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## Wix for Web Development and the Application of the Waterfall Model and Project Based Learning for Project Completion: A Case Study

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*Abstract* – Website development without prior knowledge of HTML or programming experience would be a significant challenge. This study aims to share the students' experiences developing a website using Wix, a user-friendly website builder. The website was assigned as a project-based assessment of one of the courses required to complete a Foundation programme. The course was delivered using a project-based learning (PBL) approach in this context. The students worked as a group to write a project proposal, plan activities, develop the website, write reports, and present the outcome. As for the website development process, the study demonstrates the completion of the project using the Waterfall model, a sequential approach to the software development lifecycle (SDLC). In summary, this study aims to explore the use of Wix for web development, the PBL approach for course delivery, and the Waterfall model for completing the website project. The result shows that the students could complete the website development project in a timely manner by using Wix as their web design platform and adopting the Waterfall model as their project management approach. In addition, the students also benefitted from the PBL approach. The outcomes of this study will be of great benefit to educators, particularly in their role in helping students complete their website development projects.

*Keywords*— web builder, Wix, web development, project-based learning, Waterfall

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### I. INTRODUCTION

A website is essential in today's information technology world for accomplishing several objectives, such as business platforms developed in Prestashop eCommerce Shopping Cart to help customers do online shopping easily [1], learning platforms used to conduct online learnings [2], portfolio presentations for students seeking future employment [3], sharing ideas for learning experiences among students [4], personal branding which is part of marketing strategies [5], and others. Above all, a well-designed website is also necessary since it may significantly affect user experience, customer engagement, and overall business performance, to name just a few. As a result, numerous studies were carried out to assess the efficacy of websites, along with the methodologies and findings [6]. Furthermore, selecting a suitable SDLC model for software or website development is vital to completing the work on schedule and within budget [7]. As shown in Figure 1 [10], a typical SDLC has six phases: analysis and planning, requirements definition, architecture design, implementation and development, product testing, and operation and maintenance [8]. According to [9], there are four popular models of the SDLC: Waterfall, iterative, agile, and rapid application development (RAD). Not only did [9] describe every model in the same study, but he also conducted a helpful comparison that might serve as a benchmark for choosing the most suitable model for system deployment. According to multiple sources on different websites, although each SDLC model has its unique characteristics, their ultimate goal remains the same: to aid groups in creating top-notch software quickly and cost-effectively.



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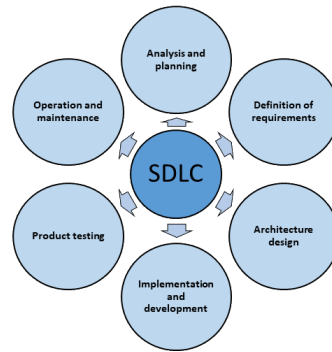


Figure 1: System Development Life Cycle

Concurrently, more and more universities are integrating PBL into their university assessments, with websites being a preferred option for student projects. According to [11], PBL is a student-centred approach that organises learning and studying around projects. Their study also concluded that PBL significantly positively influenced the student's academic achievements, such as language capabilities, critical thinking, and knowledge accumulation. Furthermore, [12] mentioned that PBL enhances the student's experience and equips them with valuable skills and knowledge that extend beyond the classroom. While [13] claimed that the most significant advantage of PBL is students' exposure to real-life projects and authentic learning experiences, the acquired various skills can be directly applied to the workplace. Moreover, according to [12], the effectiveness of PBL is attributed to a combination of well-designed courses, staff monitoring, timely intervention when necessary, and creating an atmosphere where students feel comfortable seeking advice.

For instance, the foundation programme is one of the university programmes that has increasingly adopted PBL as its assessment method. A foundation programme which is also recognised as the matriculation program, a one year programme offered by the Ministry of Education Malaysia [14], pre-university offered in University Malaysia Sarawak (UNIMAS) [2], further education in England and Wales that focuses on education and training [15], preparatory programs that offered extensive English courses in state university of Ankara, Turkey [16], and other similar names, is a higher education pathway specifically designed to prepare students for their undergraduate studies. The programme equips students with the necessary skills, knowledge, and academic foundation to excel in their chosen field of study at the university level. In Malaysia, for example, a student who enrolls in this programme at the university that offers it must complete the programme and meet all the university entry requirements before they are eligible to enroll in undergraduate studies [17]. In Saudi Arabia, for example, all the universities make foundation year programmes mandatory before university entrants [18]. The syllabi for the foundation programme usually encompass a broad spectrum of subjects, including English, Mathematics, and Computer. These syllabi have been designed to give students a solid foundation in these critical areas and to equip them with the necessary knowledge and skills for academic success. In addition, [19] mentioned that many pre-university students choose computing programs as their undergraduate studies because of employment and career, interest in learning and taste for the area.

While there has been considerable research on the PBL approach and SDLC models, there seems to be a gap in the literature regarding incorporating Wix in website project development. Thus, this study attempts to fill the gap by answering the following two research questions: RQ1 – ‘Can the students complete the website development project by using Wix while participating in the PBL approach and adopting the Waterfall model?’ and RQ2 – ‘What are the feedbacks received from the website users?’. To answer the two research questions, this study is structured in such a way that Section 1 introduces the topic and the background of the study, including the problem statement that describes the issue that requires analysis. This is followed by Section 2, the literature review that discusses and summarises the previously researched work in website project development, the PBL approach, and SDLC models to better understand the research topic. Section 3 discusses the method implemented to answer the research questions. Section 4 presents the findings of the study, which include some explanations and interpretations of the findings. Finally, Section 5 discloses the conclusions and suggestions for future work.

