part of the research involved a technical study into the back-end workings of similar applications as well as the aesthetic aspect of such platforms that would be visible to the user. Accordingly, it was first important to select an appropriate programming language. One such renown programming language is Java Script as ever since Javascript was introduced in 1997 it was popular among developers mainly because it supports multiple web browser tools such as Google Chrome, Mozilla Firefox, Safari, Opera and Internet Explorer and also because it assists in creating large-scale web applications easily. Thus, various Java Script libraries such as JQuery, AngularJS and React.js were researched on and then compared with how they were used in existing website builders such as WordPress, Wix, Weebly and Squarespace to gain an insight into the infrastructure, design, usability features and benefits provided to users. The comments and reviews of their users were also explored with a view to create an automatic homepage creating application that could be differentiated from these existing ones.

In addition, it was important to study the Mopsi application with a view of understanding its parameters, purpose and use, nature of existing and potential target audiences and future development potential. The most important aspect was the Mopsi user database as it was this that provided necessary user details to the webpage-building application when importing data to create a homepage. This process of retrieving user data from the Mopsi database was by far the most challenging task in the creation of *Quick Sites*.

Most of this study information revealed that usability factors such as ease of navigation and faster loading-time were some key perspectives valued by users and therefore more attention was placed on those aspects when developing the application (*Quick Sites*).

3.2 Online survey

With a view of obtaining empirical data that would make the study more realistic and reliable an online survey comprising of 11 questions was designed. The main focus and intention were to observe user responses from a usability, user experience and user expectations perspective. The objectives included:

- i. Understanding the popularity of online website builders among the public
- ii. Identifying user experiences pertaining to the use of on online website builders
- iii. Identifying user expectations related to online website builders
- iv. Recognizing the impact of website builders on the career prospects of web developers

Multiple choice questions were utilized in order to obtain the feedback as it is an easier and faster way to carry out research without tiring the sample and special emphasis was placed on including individuals from different countries to eliminate bias and obtain results with a global perspective. The survey results and a detailed outline of the questions are discussed in Section 10.

3.3 Model automatic homepage developing application

Finally came the challenging task of designing an online webpage building application which was later named ‘*Quick Sites*’. The central purpose of this application is to allow Mopsi users to automatically create a homepage within a minimal duration of time. As theoretical research on Java Script libraries was already carried out at the initial stage an in-depth hands-on analysis was conducted on AngularJS and React.js by conducting various experimental clone websites such as those of Instagram, Twitter and Slack. In the end React.js was selected as it uses a one-way data binding technique that makes websites using React.js faster as opposed to AngularJS's two-way data binding⁴. Also React.js is comparatively easier to learn and is flexible and its isolated components are easier to maintain whereas AngularJS is harder to understand as it has a lot of concepts and syntax⁵. One other discerning reason for selecting React.JS is its inherent feature of enabling faster loading times which could be used as a leverage by Quick Sites and outperform other website builders.

This choice was strengthened by its taking over AngularJS in popularity among professional web developers by 2020 (*Stack Overflow Annual Developer Survey 2020*)⁶ and it being used by some of the renowned Fortune 500 Companies and popular platforms such as Facebook, Instagram, Whatsapp, Yahoo, AirBnB, DropBox, Discord and Netflix. Moreover, according to a survey conducted by Web Technology Surveys⁷ it is now used by 46.4% of the websites in the world with an approximate number of 1,066,618 in total.

Deciding an appropriate technology to upload images to the homepage was another major task. Accordingly, the Node.js *middleware package* called *Multer* was selected. Multer is a software that enables multipart/form-data uploading system that assists in image and video uploads⁸. In order to maintain the loading speed of the website restrictions were placed on the usage of graphics. Thus when uploading images, a total of only ten images are allowed at once with each image not exceeding a maximum

⁴ <https://www.imaginarycloud.com/blog/angular-vs-react/>

⁵ <https://www.imaginarycloud.com/blog/angular-vs-react/>

⁶ <https://insights.stackoverflow.com/survey/2021#section-most-popular-technologies-web-frameworks>

⁷ <https://w3techs.com/technologies/details/js-react>

⁸ <https://www.npmjs.com/package/multer>

size of one megabyte. A file filter which allows only specific image categories including *jpeg*, *png* and *jpg* has also been set. All these restrictions have been added in order to make the homepage lightweight and thereby improve the *Search Engine Optimization* (SEO) of the user's homepage.

After deciding the main structure of the platform a prototype was created using *Figma*⁹ in order to obtain a preview of the final outcome. Figma is an online design tool that assists in creating a webpage prototype with the ability to view the future outcome in detail so that customized and innovative projects could be undertaken by web designers¹⁰.

The preliminary model of *Quick Sites* was created and was followed by a *Peer evaluation* and continuous discussions with Dr.Radu Mariescu-Istodor who had worked closely with the Mopsi applications at various stages of its development and therefore has a very broad knowledge on especially its database, servers and security systems. His insightful suggestions assisted in elevating *Quick Sites* to its present stage.

Even though as per the tradition it is essential to carry out user trials once an application is developed. However, currently external users could access the semi-automatic system to create a dummy page via the application but not host it or use the fully automated feature to import data from the Mopsi database due to system security and user privacy policies of Mopsi. Once these security permissions are granted the application shall be available to the public.

3.4 Limitations of the methodology

Despite a survey being carried out based on a selected sample of individuals, focusing mainly in obtaining the feedback of experienced individuals in the IT field, in an attempt to ensure that *Quick Sites* is user friendly to even the average skilled user the feedback of non-IT individuals was also sought. But as the complete sample only comprises of 30 individuals it may be difficult to accept it as comprising of sufficiently representing the views of all universal users.

⁹ <https://webdesign.tutsplus.com/tutorials/search/what+is+figma>

¹⁰ <https://webdesign.tutsplus.com/articles/what-is-figma--cms-32272>

Further, as there is limited literature on homepages and website builders there may be much to explore in the arena of benefits and drawbacks of online website builders.

Additionally, as *Quick Sites* cannot yet be open for public trials due to security measures in launching the webpage the results of its efficacy have been based on hypothetical bases whereas the actual result may vary considerably.

4. Mopsi

Mopsi¹¹ refers to a software program introduced by the Machine Learning Unit-, in the School of Computing of the University of Eastern Finland (UEF). It was originally created as a search engine (Fränti,P. et al., 2010) based on *Location-based Services* and *Global Positioning Services* (GPS) technologies that help individuals to know where their friends are and what is around them' and then evolved over the years to a social network application (Mariescu-Istodor,R. et al.,2019) that include geo-tagged photo clustering, trajectory search and analysis, event planning and service recommendations available to users on Symbian, Android, iOS and Windows Phone operating systems. Its features of data collection, user tracking, user searches for services and user service recommendations are done via user action detection techniques and data as well as photos stored in the Mopsi services databases (Mariescu-Istodor,R. and Fränti,P.,2018).

According to Waga,K. et al.(2012) Mopsi comprises of three databases that record a wide range of data. The first database includes day-to-day services used and searched by the public. These data however have to be verified by the administrators of Mopsi prior to adding them to the database and comprise of details such as location, contact information, key words used for searches of locations and user ratings. The second database includes geo-tagged photos that also comprise of location data, the time the photo was uploaded, description of location and user reviews or ratings while the third database contains routes including factors such as user location, time and attractiveness.

Mopsi allows its users to use location-based services for searches such as for example their favorite restaurants, bars, grocery stores, museums, pharmacies and *ATMs* and to obtain information on bus transportation schedules. This location search feature is valued especially by users who intend to find a location in an unfamiliar place (Waga,K. et al.,2012) as the application recommends possible locations based on the user's current location, the time when the journey started combined with the user profile details and contextual factors such as other locations they have visited and their search history. Additionally, individuals who need to find places of interest such as

¹¹ <http://cs.uef.fi/mopsi>

parks and museums in a given area when planning a trip or vacation find this application useful and time saving because it provides user recommendations that are personalized to suit the specific user's profile. These features are facilitated by a system of scoring information stored in the above mentioned databases using a special algorithm. For instance, when a keyword search is initiated it is provided a numerical score based on the search history of all Mopsi users while giving prominence to recent searches with a high frequency to help detect places in the area. Photo searches on the other hand are based on the search history, user location, ratings of other users and time. Here the time factor when the photos were uploaded plays a crucial role to assist in identifying places based on the time of the year as a location's significance changes based on seasons and to identify the recency of the photos as they affect the relevance to a user's current search. This same personalized search criteria is used in the feature of automatic user recommendations of products or services by trying to predict what the user is or may look for (Mariescu-Istodor, R. ,2019).

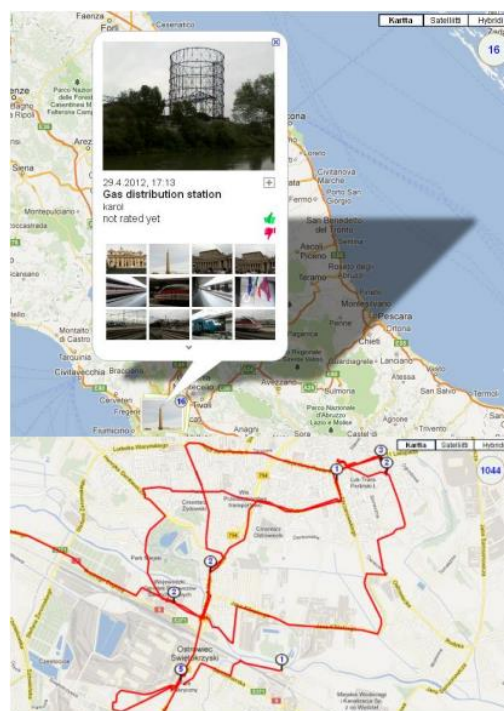


Figure 2. Examples of photos and routes from Mopsi user collection



Figure 3. Recommendation system results on website

The application also allows the sharing of photos and identifying places with the assistance of the geo-tagged photo searching system (Waga,K et al.,2012). For instance, Mopsi users could search for the nearest pizza shop and receive a customized search result with between 20,30,50 images or all matching results and the distance to it using the photo search using keywords option as seen in Figure 4. According to the contribution of (Akter,T., 2020) Mopsi users could now use its photo search tool more efficiently as it allows approximate searching or similarity matching of searches and not just inclusion matching. This allows users to obtain more accurate hits and a wide range of hits even if the keywords are misspelled.



Figure 4. Mopsi keyword photo search option

In addition to this it also facilitates *O-Mopsi* which is a *mobile-oriented gaming system* which could be played by anyone by downloading the mobile version of Mopsi with a special feature of allowing the user to create his own game if the user so wishes to (Mariescu-Istodor, R. 2013).

