DEVELOPING DYNAMIC WEB PAGES USING TEMPLATE AND NON-TEMPLATE: A DESCRIPTIVE ANALYSIS

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Abstract

World Wide Web has composed a lot of content on the Internet since its existence. Although the web has mature, there are still Websites in static behavior, causing the content hard to update. Nowadays, Web pages with fresh content are very important to attract users. Hence, Websites should be transformed into dynamic pages to ensure only latest information is displayed. Currently a good templating system is the best solution to do the transformation. In this paper we present the result of a comparison for developing and maintaining a dynamic Websites using a template, and using non-template. Two groups of students were studied: the first group required to develop a dynamic Website using template while the second group develops the same Website using non-template approach. The aim of both tasks is to compare the time taken by both groups to complete all the given tasks. The research found that although more time needed to create a template however it help decreasing the time taken to maintain the content of dynamic Websites. This result shows that template can improve the development cycle of a website especially maintaining the dynamic Web pages.

1. Introduction

World Wide Web or simply known as Web is becoming the most popular and rapidly growing technology within today's information system. Website was a complex communication medium that encompasses a huge amount of unrestricted information and important to disseminate information all around the world [4].

Website serves much kind of purposes varying from entertainment, informational, education, and promotional. There were eight basic types of Website purposes: personal, promotional, current, informational, persuasive, instructional, registration, and entertainment [1]. Thus, various types of Website need to have various types of content to suit their different purposes. This condition has

lead web administrators to seek more content from content contributors. When the amount of content increased, the development and maintenance process will become complex. More time has to be allocated to complete those processes. Sometimes these processes have not been done appropriately leaving the Web content with outdated problem.

One of the main reasons the Web content is not frequently updated is because of its static behavior. Web has traditionally consisted of static files without functionality and without the ability to interact with other software resources [3]. As a result, updating one page required developers to change the whole structure of the page, causing the updating activity tedious and hard to handle. For instance, simple changes of caption on certain button that appears on 46 Web pages throughout the Website required 46 changes of 46 files [2]. Although the changes involve only small appearance of the pages but Web administrators have to spend plenty of time to complete the process. This was considered as one of the factors why most of static HTML documents remain outdated and could not provide users with the latest information.

As the Web matures, developers and programmers tried to seek for new techniques to encounter the static behavior problem of HTML Web pages. Recently, dynamic Web content that provides time-sensitive and continuously changing the data has gain prominence [6]. Examples of such sensitive pages that people commonly access include new stories and stock information. All of these pages will always be updated to ensure their respective readers get the latest information.

The technology that resides behind the dynamic pages was the templates (or page templates). Template was a Web document that contained visual and markup placeholder (special tags) in which content will be updated by means of a publishing system or response to dynamic database technology [10]. A template could include features such as logo, intranet header and footer, text, and banner that will act as a boilerplate for all the pages in a Website [9]. Template permits modification of the Web content only by minor change to the template file. Web administrators could reuse the structure and components of a template during updating process by supplying the Website with the latest content [8].