## II. LITERATURE REVIEW

Many studies show that various approaches are available for developing a website, each with its own advantages and drawbacks. One such approach and the easiest way, as proposed by [3], is to develop a student portfolio website using

familiar tools such as Microsoft Word and Internet Explorer. Nevertheless, selecting an appropriate development approach that aligns with the users' specific needs and goals is essential to creating a high-quality website. According to [20], there are three approaches to creating websites: website builders, content management system (CMS) platforms, and coding. Based on [20]'s research output, website builders are recommended for personal websites or small projects with small budgets and short time. On the other hand, CMS platforms are helpful for people who need to develop a more professional blog or simple local business. Finally, coding must be used to create websites for larger companies like Amazon or YouTube.

Besides that, [10] recommended using CrowdUI, a web-based tool allowing website users to actively participate in the web design process. This tool will enable users to express their needs and visually suggest website design modifications. Another approach is to use PHP frameworks, which have become increasingly popular in web-based development projects. According to [21], PHP frameworks can produce more stable and secure web applications than other web development tools. Additionally, after studying the performance of three PHP frameworks, Laravel, Symfony, and CodeIgniter, [21] discovered that Laravel is best for large-scale projects and user-friendly for beginners. On the other hand, Symfony is better suited for experienced developers and the development of complex applications. CodeIgniter provides developers with high flexibility and is particularly well-suited for simple and short projects. Nonetheless, [22] claimed that a Drupal CMS is more suitable than a PHP, JSF, or ASP framework for website development because it does not require advanced programming skills or model-driven languages. For mobile web applications, [34] utilized .NET MAUI to create GoHoliday, a cross-platform mobile app prototype that combined a booking engine, an AI assistant for trip planning, and an experience-sharing platform. Meanwhile, the system for tracking arthritis used the Flutter Framework to create a weather-based mobile application. It utilized Firebase as the cloud-hosted database, Visual Studio Code as the code editor, and Android Studio as the Android emulator [35]. Alternatively, [23] mentioned that Wix is the current best practice for creating websites because it is an accessible and user-friendly online website-building platform. Furthermore, Wix has become popular among small businesses, bloggers, individuals, learners and educators.

PBL, on the other hand, can take place in-person, online, or in a hybrid setting. Many studies have confirmed that PBL, regardless of its setting environment, is more effective than traditional education, as it helps students achieve better academic results and fosters high engagement but is time-consuming and training-intensive for teachers [24 - 26]. However, [26] found some differences in the experience of online and in-person students. In-person grades of in-person students were lower than those of online students, but in-person students seemed more involved and satisfied with the experience of using PBL in the course. On the other hand, [27] suggested that higher education should focus on the PBL outcomes, especially the affective and cognitive outcomes so that the students are ready to enter the labour market in the future. The practical outcomes can use questionnaires, interviews, observation, and self-reflection journals, while cognitive outcomes can use questionnaires, rubrics, tests, interviews, observation, self-reflection journals, artefacts, and log data. [13] confirmed in his study that students acquired various skills due to PBL that can be directly applied to the workplace.

Moreover, SDLC is a development process used by developers to develop any projects, such as information systems or websites [28]. [29 - 31] were three examples of web-based systems successfully created using the Waterfall model. With the Waterfall model, [29] had successfully built a Savings and Loan Information System for the Union of Living Credit in Pekanbaru, Indonesia. This system allows employees to manage member data and savings and loan transactions. Additionally, [30] also employed the Waterfall model in developing a website named Dr.Changkitchen Diet Catering. The purpose was to market diet catering products and enhance the efficiency of transactions between sellers and buyers. A study by [31] stated that the Waterfall model can reduce errors in system development because all processes are carried out sequentially, from the process of analysis, design, system creation, and testing to implementation. Meanwhile, [32] emphasised the security aspect of SDLC, in which his study examined the deployment of Security Development Lifecycle-Agile or SDL-Agile. Indeed, numerous studies have been carried out on SDLC to raise awareness about its significance and requirements, particularly among IT developers.

### III. RESEARCH METHODOLOGY

This study used a case study method that involved studying the experience of a group of five foundation students as they applied the Waterfall model and PBL approach to develop a travel website called "TravelX" using a website builder, Wix. To be clear, the students had no formal web design training but minimal programming experience in C++ and assembly language. The website was a project-based assessment assigned through a course known as "Mini IT Project" that students must complete as part of the requirements for their foundation programme. The author of this

paper was assigned as the student supervisor. This study will explore each phase of the web development process, the Waterfall model, that the students had to complete on their own using the experience they gained in the first two semesters of their foundation programme, and certainly with the supervision of the supervisor.

#### A. The Foundation Programme

The Foundation in Information and Technology (FIT) programme is offered by the Faculty of Information Science and Technology (FIST) at Multimedia University, Melaka, Malaysia. The program is structured over 12 months, split into three intakes yearly. Each intake comprises two 14-week long semesters and one 7-week semester. This comprehensive and well-structured program is designed to provide students with a strong foundation in Information and Technology. Table 1 shows the program structure of the FIT programme, which also highlights the "Mini IT Projects" course offered in the third trimester.

