

SEATROBS: Development of Sealife Travel & Tour Online Booking System Using Usability Theory.

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ABSTRACT: The travel and tour industry is one of the world's largest industries in Malaysia, where businesses in this industry always seek advanced technology to face intense competition. Sealife Travel and Tour Sdn. Bhd. is one of them, where the owner of this company is seeking a system that can cater to their problems due to the implementation of a manual system in the customers' booking process. Therefore, this research aims to develop a Sealife Travel Online Booking System (SEATROBS) for the company. The Adapted Waterfall model has been used as a methodology, and usability heuristics had been used as a theory to guide the development of this system.

Keywords: online booking system; travel agency; usability theory

The Outline of the Presentation

- **First Section:** The profile of the research
- **Second Section:** SEATROBS: Development of Sealife Travel & Tour Online Booking System Using Usability Theory
- **Third Section:** The Theory Used
- **Fourth Section:** Results of The Study
- **Fifth Section:** Conclusion



It is a research on **Online Booking System (Management of Information System, MIS)**



Applies a theory : Usability Heuristic Theory with
Water Fall Model from SDLC (Software Development Life Cycle)

The Objectives:

- 1) To identify the current booking process of Sealife Travel & Tour Agency and their requirement for online booking system, SEATROBS.
- 2) To design and develop an online booking system for Sealife Travel & Tour agency using Usability Heuristic Theory.
- 3) To evaluate the functionality and usability of the online booking system, SEATROBS.

The Research Profile



The Adapter Waterfall model has been used in developing this system.

The system has been tested with four (4) users and two (2) experts. The testing method used for the users is the ISO/IEC 9126-4 approach to measure the usability metrics that includes efficiency, effectiveness, and satisfaction.

For the experts, heuristic evaluation is used that brings six (6) usability principles into implementation for testing. The result of the testing is very satisfying, as it shows 71.51% of efficiency, 83.33% of effectiveness and three (3) out of four (4) users very satisfied with the system.

WHY BOOKING SYSTEM?





Short answer:

- Positive Marketing
- Positive Contribution
- Government support toward e-Business



Prospect, Contribution & Support

FOR INDUSTRY:
SIMPLE AND EASY

MALAYSIA:
INCREASE INCOME FROM COMPANY
TAX

ACADEMIC:
HELP INDUSTRY PLAYER BY USING
THE SYSTEM



Manual booking system
in the industry is not a
problem-free



ISSUES OF MANUAL BOOKING SYSTEM (TOURISM INDUSTRY IN TERENGGANU)

- ❖ The first problem is exchanging information between the staff and customers through call and WhatsApp, resulting in miscommunication between them and the paper-based system that is prone to loss, misplaced, and less secure.
- ❖ The biggest downfall is the amount of space it take up in the physical shelf (storing of all paper-based booking forms and invoices into files)

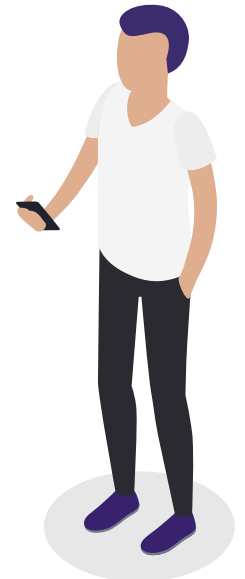
The industry does not escape from the issue of marketing , and this need to be improved