The idea of a template is to separate the presentation logic from the application logic [7]. By using templates, the HTML pages were stored separately from the program logic but they will contain placeholder tags. When the template processor encountered these tags at runtime, it will substitute the placeholder with the right data for that tags. After all tags were substituted, the pages will be sent back to the client to be displayed. The versatility of template will enable those who maintain the Web site to adapt a complex site for different page layout and maintain the site easily [5]. Figure 1 represents the template architecture.
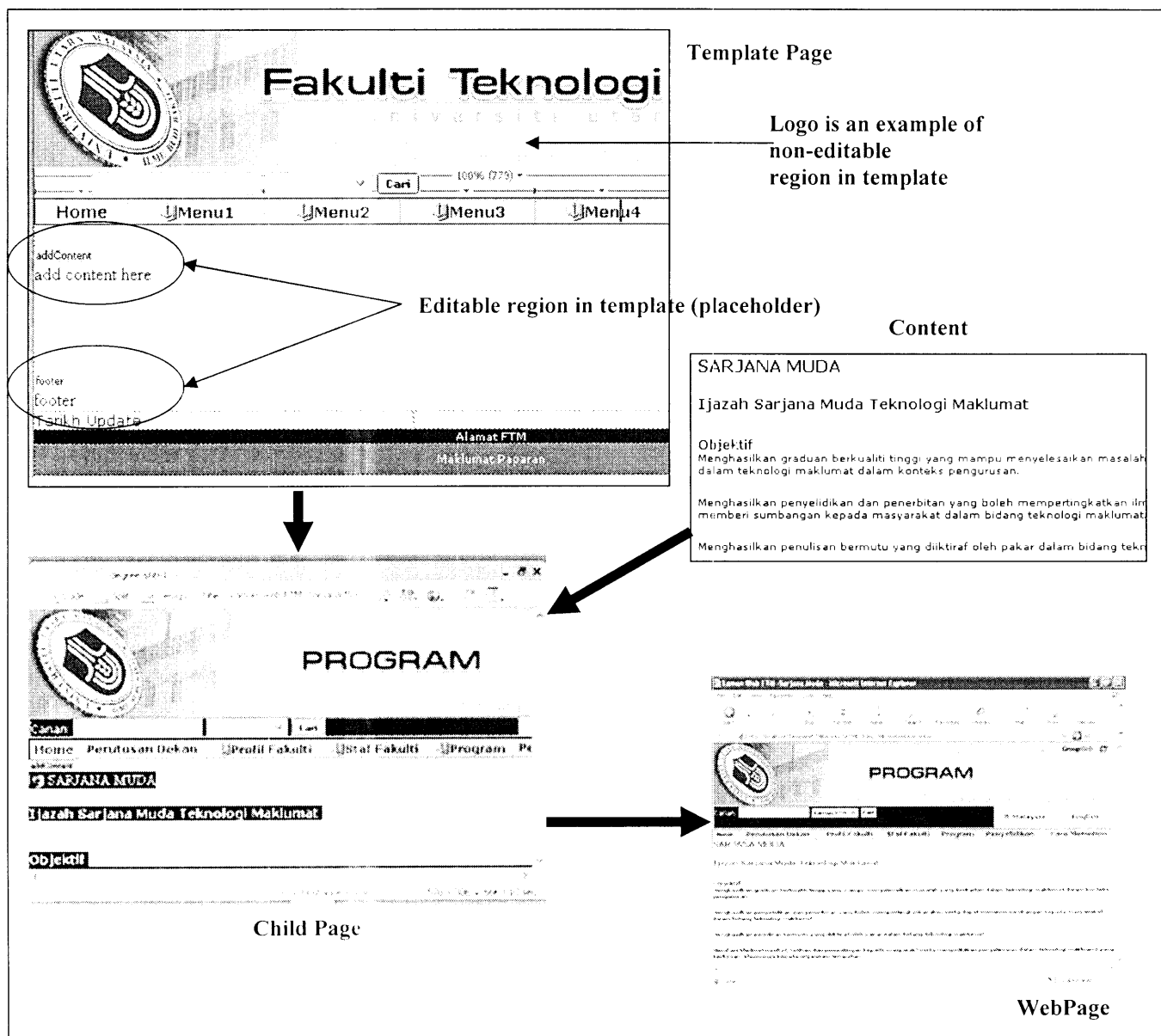
Figure 1: Template architecture

In order to prove that template could develop and maintained the dynamic web pages easily, this research was conducted. This research tends to compare the time taken to develop a dynamic Website using template and non-template (conventional) approach. Analysis on the recorded time will be used to prove the potential of templates on developing and maintaining the dynamic Web pages.

2. Comparison Material

The materials consist of a complete template and non-template application package to produce the dynamic Web pages, two sets of task (like a user manual) on using each application package respectively, and one set of form for each application package to record the time taken for each

completed task. Both application packages were developed using Macromedia Dreamweaver MX (DWMX) 2004 version 7.0. Figure 2 represents the main template page while Figure 3 represents the non-template master page.
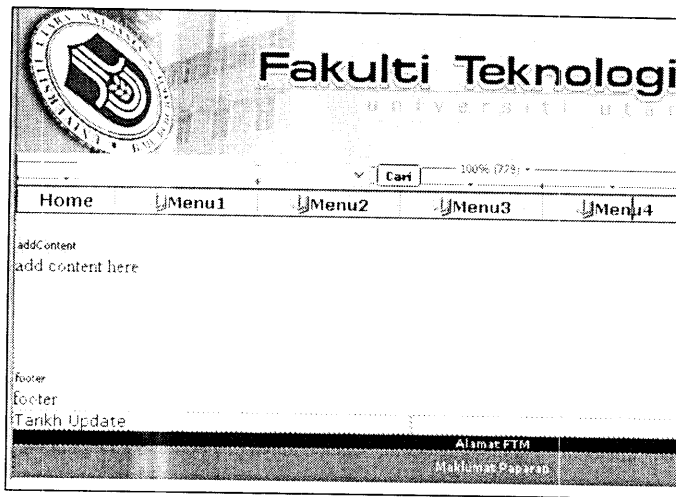