Table 1. The Program Structure of FIT

Common and University Courses					
Trimester 1	CH	Trimester 2	CH	Trimester 3	CH
Communicative English	3	Essential English	3	Academic English	3
Algebra	3	Critical Thinking	3	Introduction to Probability and Statistics	3
		Fundamentals of Business Management	4	Calculus	4
Computer Applications	4	Trigonometry	3	Problem Solving and Programming	3
		Introduction to Computer Architecture and Operating System	4	<b>Mini IT Projects</b>	3
		Introduction to Physics	3	Introduction to Multimedia Technology	4
<b>Total Credit Hours</b>	<b>10</b>	<b>Total Credit Hours</b>	<b>20</b>	<b>Total Credit Hours</b>	<b>20</b>

#### B. The Course - Mini IT Projects

"Mini IT Projects" is a 3-credit-hour course where students have to apply the knowledge and skills they acquired in the first two semesters of the programme. This course required the students to work in groups and choose to develop a multimedia app, a website, or a programming project. Furthermore, the students were free to select any title for their project, but it had to be approved by their supervisor. The project assessment breakdown and the percentage are shown in Table 2. In total, 156 students enrolled in the course that year, and a subject coordinator was appointed to oversee its completion. The subject coordinator conducted a short briefing to inform the students about the course process and then asked them to organise themselves into groups of four to five students each. Thirty-one small groups were formed, and three groups selected the author of this research paper as their supervisor for guidance and advice on conducting the project. The three groups had decided to create websites for their projects, with their websites titled "TravelX", "FitBro", and "SmartPhone." The "TravelX" and "SmartPhone" groups used a Wix builder to build their websites, while the "FitBro" group used Figma, a free and online UI tool, to develop their websites. As a supervisor, the author was responsible for monitoring the progress of the groups to ensure that all the projects were submitted by the specified deadline. The author chose the "TravelX" group for this case study because their project had a more effective development planning process, and they used Wix to develop the website.

Table 2. The assessment breakdown and the percentage of the Mini IT Projects course

Main Assessment Breakdown	Assessment Subcomponents	Percentage
Interim Evaluation	Project Proposal	10%
	Preliminary Report	20%
	Prototype	30%
Final Evaluation	Final Report	30%
	Presentation	10%

### C. The Project-Based Learning Approach

The “Mini IT Projects” course was delivered as a PBL approach, whereby the students in a group were given a semester or 14 weeks to complete the project and present the final output in week 14. In this case study, the chosen group included five students, with one student selected as the group leader. After some discussions, the group created a travel website named "TravelX" for their project. Following this, the group leader distributed individual responsibilities to each member for the project's completion. The travel website provided the following modules for users:

1. Signup or login page
2. User profile page
3. Search page
4. Booking page
5. Community page
6. 5 Popular States in Malaysia page
7. Places of 5 Popular States in Malaysia page
8. Food of 5 Popular States in Malaysia page
9. Hotel of 5 Popular States in Malaysia page

### D. System Development Life Cycle

The group had 14 weeks to complete the website project, including the final report submission and the presentation. Consequently, to ensure its completion, the group used a development model called the system development life cycle, or SDLC, to develop a website of the highest quality and lowest cost, and most importantly, in the shortest time possible. Based on the literature review conducted [29 - 31] and limited experience in software development, the group decided to utilize the Waterfall model for the development process. Figure 2 shows the seven steps of the Waterfall model: planning, analysis, design, development, testing, integration, and maintenance, and these steps were used to govern the process of this website development project. The Waterfall model was selected for this project because, as indicated by [8], in his research, the Waterfall model was suitable with predictable requirements and a need for comprehensive documentation. As for this project, the group knew the requirements and had to finish within a specific time frame. Furthermore, based on [33], when comparing Waterfall, RAD, and Agile, it is advisable to opt for RAD or Agile if the team consists of skilled and experienced developers. However, if the team lacks experience, starting with Waterfall is a better choice. This was also one of the reasons why the Waterfall model was chosen for this website project development over other models.

#### Phase I: Planning

The planning phase took place over two weeks. In this phase, the group was advised to do a brainstorming session first to generate as many ideas and solutions as possible to complete the website project. Then, this was followed by defining the objectives, establishing activities, creating a Gantt chart, estimating the costs, and determining system and user requirements. These inputs were transferred to a project proposal form, as shown in Figure 3. In any case, the group was allowed to resubmit the proposal if they wanted to make any necessary adjustments. On top of that, the group was scheduled to meet their supervisor at least six times within the duration of those 14 weeks. In short, this phase was the most important to ensure that all necessary resources were in place and everyone on the team understood their roles and responsibilities.

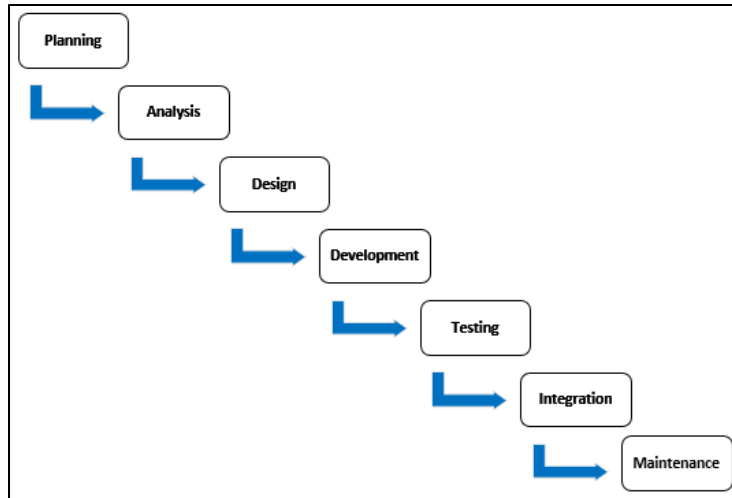



Figure 2: Waterfall model of “TravelX” website



**MULTIMEDIA UNIVERSITY**  
 Faculty of Information Science and Technology (FIST)  
 PMP0325 – Mini IT Projects  
 Project Proposal Form

**Instructions:**  
 You are required to prepare your project proposal using this template and submit it to your supervisor.