By the integration of webpage development (*Quick Sites*) to Mopsi services it shall allow and assist Mopsi users to create websites for services provided by individual users or their businesses as set out in Section 5.

5. Quick Sites

Quick Sites is a platform that specifically aims to help the average skilled IT user who is also a member of Mopsi to create a web homepage with the assistance of automation and advanced technology. The term average skilled IT user could be loosely defined as an individual with very basic computing skills such as the ability to access the internet, browse web pages and the ability to follow simple prompted instructions to download and install a software application according to the OECD criteria used to measure IT literacy levels of adult in developed countries (*OECD Survey of Adult Skills, 2016*). This type of user was selected as the target group of this application as despite there being an increase in the society's interest in digitalization and computing around the globe there is yet a significantly large gap in the IT literacy of individuals as a quarter of the survey sample didn't know how to use a computer of the remaining three quarters only 5.4% were proficient where as 42.9% had no or little computer skills¹².

The front-end of *Quick Sites* which is how the webpage appears to the user as displayed in Figure 5 was created using React.js introduced by Facebook in 2013 is one of the most recent open-source Java Script library languages that is increasingly popular among the web developing community for its ease of use, high loading speed and its flexibility in using its codes for multiple purposes among others. The *Quick Sites* application could be accessed on <http://cs.uef.fi/~shenal/quicksite/> on any search engine and the homepage in Figure 5 will load on the screen.

¹² <https://www.weforum.org/agenda/2017/02/a-quarter-of-adults-can-t-use-a-computer/>

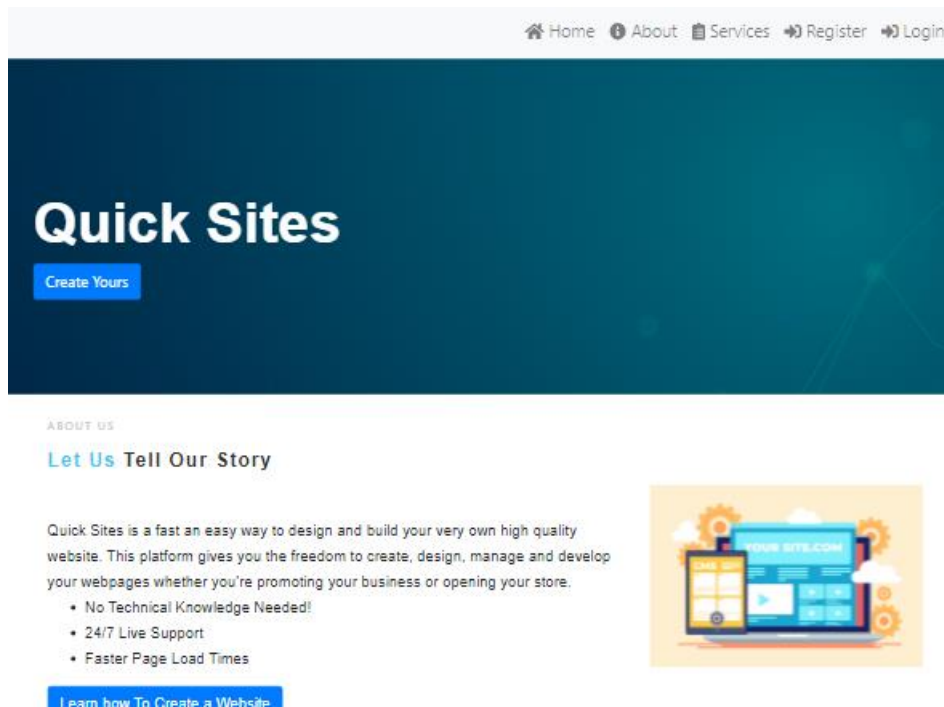


Figure 5. *Quick Sites* homepage

Contrarily, the back-end was developed using Node.js which is a run time environment that facilitates the smooth use of Java Script when building web applications. Node.js could be used as both a back-end as well as front-end run time environment though in the case of *Quick Sites* it is used to write its back-end server-side script¹³.

In order to create and successfully host the homepage users have to first register and login as a user. But unlike in popular website builders such as WordPress, Wix and Weebly users are able to create a demo page without user registration by simply clicking the blue button labelled *Create Yours* seen beneath the name *Quick Sites* and following the instruction prompts that appear subsequently. Yet, in order to save and host the webpage the user has to register and login as a *Quick Sites* user.

Despite Mopsi users being the focus of *Quick Sites* it is a user-centered application that caters to 2 types of users; The Mopsi user and the Non-Mopsi user with more benefits to the Mopsi user (members whose details are stored in the Mopsi user database stored in CS Server of UEF). The significance to Mopsi users is that they could use *Quick Sites* to create a simple but fully-functional homepage in the space of just 30 seconds using a three-step process as described in detail in Section 6. On the con-

¹³ <https://stackoverflow.com/questions/42547231/is-node-js-is-middleware>

trary, a non-Mopsi user would take an average of 3 minutes based on the user experiments carried out and detailed in Section 7 as they would have to manually enter the required data in the mandatory form fields.

These different pathways are laid out in order of their flow on the pathway diagram in Figure 6.

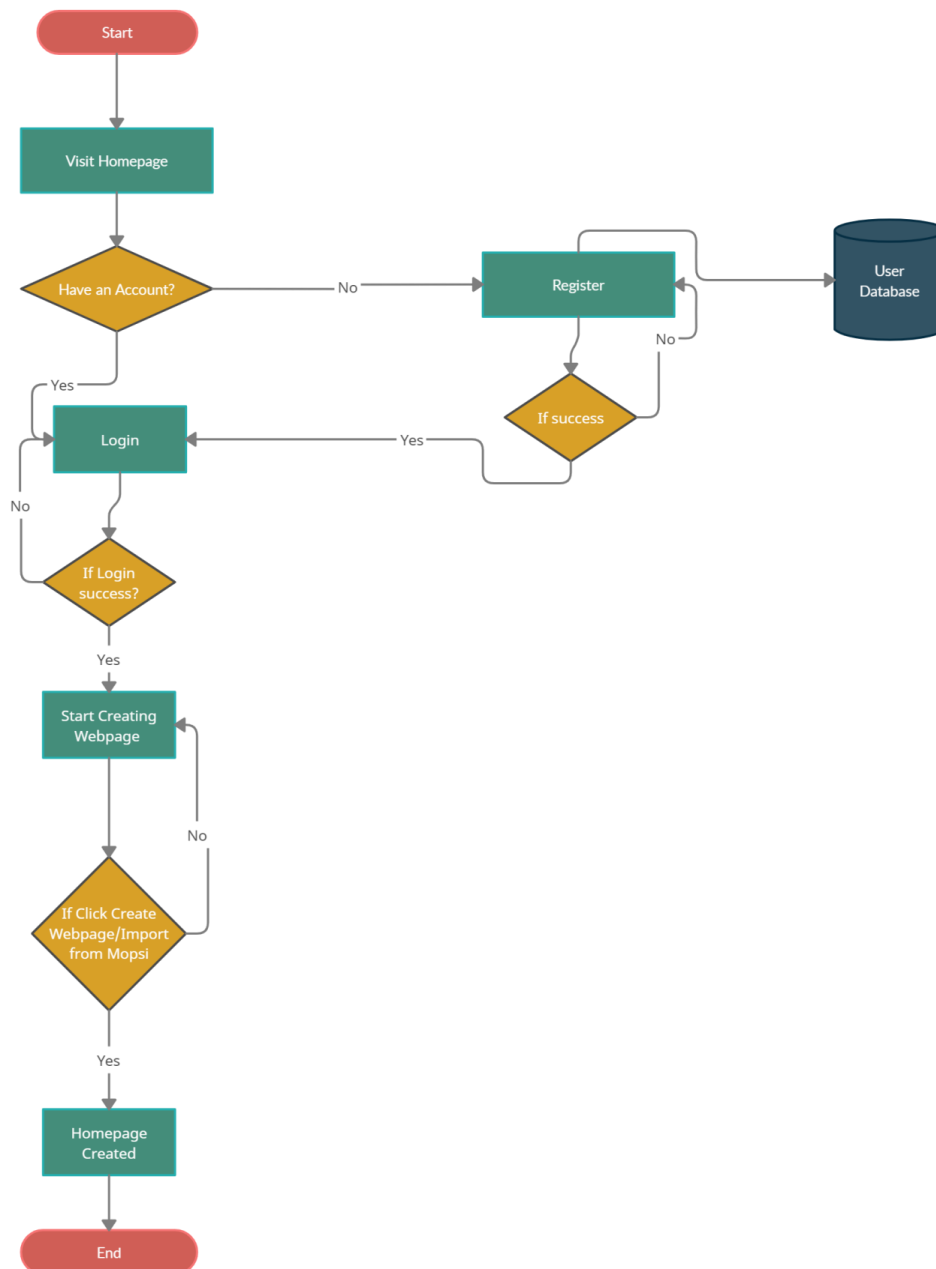


Figure 6. User pathway diagram

The application allows the user (Mopsi or non-Mopsi to create a homepage for one of four business ventures; *restaurant, fashion, online store* and *travel* which could be seen in the dropdown menu as seen in Figure 7.