Figure 2: The main template page

Figure 3: The non-template master page

The task set to use the template application package was developed by adapting steps to create Web pages using DWMX proposed by [5]. Meanwhile the task set to use the non-template application package was developed by modifying only 25 % of the template task. The modification has to be made to ensure the task is suitable with the non-template application package. The aim of both tasks was to create 13 dynamic Web pages where these pages will be linked together to become a complete dynamic Website. Table 1 represents the tasks to develop the dynamic Web pages using template application package while Table 2 represents the task to develop the same page using non-template application package.

Table 1
Tasks involved developing dynamic Web pages using template application package

Task Number	Task Name
1	Setting the template page
2	Spawning Child Pages from Template
3	Changing Template Properties for Child Pages
4	Adding Content
5	Creating Navigation Structure for the Site
6	Modifying Page Link Structure

Table 2
Tasks involved developing dynamic Web pages using non-template application package

Task Number	Task Name
1	Setting the master page
2	Duplicating site pages from the master page
3	Changing page property (page title and header image) from each pages
4	Add Content to site pages
5	Creating Navigation Structure for the site
6	Modifying Page Link Structure

Apart from the application packages and the tasks, respondents are also supplied with one set of form for the respective application package to record the time taken for each completed task. They will record the time (in minutes) when they start and finish each task in the task set provided.

3. Respondents

Students who took TV3043 (technology Video Digital) in second semester session 2004/2005 in group C was selected as the population. The total number of students in this group is 100 students. Before the sample which contained 30 students can be derived, all students name were first listed according to their matric number in ascending order. Then, the first 50 students from the list were selected as the sample. Although the selection was larger compared to the required sample size, researcher tend to do this due to preventing the absentee of the selected student during the test day. After the selected students were notified, they were required to do the test during the selected date. Only the first 30 students who enter the lab were given the permission to do the test. The students then were randomly divided into two groups where each groups contains 15 respondents. The first group was assigned to create a Website using template approach while the second group developed Website using non-template approach. Table 3 represents information about the sample.

Table 3
Information about the sample

		First Group (Template)	Second group (Non-template)
Gender	Male	5	4
	Female	10	11
Education	STPM	7	9
	Matriculation	8	6
Experience building Websites	2 Websites	2	4
	3 Websites	10	9
	4 Websites	3	2

4. Procedure

The experiment took place at the Multimedia Laboratory 1 (MM1) at Faculty of Information Technology building. All respondents were ordered to sit in their respective group. The appropriate task set was distributed to each respondent along with the form to record the time that they took to complete each task in the task set. Respondents were given only two hours to complete all the tasks. They are not allowed to complete the task outside the computer lab. Although the procedure was tight, they were always being guided to ensure that they managed to complete the task smoothly. After two hours, both groups were asked to stop from continuing their task. All the duration forms were collected although some of them are not completed. The time taken by each student to complete each task based on their group are entered into computer using Microsoft Office Excel 2003. This useful information will be used to analyze the student's performance.

5. Result

Main measure for the research was the time taken to complete all the given tasks within two hours. Table 4 represents the time taken by respondents in the first group while Table 5 represents the time taken for the second group. R1 until R15 referred to respondents in the first group while R16 until R30 referred to respondents in the second group.

Table 4
The time taken by the first group (template) to complete all tasks

Respondent	Task 1	Task 2	Task 3	Task 4	Task 5	Task 6	Total
R1	32	12	12	14	21	12	103
R2	35	13	14	13	23	11	109
R3	37	12	13	13	22	11	108
R4	34	12	12	13	21	10	102
R5	33	11	13	14	23	12	106
R6	34	12	13	15	25	12	111
R7	35	15	15	16	24	10	115
R8	32	13	11	16	22	11	105
R9	39	13	13	15	22	12	114
R10	31	13	13	15	23	10	105
R11	36	15	13	13	22	10	109
R12	33	13	16	12	21	12	107
R13	39	14	15	16	23	12	119
R14	36	14	15	14	24	11	114
R15	36	12	14	13	22	12	109
Average Time	34.80	12.93	13.47	14.13	22.53	11.20	109.07