<b>Project Title *</b> <i>Please be concise (Min. 15 and Max. 80 characters)</i>	TravelX
<b>Group Members and task distribution *</b> - Leader - Members <i>Please provide the student ID and name</i>	Leader: Student 1  Members: - Student 2 - Student 3 - Student 4 - Student 5
<b>Description *</b> <i>Please describe the essential components related (Programming, Multimedia Applications or Dynamic Web Design).</i>	This project is to create a mobile-responsive website for TravelX – a travel planner to allow customers to plan their trip online and get more ideas about regions where customers travel. The website will feature a gallery of photos and videos of the various tourist attractions to increase customer interest, and an itinerary planning tool complete with useful/interesting features to assist all the users on their journey. The goal of a trip planner is to make travel planning easier and more efficient for travelers by helping them to organize their trips and find the best options for their needs and preferences.

Figure 3. The partial page of a project proposal form

The group also performed a basic feasibility assessment to determine the practicability of the website project and identify any potential issues or problems that may occur during its implementation. Four simple feasibility studies were carried out, namely operational feasibility, technical feasibility, economic feasibility, and schedule feasibility. Since this website project was only one of the must-pass courses of the foundation programme requirements, a feasibility study was conducted to educate students on the project development process. However, Table 3 presents one of the tasks that the group completed during the operational feasibility assessment. They compared their potential travel website project with Wanderlog and Kayak, two other websites. The operational feasibility assessment aimed to evaluate if the proposed website project aligns with the current business environment and whether users would use

it if the project continues to be developed. In addition, a Gantt chart, as shown in Table 4, was also created during the scheduled feasibility study. The Gantt chart was necessary for completing the website project on time and under budget.

Table 3. Comparing the platforms TravelX, Wanderlog and Kayak

Platform	Comparison			
	Travel Suggestions	Mobile app	Service	Community
<b>TravelX</b>	Users can also find travel suggestions and detailed information about destinations.	Browser only. Doesn't have a mobile app.	Offer personalised trip planning functions for paid or premium members only.	Provide a forum for users to share their travel experiences and answer and ask questions about travelling.
<b>Wanderlog</b>	There are travel suggestions according to users' budget and destination.	IOS and Android	Trip planning with mapping service is available in a free version. Have a paid version for offline access and route optimisation functions.	Offers a travel journal feature, enabling users to create a digital diary and document their travel experiences.
<b>Kayak</b>	Doesn't have travel suggestions and little information about destinations.	IOS and Android	Free. Primarily focused on booking travel arrangements, does offer some basic trip-planning features.	Does not have a dedicated community feature.

Table 4: The Gantt chart of the "TravelX" website

Time/Task	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14
Meet with supervisor	█		█		█		█		█		█			
Planning + Project proposal		█	█											
Do survey about 5 states that people would like to visit			█											
System analysis and design			█	█	█									
Preparation for preliminary report					█	█								
Submission for preliminary report							█							
Web site development							█	█						
Testing, integration, maintenance									█	█	█			
Preparation for final report									█	█	█	█		
Submission for final report													█	
Presentation														█

*Phase 2: Analysis*

In the analysis phase, the group thoroughly reviewed all the possible options identified in the feasibility assessments to find the best overall solution that meets both the user's needs and the project's limitations. The group updated the project proposal form where needed and resubmitted it to the supervisor. After that, the group advanced to the design stage.

*Phase 3: Design*

In the design phase, the group created a sitemap and data flow diagram (DFD) based on the findings from the analysis phase. The sitemap, depicted in Figure 4, illustrates the structure of the website, detailing the number of web pages

and their relationships. Figure 5 displays the level 2 DFD for the website. Using the site map as the main reference, the group began creating storyboards for each webpage outlined in the sitemap. They needed to produce 36 storyboards. Each object created in the storyboard represented a graphic, button, text, animation, or video on a webpage. Figure 6–8 displays three out of 36 storyboard designs for the website. Because the group created all the webpages using templates and the interface designs were almost similar across all the webpages, the remaining 33 storyboard drawings were not included in this study.

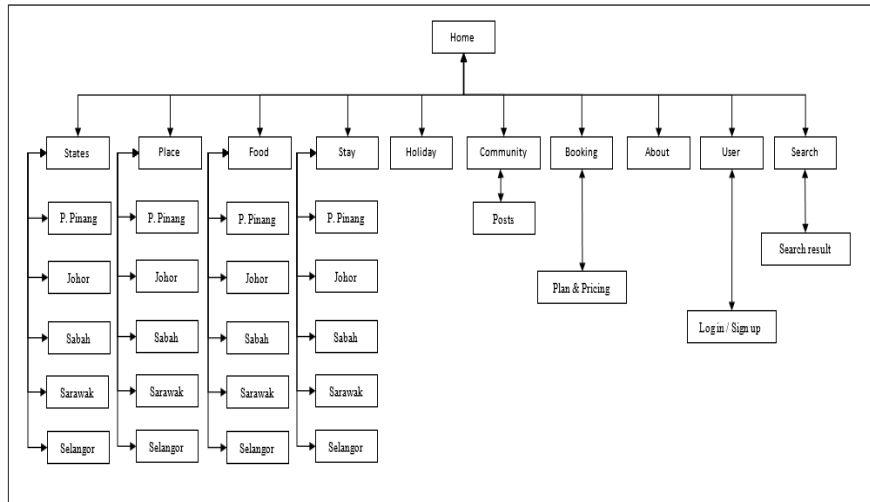


Figure 4. The site map of the “TravelX” website.