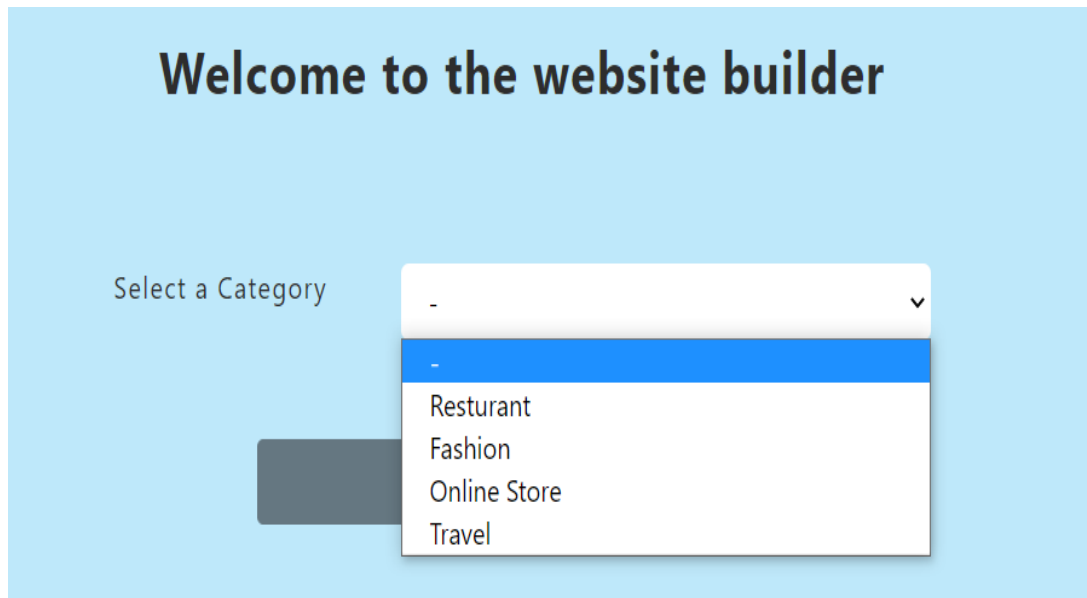


Figure 7. Category selection

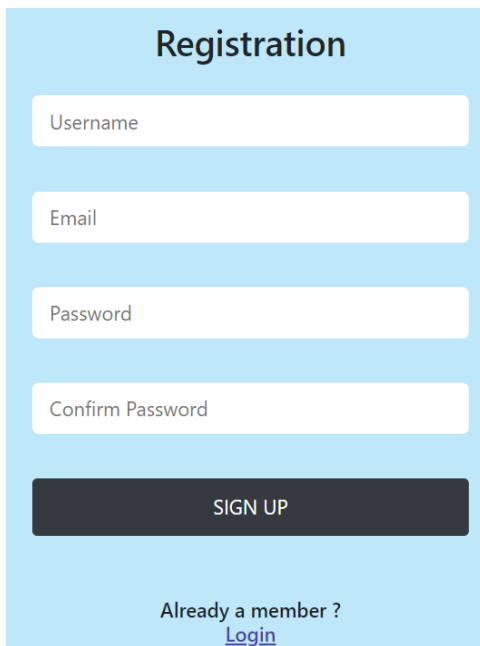
The application uses the Mopsi user data set in the Mopsi database and is hosted on <http://cs.uef.fi/~shenal/quicksite/> on the CS Server.

One of the crucial benefits of creating *Quick Sites* was the ability to clearly identify and examine the substantial difference in the time taken by a user to manually type a minimum quantity of information against using already stored data. The trial video available on You tube as well as on the *About Us* page of *Quick Sites* can be accessed from the link <https://www.youtube.com/watch?v=UYG7DhL5nkQ> shows that the reduction in the time consumed is around an overwhelming 75%.

However, in both instances there are a few pre-conditions to be fulfilled. In the first instance the 30 second target could be achieved provided the user is a Mopsi user, he intends to use the exact data saved in the Mopsi database when creating the homepage and has all the required data and photographs updated into the Mopsi database. All other external users are required to be in possession of all the mandatory data such as the webpage or business name, address and contact number, images and page content requested when creating the homepage. In addition to these, the typing and navigation skills of the user shall play a substantial role in deciding the time factor to create a homepage.

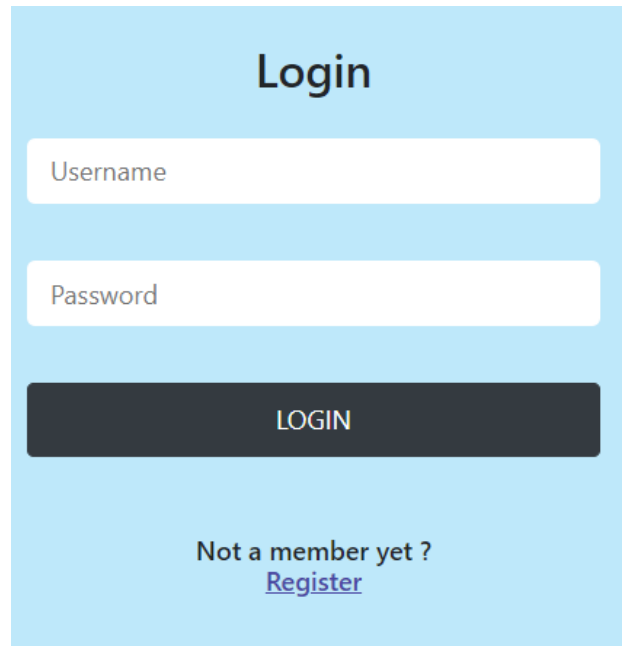
5.1 User actions

The most primary user actions comprise of registering as a new user and signing up and logging in the case of an already registered user. Any user intending to create a webpage using Quick Sites has to register themselves as a user by providing the mandatory details seen in Figure 8 and 9 and it is possible to surpass these steps and proceed to create a demo homepage.



The registration form is titled "Registration" and is set against a light blue background. It contains four white input fields stacked vertically, labeled "Username", "Email", "Password", and "Confirm Password". Below these fields is a dark grey button with the text "SIGN UP" in white. At the bottom of the form, the text "Already a member ?" is displayed, with a blue underlined link labeled "Login" positioned directly below it.

Figure 8. User registration



The login form is titled "Login" and is set against a light blue background. It contains two white input fields stacked vertically, labeled "Username" and "Password". Below these fields is a dark grey button with the text "LOGIN" in white. At the bottom of the form, the text "Not a member yet ?" is displayed, with a blue underlined link labeled "Register" positioned directly below it.

Figure 9. User login

Another common user action is changing the password in order to ensure the privacy and security of the user profile and details. A strong password is one that contains at least 8 characters including one uppercase, one lowercase, one number and one special character. A new password could always be set via the *Change Password* option that appears on the User Profile page.

The image shows a 'Change Password' form. It has a light blue background. At the top, the title 'Change Password' is centered in a bold, black font. Below the title are three white input fields with rounded corners, each containing a placeholder text: 'Previous Password', 'Password', and 'Confirm Password'. At the bottom of the form is a dark grey button with the word 'LOGIN' in white, uppercase letters.

Figure 10. Password change

The core user actions undertaken by a Quick Sites are;

- Creating a demo page
- Creating a homepage by a Mopsi user
- Creating a homepage by non-Mopsi user

-which shall be discussed in details in Section 6.

5.2 Search engine optimization

Search engines are (Yalcin, N. and Köse, U. (2010) software that collect data about websites such as their URLs, keywords, and content with the assistance of specialized software called bots or spiders that attempt to obtain the closest matching result when a query is made. This concept was first introduced by Larry Page and Sergey Brin in the year 1998 and was named and patented as was named “*Page Rank*” (Gunjan, V. et al., 2012). The algorithm measures the relevance of webpages to a given query using numerical weights assigned to the URL of the web documents. This is the birth of Search Engine Optimization (SEO)

SEO (Gunjan, V. et al., 2012) increases the visibility of a webpage by arranging keywords in a strategic manner to match with the indexing pattern of search engines such as Google Chrome, Yahoo and Bing and assists in bringing the web page among the

top few search results without a payment for ads (*Non-sponsored listings*). The significance of this concept according to Moz¹⁴ is the search results appearing on the first page of a browser have a tendency between 71% to 92% of being read, whereas out of the 71% only the top 5 links have a 67.6% of clicks while the remaining 5% receive only 3.75% of the clicks (Shelton, K., 2017). Therefore, (Yalcin, N. and Köse, U., 2010) it is important that customers are able to search and find the related webpage easily. A crucial factor that determines this is the webpage loading speed. Nielson 1999 as in Geissler, G. et al. (2001).

Hence, when developing the primary framework of *Quick Sites* SEO techniques to ensure a high website loading speed were emphasized. Accordingly, as *Quick Sites* is built on a smooth and fast JavaScript library (React.js) while restricting graphics by setting the maximum size of an image uploaded and the number of images uploaded at one time reduces the weight of the users' websites and boosts the page to the top of a search result as lighter the webpage higher the loading speed. These specifically assist small scale ventures and new start-ups operating on a limited budget while dreaming of raising sufficient funds to carry out a professional and expansive marketing campaign to promote their business ventures or services at a fraction of the costs spent on advertisements to promote and market their products.

¹⁴ <https://moz.com/blog/google-organic-click-through-rates-in-2014>

6. Creating a homepage

Quick Sites which is a user centered application categorizes homepage creation into 2; Mopsi user homepage creation and Non-Mopsi user homepage creation. The criterion that should be followed in each method differs as Mopsi users follow an automated System while non-Mopsi users follow a semi-automated system as set out in detail below. Yet the additional option of creating a demo page via the semi-automated method is available to any user.

6.1 Mopsi user homepage using automated method

Set out below is the three step process followed by Mopsi user already logged into *Quick Sites* to create a homepage for a restaurant named *La Pizzery*. This is a fully automated method as the application generates the homepage with minimum user interaction, specially via data entry.

- **Route 1**

Step One: Click on *Profile* button

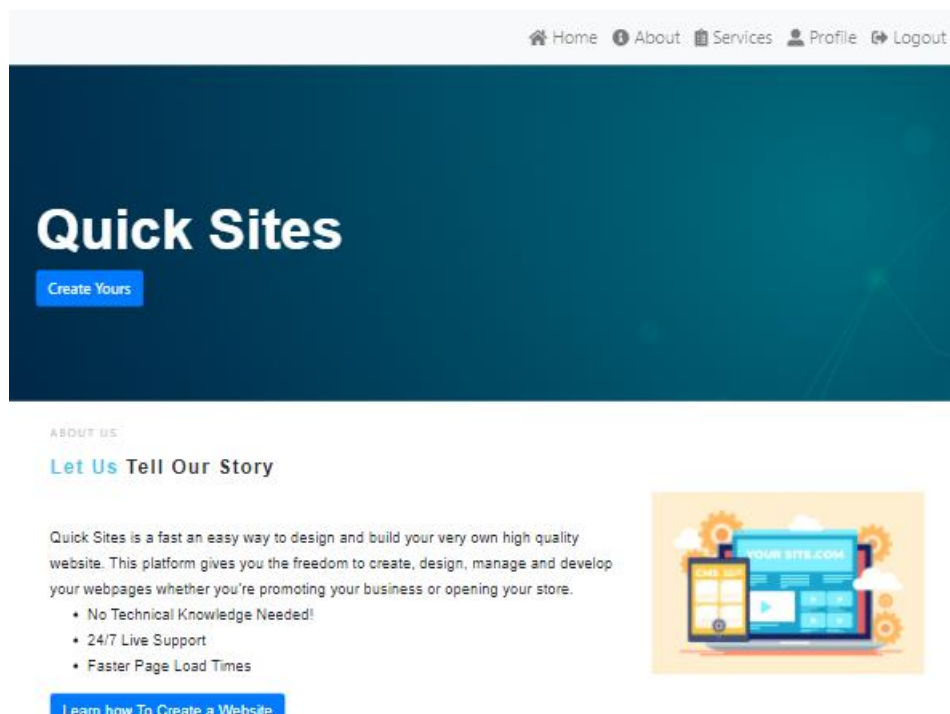


Figure 11. Logged in homepage of user

Step Two: Click on *Import Mopsi Data* (Figure 12)