Table 5
The time taken by the second group (non-template) to complete all tasks

Respondent	Task 1	Task 2	Task 3	Task 4	Task 5	Task 6	Total
R16	11	7	10	15	47	20	110
R17	14	6	15	16	46	22	119
R18	10	9	12	15	45	24	115
R19	12	11	14	13	47	19	116
R20	10	8	13	12	45	20	108
R21	10	7	12	14	47	21	111
R22	13	10	12	18	45	21	119
R23	10	12	15	14	48	20	119
R24	11	14	13	13	47	21	119
R25	12	12	15	12	47	22	120
R26	11	10	13	15	46	18	113
R27	13	12	13	14	46	21	119
R28	14	12	13	12	45	21	117
R29	12	13	16	13	43	20	117
R30	14	11	13	14	48	19	119
Average Time	11.80	10.27	13.27	14.00	46.13	20.60	116.07

Both tables indicated that all respondents managed to complete all tasks within two hours. The tables also indicate that there were several tasks that respondents have to spend plenty of time to complete the task. Table 6 represents the summary of average time taken in both tables while Figure 4 illustrates the bar chart comparing the same average time.

Table 6
Comparison of Mean for Completed Tasks Only

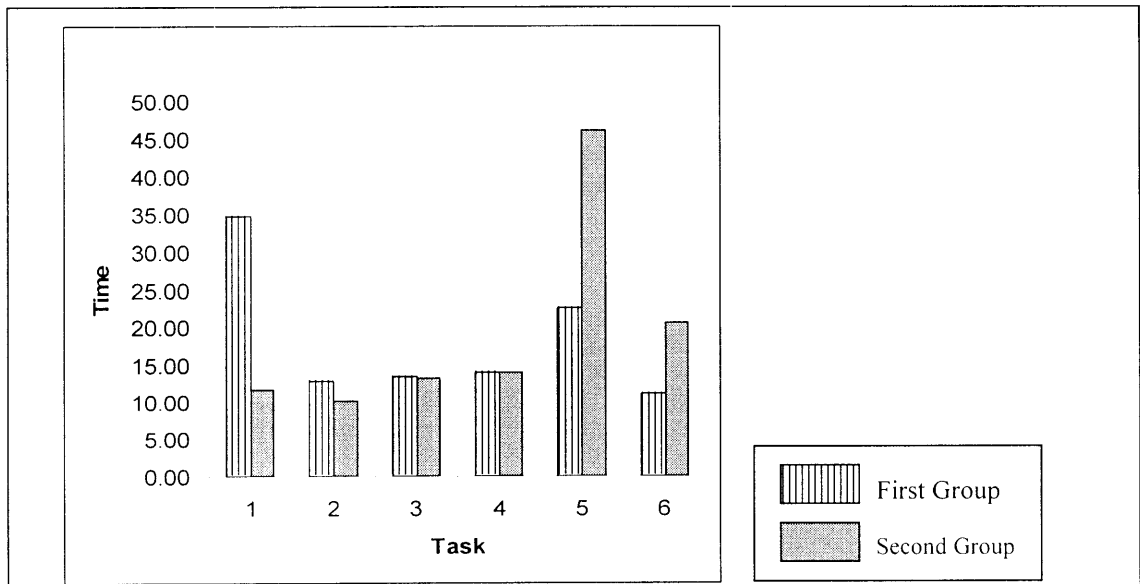|	Mean for Each Task (minutes)					
	Task 1	Task 2	Task 3	Task 4	Task 5	Task 6
First Group (Template)	34.80	12.93	13.47	14.13	22.53	11.20
Second Group (Non-template)	11.80	10.27	13.27	14.00	46.13	20.60

Figure 4: Bar chart of the average time

Table 6 and Figure 4 showed that the average time for Task 2, Task 3, and Task 4 between both groups was small. The gap of average time for Task 2 was 2.66 minutes, Task 3 was 0.20 minute, and Task 4 was 0.13 minute. This situation was due to the steps taken to complete those tasks were almost similar. For example. in Task 2, respondents in the first group created the required child pages using the "Add New File from Template" utility provided in DWMX. Meanwhile, respondents in the second group created those files but using Copy/Paste command from the DWMX edit menu. Those techniques were almost similar especially if the respondents have gained experience through using common applications like word processor, spreadsheet and presentation.

However the average time gap for Task 1, Task 5, and Task 6 between both groups was high. Based on Table 6, the different of average time for Task 1 between both groups was 23 minutes. The table indicated that respondents in the second group managed to complete the task faster as compared to the first group. In Task 1, respondents in the first group required to set up the template page. The margin was high perhaps because respondents in the first group were not familiar building a Website using templates. Their past experience of building Websites maybe started from creating a default page that will be used for the rest of the project. They have few experiences starting the process by designing the template first. However respondents in the second group found it was easy to complete the first task. With the existing experience and knowledge they already have. therefore they managed to complete the task faster than those who were in the first group.