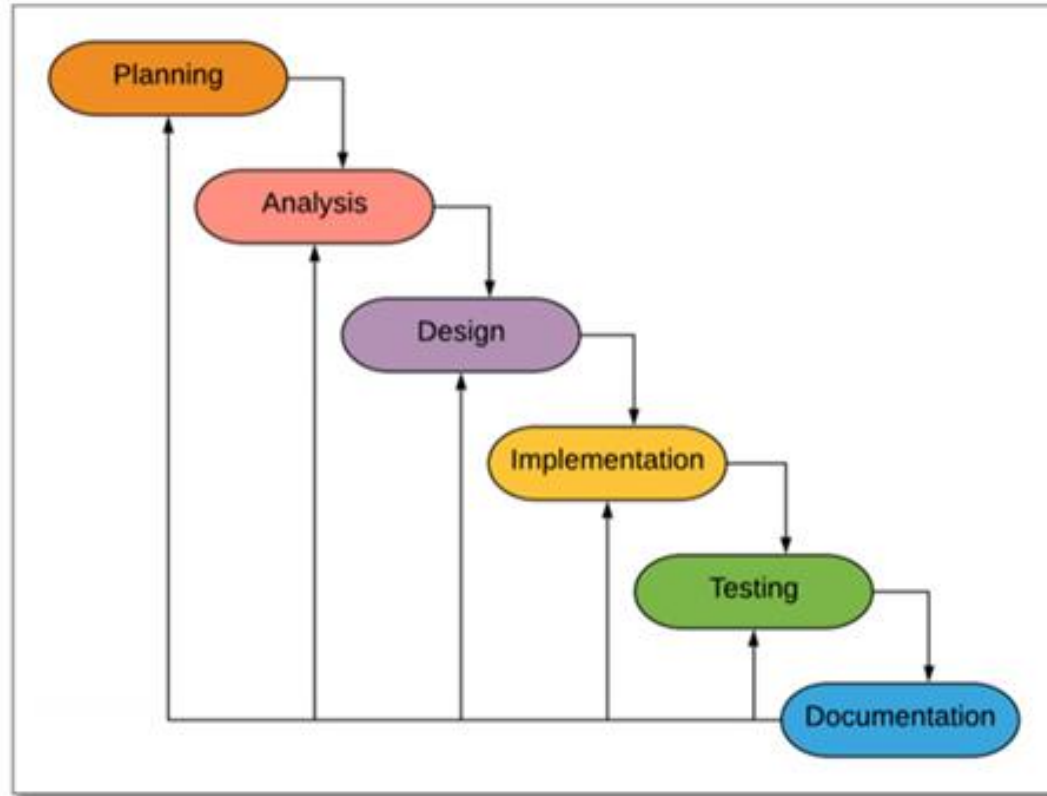
Methodology:

Software Development Life Cycle (SDLC):

Adapted Waterfall
model based on
Winston W. Royce
(1970)



Adapted Waterfall Model



The strengths of the Waterfall model

- Easy
- Provides structure
- Frames out the well understood milestones
- Set requirements stability
- Ideal for management control
- Work well when quality is more important than cost or schedule

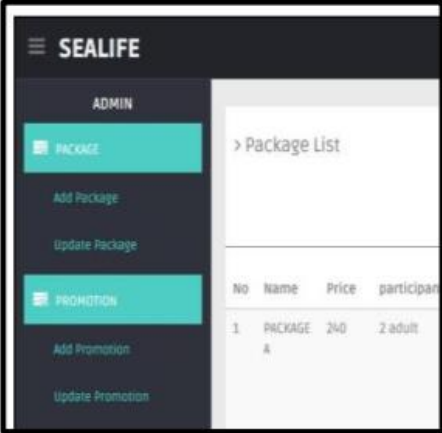




Theory of Usability Heuristic by Nielsen Norman






- ❖ By Nielsen Norman (1994)
- ❖ Composed of ten (10) principles
- ❖ Only six (6) principles used for the user interface due to limited of time in development (14 weeks)



Six (6) Usability Heuristic Principles Used

No	Principles	Explanation	Implemented in Design
1.	User Control and Freedom	The navigations and options are available for the staff, who is the admin of the system and the customers to navigate to the page they want.	 <p>The screenshot shows the SEALIFE admin interface. On the left, there are two main sections: 'ADMIN' and 'PROMOTION'. Under 'ADMIN', there are buttons for 'PACKAGE', 'Add Package', and 'Update Package'. Under 'PROMOTION', there are buttons for 'Add Promotion' and 'Update Promotion'. On the right, there is a 'Package List' table with columns for 'No', 'Name', 'Price', and 'participan'. The table contains one row: '1 PACKAGE A 240 2 adult'.</p>
2.	Match between System and Real World	The buttons used in this system are using words that are common and familiar to the users.	 <p>The screenshot shows four buttons arranged in two rows. The top row contains 'Back To Homepage' and 'See Booking Details'. The bottom row contains 'PAY' and 'CANCEL'. All buttons are rectangular with rounded corners and a light gray background.</p>
3.	Consistency and Standard	This system used the same font style and size and the exact size of the images for consistency.	 <p>The screenshot shows two promotional banners side-by-side. Both banners feature a red starburst with '50% OFF' and a yellow 'BOOKING OPEN' button. The left banner is for 'PACKAGE A PROMOTION' with details: '3 DAYS 1 NIGHT', '2 ADULT', 'RM 240', and '3 POINT SNORKELLING TRIP'. The right banner is for 'PACKAGE B PROMOTION' with details: '3 DAYS 1 NIGHT', '4 ADULT', 'RM 480', and '3 POINT SNORKELLING TRIP'. Both banners have a 'SEE PROMOTION NOW!' button at the bottom.</p>

Six (6) Usability Heuristic Principles Used

<p>4. Error Prevention</p>	<p>Pop up the message before the users can proceed to the next step and messages for the required field if the field is empty.</p>	 <p>LOGIN FORM :</p> 
<p>5. Help and Documentation</p>	<p>Provide recovery for the username and password of the users if they forgot it.</p>	
<p>6. Aesthetic and Minimalist Design</p>	<p>The form is straightforward with the necessary information to key in, and the system design is straightforward with a minimal design.</p>	 <p>REGISTER FORM :</p> 

User Testing: Usability Testing Using Metrics

The system had been tested using three (3) usability metrics which are efficiency, effectiveness and satisfaction.