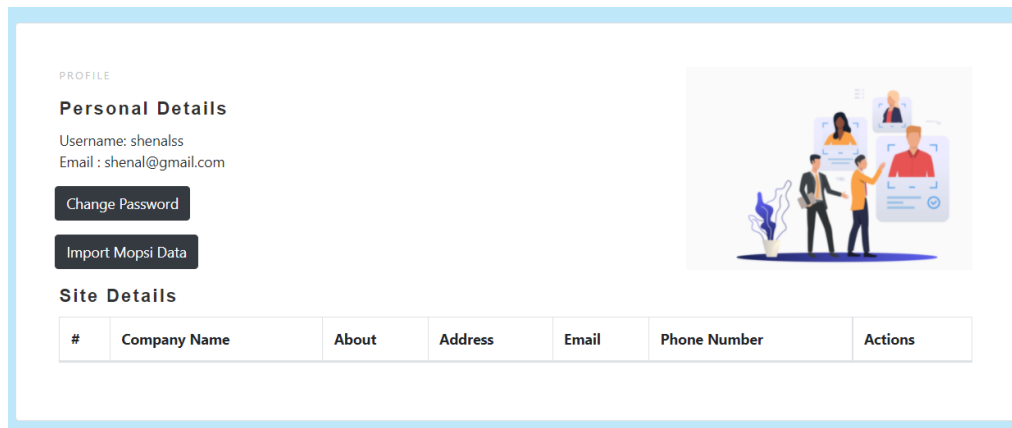


Figure 12. Importing Mopsi data

Step Three: Provide registered mobile number in Mopsi database for authorization and click *Import*

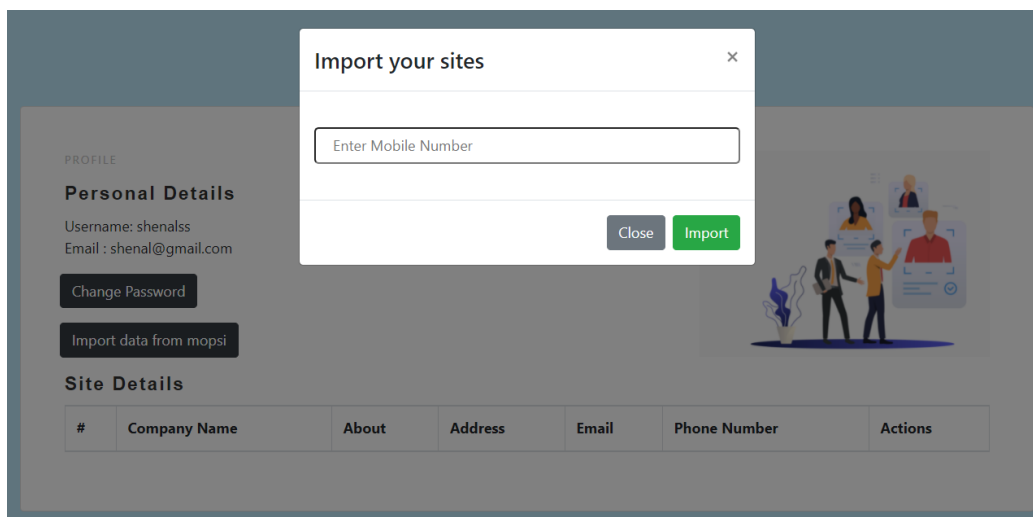


Figure 13. Mobile number authorization

And the homepage shall be generated automatically.

Users could subsequently change the data or develop the homepage into a detailed website which is done manually.

- **Route 2**

Step One: Click the *Create Yours* option.

Step Two: Select a category.

Step Three: Manually add details to all mandatory form fields and add any preferable image and click *Create website*

These steps are identical to those followed by the non-Mopsi user in Section 6.2 below.

6.2 Non-Mopsi user homepage using semi-automated method

To Create a homepage a non-Mopsi user should first register or login as a user of *Quick Sites* and follow the following steps in order to create a customized homepage. This method is considered a semi-automated method due to the requirement for manual data entry. Below are the steps to be followed to set up the homepage of *La Pizzery* by a non-Mopsi user.

Step One: click the *Create Yours* option that appears in blue on the homepage as set out in Figure 11 above.

Step Two: Select a category.

The dropdown menu as shown in Figure 14 below shall appear and the user has to select the *Restaurant* category out of the four options: *Restaurant*, *Fashion*, *Online Store* and *Travel* to create the page. The selected type will be saved and the system will check if the user had previously created a *draft homepage*. If a draft exists, the draft homepage will be loaded to the *form(fields)* and the user can continue making the previous homepage from the place where the user stopped.

If the user doesn't have any previous drafts all the fields will be empty and the user can start creating a new homepage the user will be directed to the template page to create the homepage.

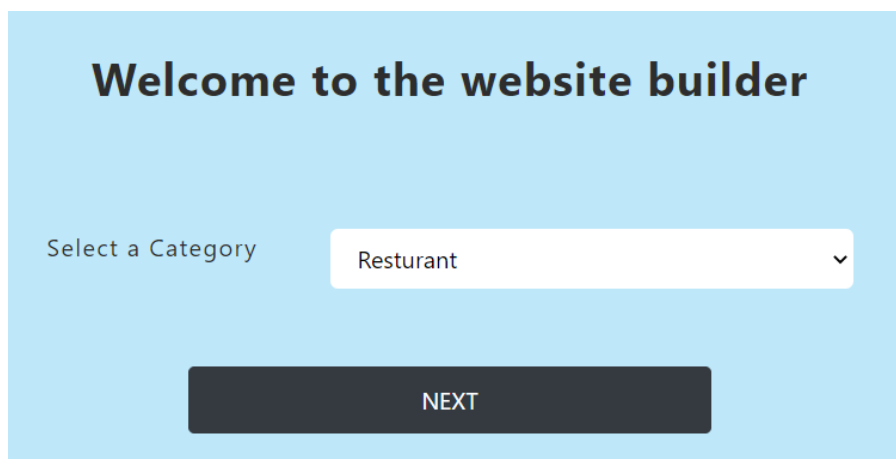
The image shows a light blue background with the text "Welcome to the website builder" in bold black font at the top. Below this, there is a label "Select a Category" in a lighter blue font. To the right of the label is a white dropdown menu with a thin grey border, containing the text "Resturant" and a small downward-pointing chevron icon. Below the dropdown menu is a dark grey rectangular button with the word "NEXT" in white capital letters.


Figure 14. Category selection

Step Three: Manually add details to all mandatory form fields, add any preferable image and click *Create website*

Name of the company: La Pizzery

About: La Pizzery is a boutique pizza stop specializing in wood fired pizza with a range of recipes for both vegetarians and meat-lovers. We place emphasis on using farm fresh ingredients of the finest quality to


Address: Joensuu, Finland




Email: shenal@gmail.com

Phone Number: 0123456789

Photos: Drag 'n' drop some files here, or click to select files



Cover Picture: Drag 'n' drop some files here, or click to select files



save Draft Create web site

Figure 15. Mandatory details

Once the *Create website* option is selected the system will automatically check if there is a previous draft from the same *User ID* and if so, delete the pre-existing draft and create the homepage by storing the new details in the database table for websites in the back-end (Figure 16). The user will then be directed to the profile section (*User Profile* as seen in Figure 19) where the user can see all the websites that have been created from that user's profile.