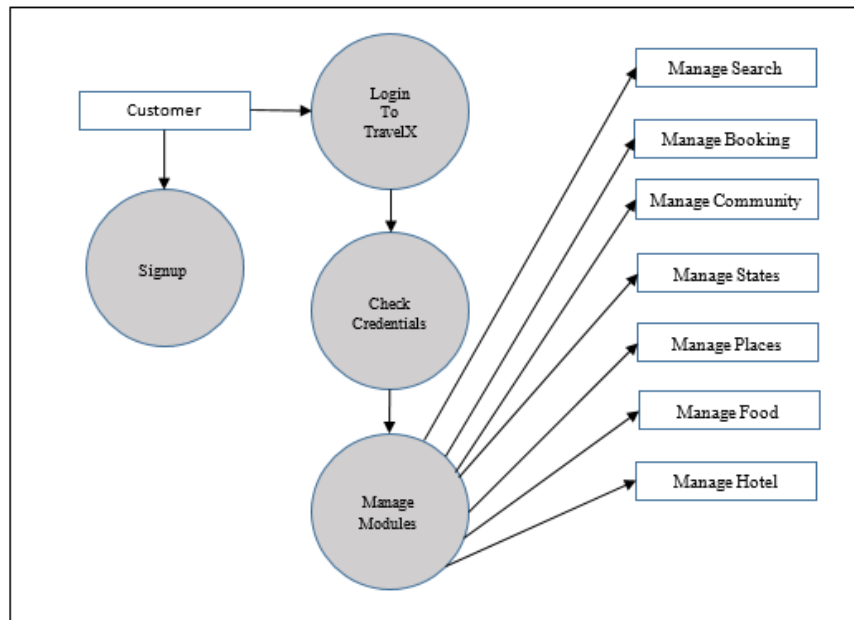


Figure 5. Level 2 DFD of “TravelX” website.



Title: Home

SCREEN DESIGN	INTERFACES INSTRUCTION	ACTION/SCRIPT
	<p>G1: Graphic – Logo                      T1: Text – Search bar                      B1: Button – Notification                      B2: Button – User Profile                      B3: Button – Menu 1                      B4: Button – Menu 2                      B5: Button – Menu 3                      B6: Button – Menu 4                      B7: Button – Menu 5                      B8: Button – Menu 6                      B9: Button – Menu 7                      B10: Button – Menu 8                      A1: Animation – Slide Show                      T2: Text – Quote                      T3: Text – Search Bar                      T4: Text – Popular Destinations                      T5: Text – Subtitle 1                      G2: Graphic – Photo                      B11: Button – Read More                      T6: Text – Subtitle 2                      G3: Graphic – Photo                      B12: Button – Read More                      T7: Text – Subtitle 3                      G4: Graphic - Photo                      B13: Button – Read More                      T8: Text – Subtitle 4                      G5: Graphic – Photo</p>	<p>B1: Go to Notification                      B2: Show Profile and Log Out                      B3: Go to Home                      B4: Show menu of States                      B5: Show menu of Place                      B6: Show menu of Food                      B7: Show menu of Stay                      B8: Go to Planner                      B9: Go to Community                      B10: Go to About                      A1: Slide Show</p> <p>B11: Go to Place 1 details                      B12: Go to Place 2 details                      B13: Go to Place 3 details</p>

Figure 6. The storyboard for the Homepage.

SCREEN DESIGN	INTERFACES INSTRUCTION	ACTION/SCRIPT
	<p>G1: Graphic – Logo                      T1: Text – Search bar                      B1: Button – Notification                      B2: Button – User Profile                      B3: Button – Menu 1                      B4: Button – Menu 2                      B5: Button – Menu 3                      B6: Button – Menu 4                      B7: Button – Menu 5                      B8: Button – Menu 6                      B9: Button – Menu 7                      B10: Button – Menu 8                      G2: Graphic - Photo                      T2: Text – Title                      T3: Text – Quote                      T4: Text – Place                      T5: Text – Description                      T6/ T7/ T8: Text – Subtitle                      G3/ G4/ G5: Graphic – Photo                      B11: Button – More                      T9: Text – Food                      T10: Text – Description                      T11/ T12/ T13: Text – Subtitle                      G6/ G7/ G8: Graphic – Photo                      B12: Button – More</p>	<p>B1: Go to Notification                      B2: Show Profile and Log Out                      B3: Go to Home                      B4: Show menu of States                      B5: Show menu of Place                      B6: Show menu of Food                      B7: Show menu of Stay                      B8: Go to Planner                      B9: Go to Community                      B10: Go to About</p> <p>G3/ G4/ G5: Go to Detail                      B11: Go to Place &gt;&gt; Pulau Pinang</p> <p>G6/ G7/ G8: Go to Detail                      B12: Go to Food &gt;&gt; Pulau Pinang</p>

Figure 7. The storyboard for the Pulau Pinang page.