Table 6 also indicated that the average time gap for Task 5 was high (23.6 minutes). For this task, respondents in the second group spent more time to complete the task as compared to counterparts in the first group. The average time taken by them to complete the task was 47.87 minutes. The fastest respondent who managed to complete this task took 45 minutes while the slowest took 52 minutes. Meanwhile. in the first group, the average time taken by respondents to complete Task 5 was 22.67 minutes. The reason that influence respondents in the second group spent more time for the task was the inability of non-template page to update the link structure of the dynamic Web pages automatically. In Task 5, respondents in the second group were required to create the navigation structure of the Website. They have to do the same job for all dynamic pages (13 pages) in the Website. There was no short cut to reduce the time because each page exists independently. This situation was different for respondents in the first group. Although the objective of the task was the same. however by using the template; each child page could be updated immediately once the link structure in the template page was modified. There were several code lines in the child page where this code will always refer to the template; any modification made to the template file will ensure each child page will also be affected. Therefore the template approach can ensure updating process could be done faster as compared to non-template.

Based on Table 6, Task 6 also exhibited the same trend as Task 5 where respondents in the first group managed to complete the task faster then respondents in the second group. The average time gap between both groups was 9.4 minutes. In this task, respondents in both groups have to update the page link after modified it. Respondents in the first group managed to it faster because they only have to modify the template page and afterwards gave a simple command to the template to update the child pages. The child pages will be updated automatically through the changes. Meanwhile respondents in the second group have to rely on their skill and experience to update the

link manually. They have to spend more time to complete the task. Therefore the condition in Task 6 approved that using template could increased the speed of updating the Web pages.

The Task 5 and Task 6 result were similar with the statement made by [2] that template could help reducing the time to update Web pages. The template helps fastening the completion of both tasks for respondents in the first group. Although templates were slight hard to create but it could help reducing the time taken to update and modify the structure of the Website. By using template, updating process could be done faster and easier hence the efficiency of doing such job can be increased.

6. Conclusion

The main benefits achieved by using template in developing and maintaining the Website were; (1) to reduce the time taken to update the Web page, (2) to provide a better way to handle several important phases during the development process, and (3) to increase the speed of work. Template provides a smart way to increase the efficiency of works that involve dynamic Web pages. Although the process to create a template might require some extra knowledge and skills, the advantages were worth.

7. References

[1] Alexander, J., & Tate, M. A. (1999). *Evaluating Web resources*. Retrieved November 10, 2003 from http://www2.widener.edu/Wolfgran Memorial Library /Webevaluation /Webeval.htm.

[2] Cunningham, B. (2001). Web Development with PHP and FastTemplate 1.1.0. *Linux Journal, 2001*(86), 6-10.

[3] Evans, M.P., Phippen, A.D., Mueller, G., Furnell, S.M., Sanders, P.W. & Reynolds, P.L. (1999). Strategies for content migration on the World Wide Web. *Internet Research: Electronic Networking Applications and Policy, 9* (1), 25 – 34.

[4] Farkas, D.K., & Farkas J. B. (2002). *Principle of Web Design*. New York: Longman.

[5] Halstead, B., & Summers, M.R. (2003). *Dreamweaver MX Templates*. Indianapolis: New Riders Publishing.

[6] Ko, I., Yoa, K. & Neches, R. (2002). Dynamic coordination of information management services for processing dynamic Web content. *Proceedings of the eleventh international conference on World Wide Web* (pp.355 – 365). New York: ACM Press.

[7] Kristensen, A. (1998). Template Resolution in XML/HTML. *Computer Networks & ISDN System, 30*, 239-249.

[8] Nanard, M., Nanard, J. & Kahn, P. (1998). Pushing Reuse in Hypermedia Design: Golden Rules, Design Pattern & Constructive Template. *Proceedings of the ninth ACM conference on Hypertext and hypermedia : links, objects, time and space* (pp.11-20). New York: ACM Press.

[9] Nicholson, S, R. (2003). Macromedia *Dreamweaver MX 2004 and Database*. Indianapolis: New Riders Publishing.

[10] Zeldman, J. (2001). *Taking your talent to the Web: A guide to the transitioning designer*. Indianapolis: New Riders.