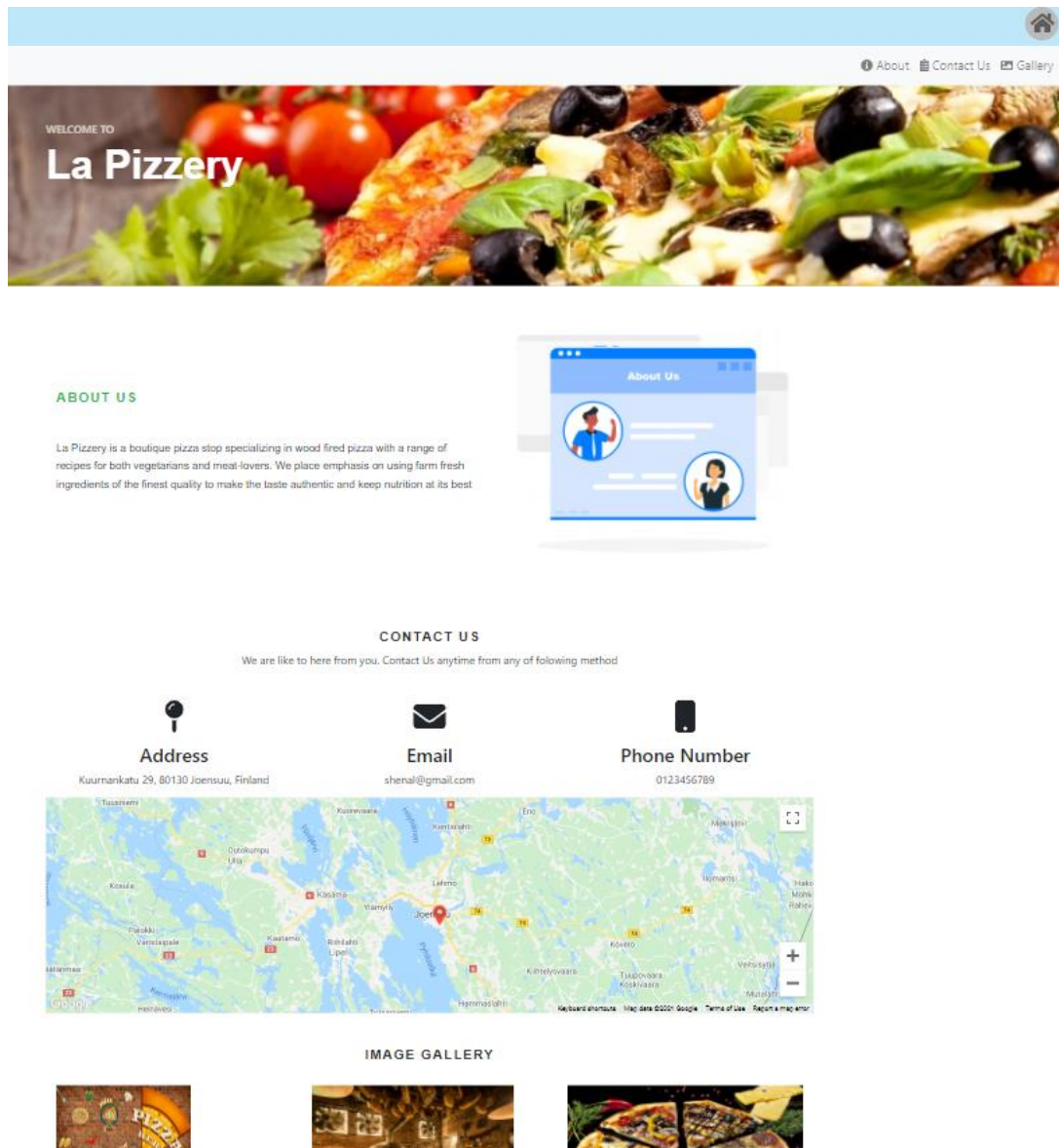


Figure 16. Completed homepage

If the user intends to simply save a draft, he could do so by clicking on *Save Draft* instead of *Create website*. The draft could later be improved and the website created at a future date. Further, as the user is logged on as a registered user whenever the user logs onto the application the draft shall automatically load and the user could continue editing the draft from where he/she left it off on the previous occasion. In case the user does not want to continue with the saved draft and need to create a page for a new business category he/she simply has to change the category and then proceed to make any further required changes. But users are not permitted to save more than one draft with a view of saving space on the database.

An important aspect to be noted when manually adding details to the form fields is that there are two ways that the user can add the address to the system.

1. Typing the address in the address field (Figure 17).
2. Click and drag the marker on the map to any point and then release the marker to select the location automatically.

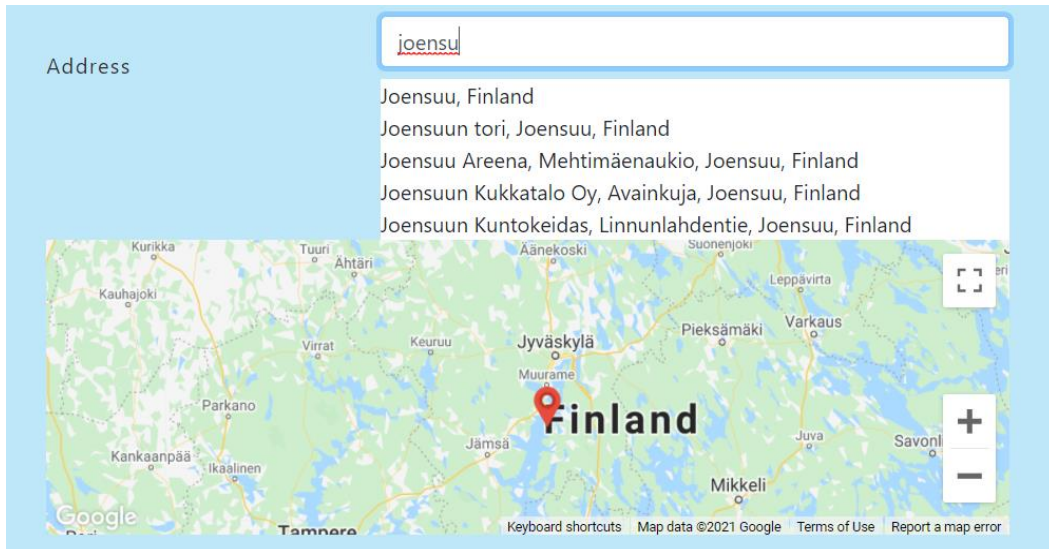


Figure 17. Selecting an address

Also, when uploading images, a file filter which allows only *jpeg*, *png* and *jpg* image categories has been set together with a maximum limit of ten images at one time where each image shall not exceed a maximum size of one megabyte.

6.3 Demo homepage

Users who intend to try out the application before registering as a *Quick Sites* user are allowed the option to create a demo page and familiarize with the application. This is a special feature of *Quick Sites* as no other website builder allows this feature prior to registration and login. These users shall use the semi-automatic feature to create a homepage by manually adding the required data as was seen in Figure 15.

Further, these users shall only be allowed to view the demo homepage but shall not be permitted to create the webpage without registering as a *Quick Sites* user. If the user intends to proceed to host, the web page the user should click *Login to Create website* (Figure 18) and follow register and login steps as in Figure 8 and 9 above.

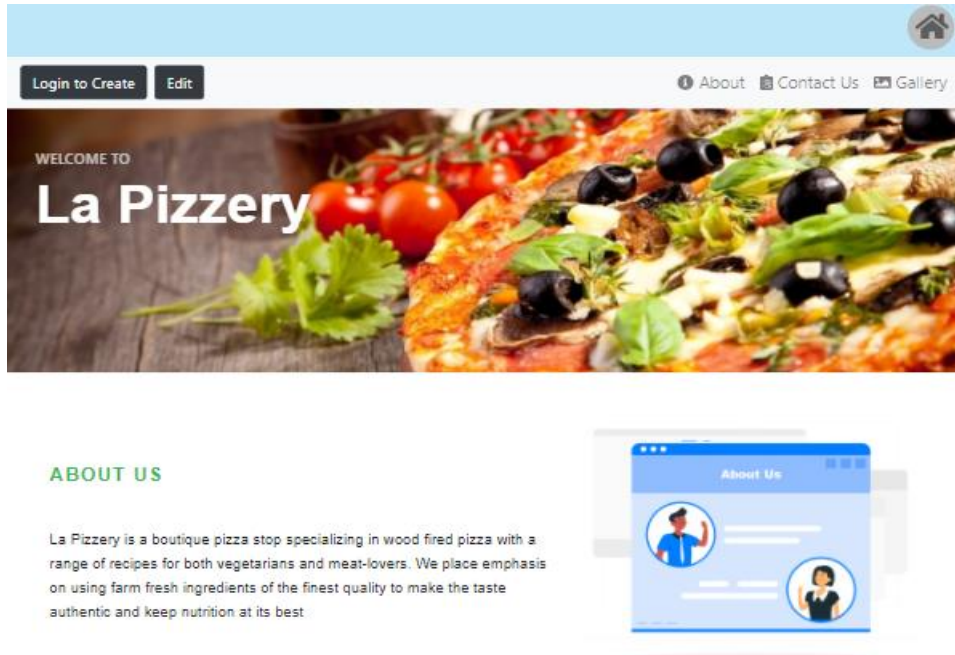


Figure 18. Saving the demo page

6.4 User profile and editing

If the user is logged in successfully to the system, the user information and all the homepages that the user has created will be displayed on the *User Profile* page as seen in Figure 19 below.

PROFILE

Personal Details

Username: shenalsj
Email : shenal@gmail.com

Change Password

Import data from mopsi



Site Details

#	Company Name	About	Address	Email	Phone Number	Actions
47	Imported La Pizzeria	La Pizzeria is a boutique pizza stop specializing i ...	Joensuu finland	mysite@example.com	0466324915	
48	La Pizzeria	La Pizzeria is a boutique pizza stop specializing i ...	Yliopistokatu 2, 80100 Joensuu, Finland	shenalsj@gmail.com	0123456789	

Figure 19. User profile details

In addition, other options such as changing the password as well as importing data from Mopsi services as discussed in Section 6.1 are available on this page for the ease of the registered user. The user should come to this page if the user needs to edit any details or even to view the homepages that the user has already created.

Site Details

#	Company Name	About	Address	Email	Phone Number	Actions
30	Pizza Restaurant	Check out best pizza ...	Joensuu, Finland	shenal@gmail.com	0123456789	 






Figure 20. Webpage editing

This could be done by clicking the *Webpage Edit* option as shown in Figure 20. The user is allowed to update the webpage details or even the user can add images and when the user clicks the *Update* option all the data which the user wants to change or add will be saved in the database accordingly.

6.5 View webpage

Site Details

#	Company Name	About	Address	Email	Phone Number	Actions
30	Pizza Restaurant	Check out best pizza ...	Joensuu, Finland	shenal@gmail.com	0123456789	 




Figure 21. Viewing created webpage

To view the homepages that the user has already created, click the *eye* icon as showed in the image in Figure 21 above.

6.6 Domains and hosting

Most online website building platforms such as WordPress, Wix, Weebly and Squarespace allow its users to host their websites on its own cloud servers. Similarly, homepages created on *Quick Sites* are hosted at <http://cs.uef.fi/~shenal/quicksite/> on the CS Server of UEF.

These popular website builders also provide their users the freedom to select their own domain name such as *.com* and *.net*, to suite their businesses or to proceed with the default domain name of the website builder. However, at present *Quick Sites* does not permit users to use their custom domain names.

7. A comparison between Quick Sites and other builders

The existence of various competitor website builders makes it mandatory to make a comparison between at least a few of the more prominent website building platforms. Accordingly, the chart below summarizes some striking differences in pricing and usability as well as aesthetic features of the 4 popular website builders; WordPress, Wix, Weebly and Squarespace that have been used as a control throughout this thesis. The information was compiled based on the feedback from the user trials of *Quick Sites* as well information from online sources, mainly based on public reviews for each website builder.

Table 1. Comparison of website builders

Website Builder	Pricing Chart (Per month plans)	Remarks
Word-Press	Free: - \$0 Personal: - \$7 Premium: - \$14 Business: - \$33 e-commerce:- \$59	Good IT skills required Free Plan No installation or maintenance Support included Powerful e-commerce Cannot test e-commerce plan for free Low price to features ratio Few SEO options Not very intuitive
Wix	Free: - \$0 Connect Domain: - \$4.50 Combo: - 8.50 Unlimited: - \$12.50 VIP: - \$24.50	Average IT skills required Attractive template designs Over 500 templates Wix ADI Extremely Flexible Powerful add-on marketing tools Extensive App market High Pricing Templates cannot

		be changed easily (until signed in) Media-heavy sites slower to load on mobiles
Weebly	Free: - \$0 Connect: - \$5 Pro: -\$12 Business: -\$25	Average IT skills required Ease of use Responsive Themes App center Team management Limited design flexibility (unable to view until signed in) Multilingual web- sites Slow development
Squares pace	Free: - \$0 Personal: - \$16 Business: - \$26 Basic Commerce: -\$35 Advanced Com- merce: - \$54 Annual payments re- ceive 30% discounts	Good IT skills re- quired Templates and de- signs Blogging feature Support Mobile Apps Usability of the editor (sign up re- quired to edit) Only sub-naviga- tion Slow page speed

An important aspect to be determined is the skill level required by a user to operate and navigate the above website builders. In order to obtain an understanding of the level of skill the OECD Adult Skills survey conducted in 2016 (*OECD Survey of Adult Skills, 2016*) used the following criteria to measure the IT literacy levels of adults in developed countries across the world.