SCREEN DESIGN	INTERFACES INSTRUCTION	ACTION/SCRIPT
	G1: Graphic – Logo T1: Text – Search bar B1: Button – Notification B2: Button – User Profile B3: Button – Menu 1 B4: Button – Menu 2 B5: Button – Menu 3 B6: Button – Menu 4 B7: Button – Menu 5 B8: Button – Menu 6 B9: Button – Menu 7 B10: Button – Menu 8 T2: Text - Title B11: Button – Time Zone B12: Button – Month & Year B13: Button – Today C1: Calendar – Google Calendar B14: Button – Chat B15: Button – Ratings T3: Text – Info B16: Button – Message B17: Button – Back To Top G2: Graphic – Icons T4: Text – Gmail	B1: Go to Notification B2: Show Profile and Log Out B3: Go to Home B4: Show menu of States B5: Show menu of Place B6: Show menu of Food B7: Show menu of Stay B8: Go to Planner B9: Go to Community B10: Go to About  B11: Show and Select Time Zone B12: Show and Select Month & Year B13: Go to Today date  B14: Open Chat Inbox B15: Select Stars  B16: Write and Submit Message B17: Go to Top of the Page

Figure 8. The storyboard for the Holiday page.

Phase 4: Development

The group had chosen Wix as their website builder because it is user-friendly and easy to create. Among other reasons were the limited time and lack of experience in programming. The development phase took only two weeks because the group had the sitemap and storyboards as their guidelines. The group accessed Wix online, and each member developed their web pages as assigned by the group leader. Wix allowed the group to create, edit, update, publish online, and preview the output in real-time. Other development tools required in this phase were (1) LogoMaker, a free website, to create the website logo; (2) Paint.Net, a free graphic software, to create and edit pictures; (3) Movie Maker, to create and edit animations, (4) MS Word, to create and edit all the documentations for reporting purposes and (5) MS Powerpoint, to create slides for the presentation. Figure 9 shows the collaged pictures of some web pages created for the websites using Wix.

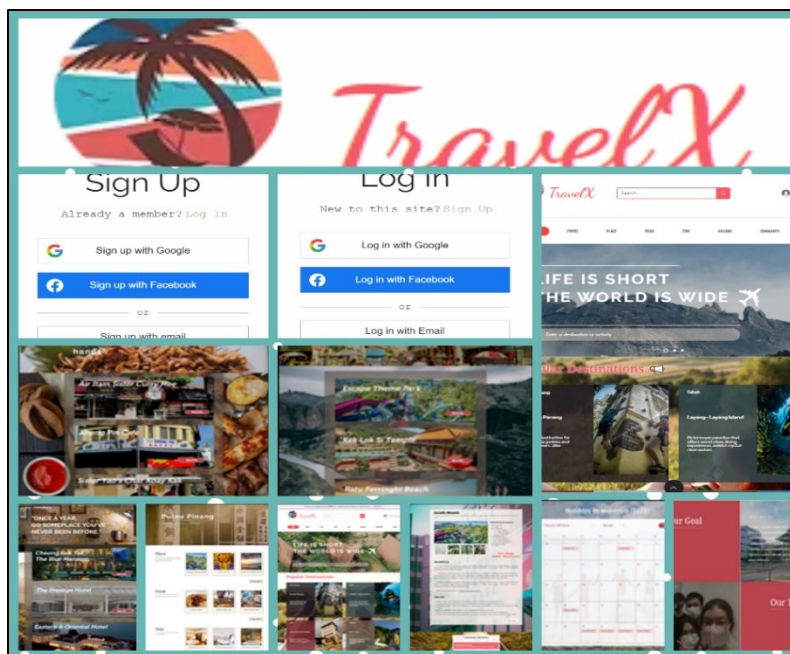


Figure 9: The collaged pictures of some web pages created for the websites. using Wix.

*Phase 5: Testing*

During the testing phase, which took place in week 9, the group extensively tested the website and considered all possible scenarios. This phase involved multiple steps, including:

- To identify any errors in linkage and define the steps to correct them.
- To identify any incorrect information on a webpage and replace it with the correct information.
- To test webpages that require input data and produce expected output.

Also, this was the phase where the group had a physical meeting again to discuss all the possible problems and situations, and this was to ensure the quality of the website being developed.

*Phase 6: Integration*

This phase involved integrating all the web pages each group member designed and linking them to create a single website. During this stage, the team presented the 90% finished website to the supervisor for feedback.

*Phase 7: Maintenance*

Throughout the maintenance period, the team consistently monitored the website to guarantee it was free of errors prior to submission and presentation. Furthermore, based on the supervisor's feedback prior to this phase, the group did some editing for improvements. At the same time, the group finalised their final report for submission and slides for presentation.

*D. User Survey*

The final output expected from this project was a functional prototype of a website and not a complete version of a website. This is in line with the learning outcomes stated in this course which is the students should be able to demonstrate the technical solution skills in computer system and application development. Thus, since Malaysia has 14 states, the group was advised to choose only the most popular states in Malaysia to showcase in their website project. In addition to that, for the students to gain more experience in website development, the group was asked to get some feedbacks from users with their website designs especially the user interface designs (UID).

The group conducted two simple surveys before the website project began and after it was finished for the aforementioned reasons and they used Google Forms to create the surveys. The first survey had only one question, as shown in Table 5, asking the respondents to choose which five out of 14 states in Malaysia they wanted to visit the most. The selected five most popular states in Malaysia were later used for website development purposes. The second survey, a set of 10 questions, aims to get some feedback from users on their website designs, especially the user interface designs (UIDs), and at the same time gain more experience in the website development process.