- Below Level One: - Sorting Emails into pre-existing folders
- Level One: - Can use e-mail and a browser to solve a problem with minimal navigation skills required

- Level Two: - Solve a problem using an online form and some navigation across pages and applications
For example: Responding to a request for information by looking through a spreadsheet and emailing an answer.
- Level Three: - Problem-solving using multiple steps and operations.

Accordingly, it could be observed that based on factors such as ease of navigation, availability of instructions or instruction prompts, depth of navigation and user support all the 4 website builders above require level two or above IT skills to create a website or a homepage. However, in hierarchical terms they could be ranked from least skills to highest skills required as Wix , Squarespace, Weebly and WordPress¹⁵.

Further, comparing the price to reward or price to feature component it could be observed that despite Wix appearing the best its pricing plans are expensive in comparison to Squarespace or Weebly while WordPress did not appear to provide sufficient value for the price charged.

Overall, Wix, Squarespace and Weebly appear to be preferred more than WordPress by the public due to features such as availability of attractive templates, better value for money, more value for price paid and better SEO.

Moreover the time taken to create a simple homepage by the 6 users who took part in then user trials are summarized and shown in Table 2.

Table 2. Summary of user trial timing

Website Builder	User	Category	Time (mins)
Quick Sites	Shenal	Mopsi	0.30
		Non-Mopsi	1.00
	Pasi	Mopsi	0.30
		Non-Mopsi	1.00
	Juha	Mopsi	0.30

¹⁵ <https://www.tooltester.com/en/website-builder-comparison/>

		Non-Mopsi	1.00
	Pramod	Non-Mopsi	1.80
	Ishara	Non-Mopsi	2.00
	Charles	Non-Mopsi	2.00
WordPress	Shenal		4.00
Wix	Shenal		4.00
	Pramod		5.00
	Ishara		6.00
	Charles		5.00
Weebly	Shenal		3.00
	Pramod		3.50
	Charles		3.40
	Ishara		3.50
Squarespace	Shenal		4.00
	Pramod		5.00
	Ishara		5.00
	Charles		5.00

Users were given a data set to create a homepage for a pizza store named *La Pizzeria* with a specific address, contact details, the page description and an image and were asked to create a homepage using *Quick Sites*, WordPress, Wix, Weebly and Squarespace. The users were instructed to simply copy and paste the given data to create the page. This was done in order to eliminate any difference in the results due to varying typing speeds. In the case of Wix, Weebly and Squarespace users were instructed to use the simplest template suitable for a pizza. They were instructed to time themselves and fill the feedback form (Appendix 2).

The results of the user trials displayed that of the popular website builders, WordPress was not user friendly as most users preferred not to continue the trial using WordPress whereas there was a highly favorable inclination towards Wix. After Wix most users appeared to prefer Squarespace due to its attractive design layouts and templates but

due to language issues with its templates users found it difficult to select a suitable template quickly.

On the other hand, the response about *Quick Sites* was beyond expectations. Users with Level two and above IT skills such as Shenal, Juha and Pasi could create a non-Mopsi user (semi automatic) homepage in less than 2 minutes whereas Juha who created a fully automatic homepage for Mopsi user reported the time taken to be slightly over a minute. On the contrary, average users such as Pramod, Ishara and Charles took up a time frame closer to 2 minutes.

Limitations of this user trial primarily include the fact that users of the public could not carry out the trials on *Quick Sites* independently and had to resort to the simulation trials as logging in and image uploads on the demo page required access from the system administrators of UEF. Another hurdle in carrying out a comparative user trial between all the above platforms was the difficulty in selecting a simple homepage template that closely resembled that of *Quick Sites* in order to make a more realistic comparison.

8. Benefits and limitations of Quick Sites

Homepages allow businesses to reach their target customers easily and disseminate information through inexpensive advertising (Stover, M. and Zink, S.D., 1996). The primary purpose of *Quick Sites* is to benefit the users of Mopsi services by making web-page creation more efficient via automation. This has been successfully achieved by reducing the time taken to create a webpage by approximately 75%. *Quick Sites*, using the fully automated system set out in Section 6.1 above. The absence of much user interaction with the application reduces chances of error and ensures the user's needs being met easily.

The user guide available on the *About Us* page and also accessible at (Jayaratne, Shenal. *How to Use the Website Builder. YouTube*, YouTube, 10 June 2021) provides a practical and realistic overview of how to operate the application for individuals who may be reluctant to read and execute instructions whereas other website builders merely display a list of instructions to be followed in order to create a homepage.

Moreover, another benefit of *Quick Sites* is its clarity and ease of navigation. As seen in the user feedback to question 4 in the online survey carried out in Section 10 *computer jargon* is rated as one of the biggest reasons for users being discouraged from using website building platforms. Therefore, all information and instructions displayed via the instruction prompts in *Quick Sites* are presented in the simplest language form possible to improve the ease of navigation of the average user and to prevent misunderstandings and probability of errors occurring when comprehending computer jargon. Also, the availability of short instruction prompts reduce the risk of errors by an inexperienced user.

The automated nature of *Quick Sites* allows the user to not only import content information but also graphical information as well. This eliminates the need to manually click photographs continuously and also removes the need to manually add pictures when creating the webpage. The combination of these features contribute to the speeding up of the page creation process thus giving the time benefit as discussed above.

Moreover, it was observed in the user trials described in Section 7 above that creating a similar webpage using the same average skilled IT user on a popular platform such

as Wix takes an average of 5 minutes. But on *Quick Sites*, even a non-Mopsi user would only take an average of 3 minutes to create a complete web page. It should be noted that Wix was the most popular platform used by the participants in the trial out of the existing website builders while for instance WordPress was considered too complex by average users.

As Barnes, D. et al. (2012) observed small businesses use a range of Web 2.0 tools in marketing and communication to engage in trade and trade-related activities. *Quick Sites* could be hence utilized by these firms to create simple homepages and increase customer awareness about their products in a cost effective manner and attract more sales.

One common complaint against Wix is the difficulty in choosing from over five hundred templates (Arafin, S. and Jiang, Y., 2017), *Quick Sites* therefore uses a fixed template that prevents user confusion and stops the user from spending a long time debating for a suitable template. This in turn plays a crucial role in enhancing the speed of webpage creation.

Also another special feature of *Quick Sites* is that unlike in other existing website builders *Quick Sites* allows any user to create a demo page prior to becoming a registered user of the application. This helps the user to familiarize with the application before creating the final homepage and also assists the user to make an informed decision about selecting the application.

Additionally, as *Quick Sites* permits only one draft to be saved at a time it performs a socially responsible role by supporting environmental conservation and climate control. According to an article done by Climate Care (ClimateCare, 2021), *The Carbon Footprint of the Internet*, every time a webpage is accessed or viewed on the internet it releases a certain amount of carbon dioxide into the atmosphere as the servers heat up. Accordingly, users being permitted to save only one draft considerably reduces database overcrowding and server overheating which shall not excessively contribute to the carbon footprint.

Some shared characteristics of *Quick Sites* with other website builders is that it is supported on many platforms such as Windows, Android and iOs allowing users to use the application on a range of devices. Similarly, the *drag-and-drop* option which

is both a user-favorite as well as a developer-favorite is also incorporated to *Quick Sites* to reduce user effort and speed up page creation.

Among the drawbacks of *Quick Sites* as an automatic homepage creating platform is its lack of categories available to the user where the user has to select only from 4 options; *restaurant, fashion, online stores* and *travel* categories. In comparison other popular webpage builder such as Weebly provides 7 and Squarespace provide 20.

Another limitation that could be viewed as restricting the aesthetic parameters of *Quick sites* is the unavailability of a range of templates whereas Wix for instance provides a selection of over 500 templates to the user. However, it should be noted that the fixed template also contributes significantly to increasing the speed at which the user's homepage is created as observed in the user trials in Section 7.

One of the major hurdles before *Quick Sites* at present is that the application cannot be accessed by the public due to security concerns in maintaining the privacy of Mopsi users. As all Mopsi user details as well as *Quick Site* user details are stored in the CS Server of UEF all homepages created via *Quick Sites* are also hosted through this server therefore maintaining security is of crucial importance. However, once these security issues are resolved the *Quick Sites* URL could be accessed on any search engine and the services could be enjoyed by both Mopsi users as well as external users. These developments shall also allow users to host their homepages using a preferred domain name in the future.

In addition to this some common limitations of website builders in general are also applicable to *Quick Sites*. These include automated systems lacking an understanding of concepts such as *business culture*. In terms of e-commerce (Zhu, P., 2015) the business culture plays a crucial role in deciding the success or failure of a homepage and allowing an unskilled and inexperienced user may lead to loss of revenue as well as a loss of business reputation. This is distinctly explained by Zhu by drawing a comparison between the real estate webpages of the China Vanke company, a Chinese real estate firm and the U.S. Zillow company an American real estate firm. It was pointed out that each company's web page would never have drawn a clientele from the other country and the reason for this are the different cultural values of each country.

9. Future developments

Increasingly, *Artificial Intelligence* or AI is utilized (Stocco, A., 2019) in order to increase the efficiency of webpage development and it is expected that in the future AI shall be able to even *generate HTML wire frames directly from a hand-drawn image (Computer Vision)*, thus reducing the tasks related to manual programming. While reducing the workload of web developers this shall also reduce the time taken to create a functioning website resulting in a rise in the ability to cater to the continuously rising market demand for webpages. This also opens a window of possibility to introduce voice-based instructions or searches using *AI bots* where speech recognition technology shall enable voice commands issued by the user to fill mandatory fields and create the webpages automatically. Wix for instance uses *Wix Artificial Design Intelligence (ADI)* which helps to create a customized website within a matter of minutes by feeding some information and personal design preferences to the technology¹⁶. Simultaneously, in the future AI technology could be used to speed up search processes and obtain a larger number of accurate hits which will enhance user satisfaction.

Additionally, if *Quick Sites* is officially integrated into the Mopsi database, adding Suomi (Finnish language) would perhaps be mandatory to make it more accessible to the non-English speaking citizens. Further it would be more interesting if a few more templates as well as categories could be added so as to cater to the creative needs of some advanced users. However, a balance shall have to be struck between usability, clarity and ease of navigation as these factors may be more important to the user than attractiveness of the homepage (Bevan, N., 1999) and media-heavy sites could slow down web page creation.