Table 5: The one question of the first survey

	Questions
1.	Choose the 5 states you like to travel

Table 6: The 10 questions of the second survey

	Questions
1.	Is the logo suitable for our website?
2.	Is the colour nice on the website?
3.	Does the photo match the entire scene?
4.	Is the font suitable?
5.	Does the arrangement look nice?
6.	Is the menu bar convenient for users?

7.	Is the back button and top button convenient for users?
8.	Are all the details helpful to users?
9.	Is the community page a good idea for users?
10.	Is our website a user-friendly experience?

#### E. Documentation and Presentation

The group had to prepare three types of documentation: the project proposal, preliminary report, and final report. These three reports were ongoing reports that consisted of all the key details required over the course of the website project. The project proposal was submitted in week 3; the preliminary report was submitted in week 7, together with at least 30% of the website prototype completed. The final report was submitted in week 14, and the presentation was done in week 14.

#### IV. RESULTS AND DISCUSSIONS

"Mini IT Project" was one of the fifteen courses students had to take and pass to complete the Foundation programme. The course was delivered as a PBL approach where the students in a group of five had to engage actively in a real-world and valuable project. Two research questions were formulated for this case study. The first research question was: Can the students complete the website development project using Wix while participating in the PBL approach and adopting the Waterfall model? The second research question was: What feedback is received from the website user?

To respond to the first research question, the researcher of this study chose one group out of three under her supervision to be the subject of this case study. The group, made up of five foundation students, had no background in web design but had gained some familiarity with C++ programming and multimedia design during the first two semesters of their foundation programme. The group then was briefed about the project. Initially, the group doubted their skills in creating a website, but after a few meetings with the supervisor, the group was ready to proceed with the project. The outcome of multiple group meetings showed that the most challenging decision for them was settling on a topic for their website. Various website topics were proposed, including handphone sites, places of interest websites, and a few others. After some deliberation with the supervisor and fellow group members, the decision was made to create a travel website.

Before starting the development process, the group conducted a simple survey that consisted of only one question. Since there are 14 states in Malaysia, the question was for the users to choose 5 states they wanted to visit the most. Forty respondents with no demographic information participated in the first survey, and Figure 10 shows the result. It was found that Johor, Pulau Pinang, Sabah, Sarawak and Selangor were the states users most wanted to visit. These 5 states were the states the group developed for the contents of their website project.

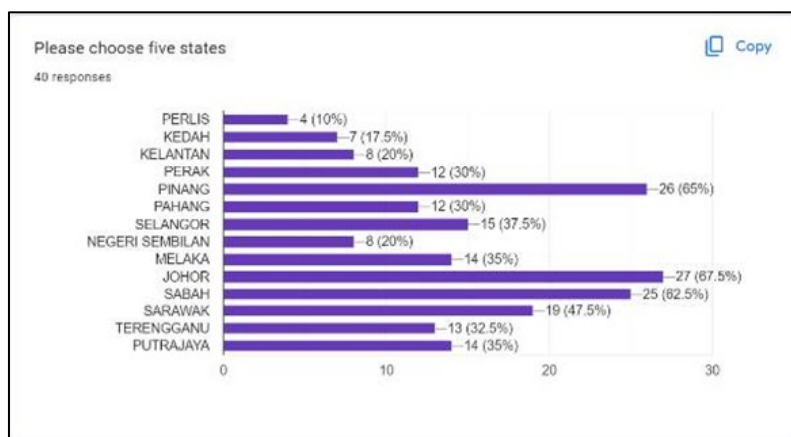


Figure 10: The result from the first survey

The Waterfall model that was adopted in the project helped the group efficiently manage the development process in phases. The group completed each phase after another from the planning, analysis, design, development, testing, integration, and maintenance phases. This model was good for the group because the website was developed based on the fixed requirements set forth at the beginning of the project. Furthermore, the Waterfall model was also a good choice because the project did not cost much money and had a limited completion time of about 14 weeks.

The Gantt chart created at the beginning of the project assisted the group in planning and scheduling it. The group leader can especially use the Gantt chart to track the progress of the project so that the group can complete the website project on time.

The author's observation as a supervisor was that the most challenging phase in the Waterfall model was the planning phase. This phase will determine the direction of the rest of the project. In the planning phase, the group defined the project objectives, determined the system and user requirements, and created the Gantt chart. However, it is also important to give equal importance to each phase of the Waterfall model.

Besides, the PBL approach in the website project allowed the students to engage more in completing the project. Working in groups, the PBL approach gave the students a sense of ownership and control over the project. Not only that, PBL also developed social and emotional skills such as collaboration, communication, responsibility, empathy, and self-awareness. These advantages were synchronised with the student's feedback about the website project, as shown in Table 7. Therefore, the final output of this website development project has answered the initial research question, as the students successfully completed it through the implementation of the PBL approach and Waterfall model.

Table 7: Students' feedback on the website project

Student 1 – the group leader	I think this project is quite informative and useful, as I have learned many skills, such as communication skills, website development, basic knowledge, and teamwork skills.
Student 2	I think this project is quite helpful and useful for our future as we are Information Technology students. It allows us to learn many skills, such as communication skills, design skills, teamwork skills, and especially basic website development knowledge.
Student 3	This project helped me a lot to get to know my country, Malaysia. I did a lot of research on this website.
Student 4	I believe that this project has been really educational and helpful because I have gained a lot of new skills such as website development basic knowledge. I also have excellent teamwork with my teammates.
Student 5	This project is useful because I have gained a lot of knowledge and skills in website development and design, which will be helpful in the future. I also learned about the importance of teamwork.