Moreover, other security and legal factors such as user privacy and rights would have to be first improved before integrating existing databases to external applications as they may otherwise expose confidential user information to inappropriate and perhaps harmful audiences such as unethical hackers. Also, though currently *Quick Sites* does not allow the user to host the created web site in the user's own domain name this could be facilitated in the future by redirecting the website to the user's domain URL.

¹⁶ <https://www.wix.com/blog/2016/06/wix-artificial-design-intelligence/>

The creators of Mopsi had also envisaged the addition of services such as restaurants, bars, cafeterias, grocery stores, museums, pharmacies and ATM Machines by any Mopsi user which would be saved in the database subject to the prior approval of the administrator (Mariescu-Istodor, R., 2013). This feature may allow users to add images of such approved locations to the homepages created on *Quick Sites*. It would enhance the usability and attractiveness of the user's webpage if real time images could be imported from the Mopsi database without manually having to click photographs and add them to the webpage.

Further, according to the research of Mariescu-Istodor, R. (2013) if linking the Mopsi account to Facebook is enabled, businesses and other Mopsi service providers could market their services and products by linking the business's Facebook page to the homepage via Mopsi.

10. Online survey on website builders

In order to assist in answering the research questions effectively an online survey via Google Forms (<https://forms.gle/xWVEAj7RYSNT31n6>) was sent to a selected number of respondents. This survey comprising of eleven questions was sent to a sample of 30 focusing on including a number of IT as well as Non-IT users from a range of countries with a view of obtaining a balanced feedback from users with different skill levels and to eliminate any notion of racial or cultural bias and study the impact purely on a worldwide platform.

Also, with a view of examining cross-cultural influences on the popularity and use of online website builders the sample included individuals from the countries; Sri Lanka, Finland, the United Kingdom, Australia, India and Bangladesh.

The questions were posed on this selected sample of thirty respondents with a view of achieving the following objects:

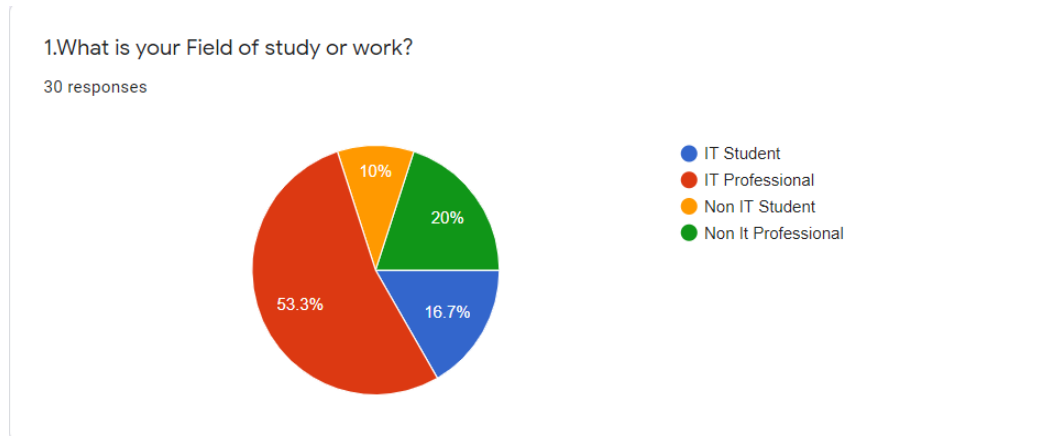
- i. Understanding the popularity of online website builders among the public
- ii. Identifying user experiences pertaining to the use of on online website builders
- iii. Identifying user expectations related to online website builders
- iv. Recognizing the impact of website builders on the career prospects of web developers

The questions were designed to draw a combination of both qualitative and quantitative responses for a balanced survey and is focused on the three aspects of usability, user experience and user expectations. Accordingly, the questions can be classified as follows;

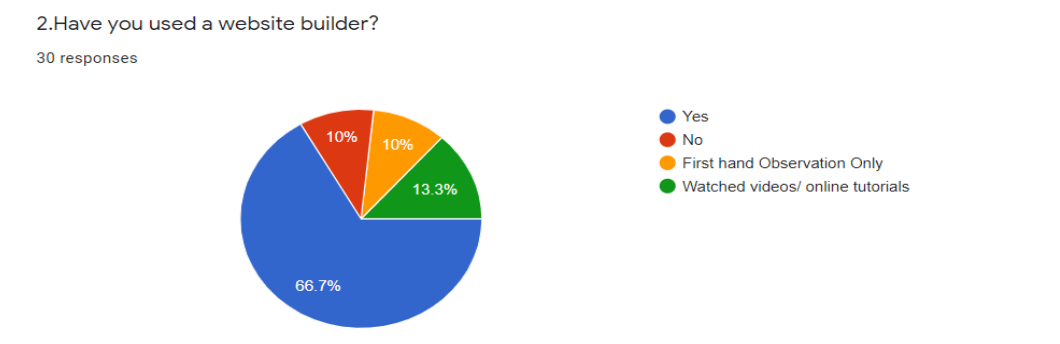
Table 3. Classification of survey questions

Usability	User Experience	User Expectations
Q3, Q4,Q5, Q7, Q8, Q9, Q10	Q1, Q2, Q3, Q7	Q4,Q5,Q6, Q8

Further, the questions were structured in simple language to encourage clear feedback and eliminate chances of misunderstanding that may lead to inaccurate results and the sample was instructed to be as truthful as possible.



The first question is to obtain a basic understanding of the sample and to easily and efficiently evaluate the performance of the sample based on four different categories; IT Student, IT Professional, Non-IT Student and Non-IT Professional. This survey has been attempted by 53.3% IT Professionals and 16.7% IT Students. It should be noted that IT professionals were advised to consider the experience and knowledge they have with their working clients to answer the questions as it shall make this study more relevant and reliable because *Quick Sites* focuses more on the average users.

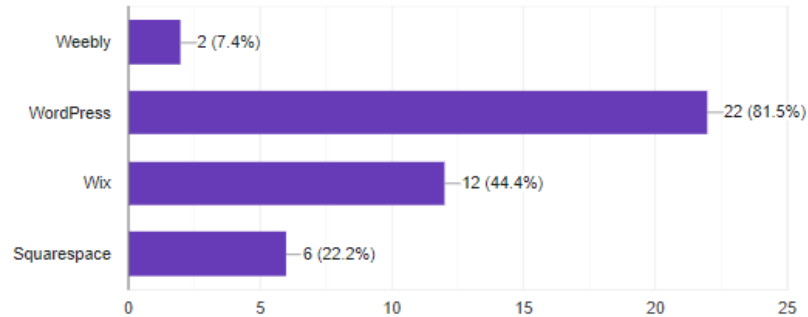


The second question was designed to gain a basic idea about the popularity of website builders among the public with a view of answering the first research question that this study is based on.

It was found that online website builders were popular among both IT as well as Non-IT users in all the above mentioned countries. Hence there appears to be a sufficiently high demand for online website builders.

3.What are the different web builders you have used?

27 responses

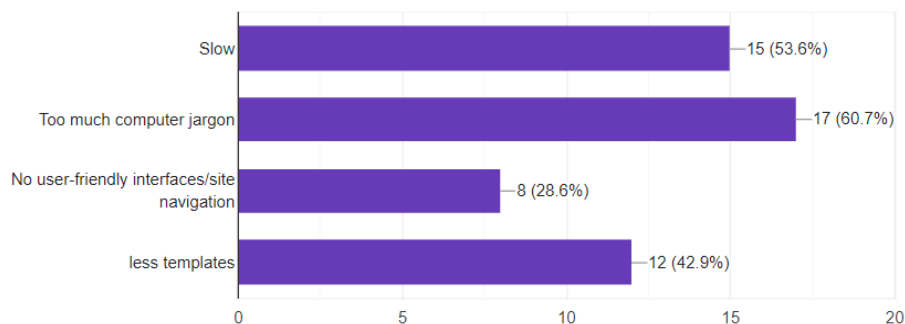


This question was framed with the objective of identifying the popular and trending website builders among a wide range of users. The information would assist in gaining an insight into the usability and aesthetic features users of website builders prefer so it could be used to build *Quick Sites*. It also supports answering the first research question, by providing an overview of the website builders that are demanded more.

Thus, it could be seen that WordPress was the majority favorite possibly for being an open-source platform, providing a higher number of plug-ins and its freedom in customizing templates while Wix being the second favorite also shared similar characteristics such as a larger choice of templates.

4.Select two drawbacks of existing website builders that is of highest significance to you

28 responses

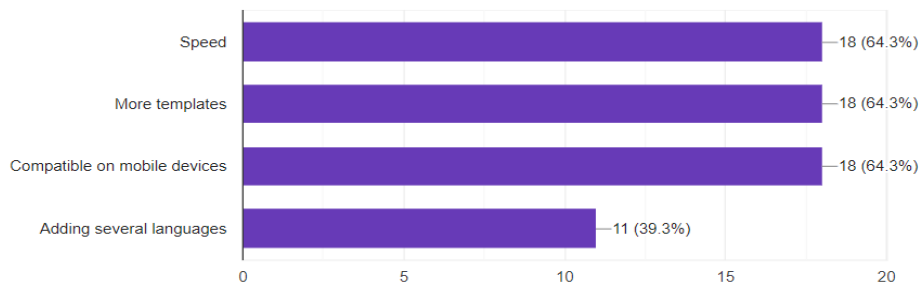


This question was specifically designed in order to distinctly identify specific difficulties and user problems in order to minimize such problems when creating *Quick Sites*. Accordingly, the question allows us to partly find an answer to the second research question by understanding how to make an online website builder more efficient from a general user perspective.

On the whole it could be observed that the usability issues such as existence of computer jargon (60.7%) and speed (53.6%), mattered more to the user than the aesthetic aspect of an average homepage. But it should be noted that the aesthetic aspect is not very far behind.

5. What O2 features do you expect from an above-average website builder?

28 responses

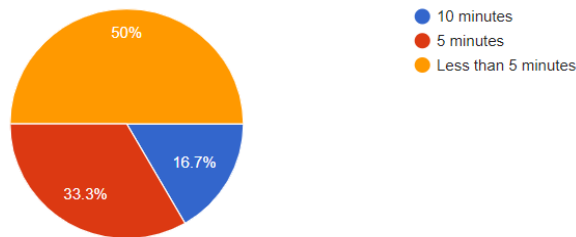


This question is a related question to question 4 of the survey so that the same additional issues that could be addressed in order to improve user satisfaction could be evaluated with a view of supporting the answer of the second research question in the case of question 4 above.