Besides focusing on the website development process and its content, the group was also asked to consider the UID. The website highlighted several UID features, including the “back-to-top” button (Figure 11), horizontal stripe images (Figure 12), and colour scheme (Figure 13). The "back to top" button allows users to return to the top of a page without scrolling. The horizontal stripes images would give a sense of calm to users, while the colour scheme would produce visual harmony or contrast with web pages. The purpose of the 10-question survey was to gather user opinions on the website's UID. The 1-5 point Likert Scale (strongly agree (SA) - agree (AG) - average (AV) - disagree (DG) - strongly disagree (SD)) was used respectively. The survey was answered by 16 respondents aged 18 to 58, with the majority being students. Based on Table 8, 41.28% of the respondents were strongly happy with the website UID, 51.87% were just delighted with the UID, and the remaining percentage had an okay or no comment about the UID interface. On average, more than 90% of the respondents give positive feedback about the UID. Thus, this answered the second research question.

Table 8: The user feedback on the website’s UID

	Question	SA (1)	AG (2)	AV (3)	DG (4)	SD (5)
1.	Is the logo suitable for our website?	56.3% (9)	43.7% (7)	0%	0%	0%
2.	Is the colour nice on the website?	37.5% (6)	62.5% (10)	0%	0%	0%
3.	Does the photo match the entire scene?	37.5% (6)	50% (8)	12.5% (2)	0%	0%
4.	Is the font suitable?	31.3% (5)	68.7% (11)	0%	0%	0%
5.	Does the arrangement look nice?	50% (8)	43.8% (7)	6.2% (1)	0%	0%
6.	Is the menu bar convenient for users?	43.8% (7)	50% (8)	6.2% (1)	0%	0%
7.	Is the back button and top button convenient for users?	43.8% (7)	50% (8)	6.2% (1)	0%	0%
8.	Are all the details helpful to users?	37.5% (6)	50% (8)	12.5% (2)	0%	0%
9.	Is the community page a good idea for users?	31.3% (5)	50% (8)	18.7% (3)	0%	0%
10.	Is our website a user-friendly experience?	43.8% (7)	50% (8)	6.2% (1)	0%	0%



Figure 11. Back to top button

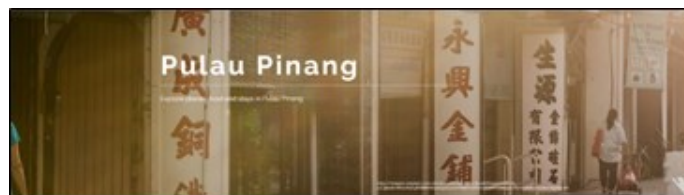


Figure 12. An example of a picture with a horizontal strip effect

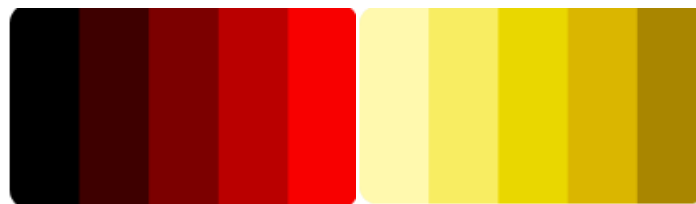


Figure 13. Two colour schemes used in the website design

## V. CONCLUSION

Creating a website can be daunting for those without HTML or programming experience, but Wix simplifies the process. Wix, a website builder that does not require coding, is an excellent web authoring tool, especially for students who have no previous knowledge of HTML or programming but must create a project-based website for their coursework assessment. In addition, integrating the PBL approach, which has been proven in various studies to have benefits, has helped students develop lifelong learning skills and gain more experiences, not just in web development. Furthermore, completing the website project is possible by following the Waterfall model. The supervisor's role should be taken into account in checking and balancing to ensure the completion of the website project. Nonetheless, even though all these tools and approaches provide practical advantages to those who need them, they can also change the perspectives and attitudes of those who do not.

This study aimed to share the experience of a group of foundation students who created a travel website named "TravelX", which was incorporated into a foundation course called "Mini IT Projects". The study emphasised the website project, the PBL approach, and the Waterfall model. Undoubtedly, this study's outcomes will significantly benefit educators, especially their ability to assist students in finishing their website development projects.

Nevertheless, as the study focused solely on the group that implemented SDLC, it is not possible to definitively say if another group could achieve the same results without using SDLC. Also, as this study used the Waterfall model to manage and complete the entire development process of the website project, it is not possible to determine if Waterfall is superior to other models like RAD, Agile, or iterative. Therefore, it is important to explore if a group can finish a project without using the SDLC, and it would also be beneficial to consider other SDLC models besides the Waterfall model. In addition, the effectiveness of the SDLC models in completing the project can also be influenced by the skills and experiences of the developers. It is also important to consider whether a group can finish the website project on time without using a PBL approach.

Clearly, this study has some limitations. First, this was the first experience for the students to be involved in a website development project; thus, there was a lack of details in completing the project. Furthermore, the web pages, pictures, and survey data used for this case study were extracted from this website project, so there might be some deficiencies when completing this case study. In addition, this website project was not an actual project for real customers; it was just for completing the university coursework. Thus, real clients did not thoroughly test the user requirements set for this project. Lastly, the number of respondents was too small to justify the quality of the website's user interface. As a result, this deficiency leads to weak results and discussions.

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## AUTHOR CONTRIBUTIONS

Ng Kai Xuen: Conceptualization, Data Curation, Formal Analysis, Investigation, Methodology, Validation, Visualization, Writing – Original Draft Preparation;

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## CONFLICT OF INTERESTS

No conflict of interests were disclosed.

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