This again reflects the slim gap between the user preference for usability aspects in comparison to the aesthetic aspects as they have gained equal attention and preference by the sample.

6. What is the average time that you expect an optimum website builder to take to perform the task of designing a website based on your requirements?

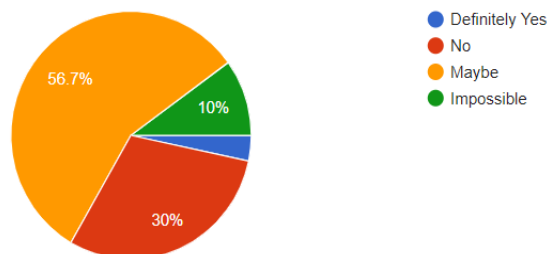
30 responses



This question is purely based on the common usability issue of speed as a determining factor for the efficiency of a homepage developing application (website builder). The responses to this question could be used to effectively answer research question 2 as well as 3. It could be distinctly observed that speed and efficiency issues are major interests common to all users as a majority of the sample expected to create a homepage in less than 5 minutes.

7. Do you think website builders could easily substitute web developers?

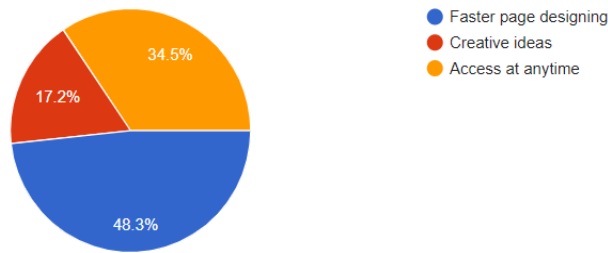
30 responses



This question was posed to assist in answering both research question 1 and 2. It appears that the feedback projects a positive demand for online website builders in the future as more responses are open to and not averse to the concept of such replacement (56.7% plus 3.3%). These responses also give an indication of user preference of automated systems to human interaction while acting as a means to measure user bias towards technology.

8. What do website builders have that web developers lack?

29 responses

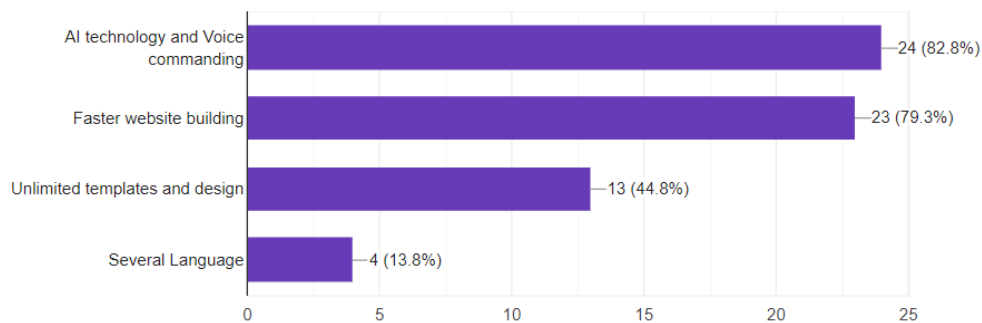


This question follows through with question 7 to examine why web developers or website builders may outperform the other with a view to answer both research question 1 and 2.

It is observed that speed and access are highly available in the software whereas it lacks creativity and templates, hence web developers need to improve more on the aspects of timeliness and accessibility if they are to remain competitive.

9. What are the advanced features and tools you expect from futuristic web builder technologies?

29 responses

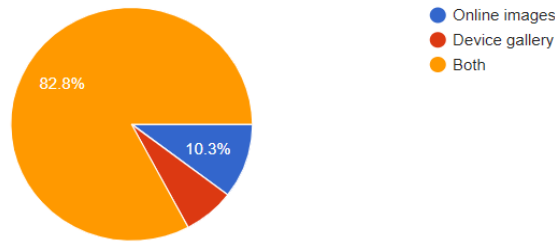


The question not only assists in identifying user expectations to answer research question 2 but also helps to plan on a website builder that shall achieve higher levels of user satisfaction.

Accordingly, recurring concepts such as speed (79.3%) and templates (44.8%) appear to be popular while new technological advances such as AI and voice or speech recognition are the most anticipated features (82.8%).

10. Would you prefer the option for selecting images online or adding images from the device's own picture gallery?

29 responses

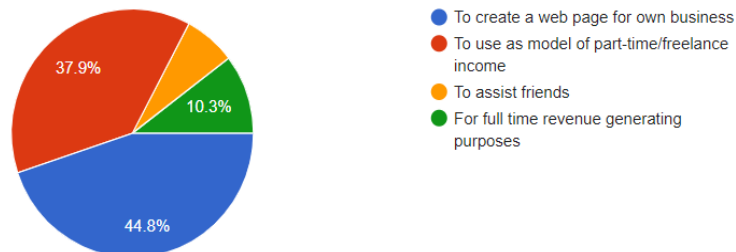


This question was posed to identify whether more emphasis had to be placed on improving downloads of online images with a view of answering research question 2 of this study.

A majority of users appear to require the ability to both upload their own captures from the device gallery as well as to obtain online pictures (82.8%). This shows that users in the present day prefer to be allowed wider options and dislike being restricted.

11. What purpose would you use a web builder for?

29 responses



This final question was framed around the research question 1 to understand the motives of users in using website builders.

Accordingly, it could be seen that websites are popular for individual entrepreneurial purposes than other individual purposes (44.8% vs 6.9%). Also, it could be observed that the most popular expectation is to use them for income generation. This may suggest that online website builders are popular among both the general public as well as professional web developers as an occupation or source of income.

11. Conclusion

Mopsi is a location-based search engine that continues to add features and applications to it so as to enhance the user experience of its members. This thesis focuses on adding further value to its users by assisting them to create a homepage or landing page for their own website at a lower cost, faster speed and with a better SEO strategy. This study uses theoretical analysis, an online survey to gather first-hand information and an online web application called *Quick Sites* to find solutions to the three research questions focused herein.

The results of the online survey together with other research data confirm that there is indeed a significant demand for online website builders mainly among the IT community while it is also increasingly becoming a trend among non-IT related individuals of the public. Hence the first research question; *Is there a demand for automated homepage creation among users in the general public?* could be answered in the affirmative with the justifiable expectation that it would only increase in the future.

In response to the second research question; *How can the creation of a homepage be made more efficient to the Mopsi user in comparison to the ordinary user?* I have developed the application *Quick Sites* with a view of assisting Mopsi members to create a homepage for individual services or commercial purposes within a very short time of approximately thirty seconds as opposed to the average time of three minutes that a non-Mopsi user would take to create the same homepage using *Quick Sites*. Additionally, the evidence from the user trials of *Quick Sites* against other popular online website building platforms such as WordPress, Wix, Weebly and Squarespace point out that *Quick Sites* has a clear advantage in page creation speed of over 75% with regards to the automatic homepage creation feature offered to Mopsi users. Further, even the semi-automatic feature available for non-Mopsi users allow the user to create a homepage faster than even Wix which was found to be the fastest among others.

Moreover, increased digitalization and the need for homepages to promote one's products or services becoming a trend clearly points out that faster homepage creation improves and promotes more individual services and increases business startups that could operate profitably by assisting them to attract potential customers via the Mopsi

recommendation system. Further, when integrated with features such as the geo-tagged photograph sharing feature service-providers could provide directions to customers to easily locate the business and thereby add value to the customer experience as well. Thus, empirical research and the online information gathered via the survey help to find a satisfactory response to the final research question; *How will the faster creation of a homepage assist in improving Mopsi user experience.*

On the whole, it was observed that users generally prefer easy to use applications with less depth of navigation and simple but attractive templates. At present *Quick Sites* has an advantage over other website builders in the aspects of speed of webpage creation, simple and prompted instructions with minimal computer jargon and SEO support due to the inherent features of the React.js technology used. But the integration of *Quick Sites* with Mopsi shall elevate social networking to a new level as it recognizes and addresses the needs of the overlooked average IT skilled user of the public who is only familiar with basic computing skills such as web searching, browsing and running simple applications, and celebrates their success in promoting their very own brands.

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Appendix

Appendix 1: Online Survey Form

1.What is your Field of study or work?

1. IT Student
2. IT Professional
3. Non IT Student
4. Non It Professional

2.Have you used a website builder?

- Yes
- No
- First hand Observation Only
- Watched videos/ online tutorials

3.What are the different web builders you have used?

- Weebly
- WordPress
- Wix
- Squarespace

4. Select two drawbacks of existing website builders that is of highest significance to you

- Slow
- Too much computer jargon
- No user-friendly interfaces/site navigation
- less templates

5. What 02 features do you expect from an above-average website builder?

- Speed
- More templates
- Compatible on mobile devices
- Adding several languages

6. What is the average time that you expect an optimum website builder to take to perform the task of designing a website based on your requirements?

- 10 minutes
- 5 minutes
- Less than 5 minutes

7. Do you think website builders could easily substitute web developers?

- Definitely Yes
- No
- Maybe
- Impossible

8.What do website builders have that web developers lack?

- Faster page designing
- Creative ideas
- Access at anytime

9.What are the advanced features and tools you expect from futuristic web builder technologies?

- AI technology and Voice commanding
- Faster website building
- Unlimited templates and design
- Several Language

10.Would you prefer the option for selecting images online or adding images from the device's own picture gallery?

- Online images
- Device gallery
- Both

11.What purpose would you use a web builder for?

- To create a web page for own business
- To use as model of part-time/freelance income
- To assist friends
- For full time revenue generating purposes

User Trial

- **Address:** Yliopistokatu 2, 80100 Joensuu
- **Telephone No.:** 0123456789
- **Page Name:** **La Pizzeria**
- **About Us/ Homepage Description:** **La Pizzeria** is a boutique pizza stop specializing in wood fired pizza with a range of recipes for both vegetarians and meat-lovers. We place emphasis on using farm fresh ingredients of the finest quality to make the taste authentic and keep nutrition at its best.



User Trial Feedback Sheet

Name:

E-mail address:

User Category: Mopsi User Non-Mopsi User

Level of Computer Literacy:

Excellent Fair Weak Very Weak

PLATFORM	TIME TAKEN	REMARKS
Quick Sites		
WordPress		
Wix		
Weebly		
Squarespace		