1) Efficiency

Efficiency is measured in terms of time taken for the user to complete the task. Formulae:

$$\text{Overall Relative Efficiency} = \frac{\sum_{j=1}^R \sum_{i=1}^N n_{ij} t_{ij}}{\sum_{j=1}^R \sum_{i=1}^N t_{ij}} \times 100\%$$

- N = The total number of tasks (goals)
- R = The number of users
- n_{ij} = The result of task i by user j; if the user completes the task, then
N_{ij} = 1, if not, then N_{ij} = 0
- T_{ij} = The time spent by user j to complete task i. If the task is not completed, then time is measured until the moment the user quits the tasks.



Taking the above equation into implementation, four (4) users have tested and performed the same tasks in this system. Therefore, based on the result of each of the users, the calculation is made by placing the values into the equation as follow:

User	Task 1	Task 2	Task 3
User 1	Completed (15 sec)	Completed (4 sec)	Completed (12 sec)
User 2	Completed (22 sec)	Completed (6 sec)	Completed (16 sec)
User 3	Completed (26 sec)	Completed (5 sec)	Completed (20 sec)
User 4	Uncompleted (29 sec)	Completed (7 sec)	Uncompleted (24 sec)

Therefore, based on the result of each of the users, the calculation is made by placing the values into the equation as follow:

$$\text{Task 1} = ((1 \times 15) + (1 \times 22) + (1 \times 26) + (0 \times 13)) = 63$$

$$\text{Task 2} = ((1 \times 4) + (1 \times 6) + (1 \times 5) + (1 \times 7)) = 22$$

$$\text{Task 3} = ((1 \times 12) + (1 \times 16) + (1 \times 20) + (0 \times 24)) = 48$$

$$\text{Overall time taken} = 15 + 22 + 26 + 29 + 4 + 6 + 5 + 7 + 12 + 16 + 20 + 24 = 186$$

$$\begin{aligned} \text{Overall Relative Efficiency} &= \frac{63 + 22 + 48}{186} \times 100\% \\ &= 71.51\% \end{aligned}$$



2) Effectiveness

Efficiency is calculated by measuring the completion rate. Formulae:



$$Effectiveness = \frac{\text{Number of tasks completed successfully}}{\text{Total number of tasks undertaken}} \times 100\%$$

Using the above equation and information calculated as follows:

Task 1 = 3 users completed, 1 uncompleted

Task 2 = 4 users completed

Task 3 = 3 users completed, 1 uncompleted

the overall user effectiveness is

$$\begin{aligned} \text{Effectiveness} &= \frac{(3 + 4 + 3)}{(4 + 3)} \times 100\% \\ &= 83.33\% \end{aligned}$$

3) Satisfaction

This is based on the questionnaires distributed to each of the users. For the calculation, we used the system usability scale (SUS) method with formulae:



- Strongly disagree = 1 points
- Disagree = 2 points
- Neutral = 3 points
- Agree = 4 points
- Strongly agree = 5 points

$$\text{SUS Score} = (X + Y) \times 2.5$$

X = Sum of the points for all odd-numbered questions - 5

Y = 25 - Sum of the points for all even-numbered questions

Using the above equation, the SUS score for each of the user is calculated as follows:

$$\text{User 1 : } (18 + 19) \times 2.5 = 92.5$$

$$\text{User 2 : } (15 + 17) \times 2.5 = 80$$

$$\text{User 3 : } (14 + 17) \times 2.5 = 77.5$$

$$\text{User 4 : } (11 + 13) \times 2.5 = 60$$

Expert Testing: Heuristic Evaluation

Based on the open-ended questionnaires with different status (agree, not sure or disagree).



The result is based on the six (6) usability heuristic principles applied in the system :

No	Usability Principles	Expert 1	Expert 2
1.	User Control and Freedom	Agree	Agree
2.	Match between System and Real World	Agree	Agree
3.	Consistency and Standard	Disagree	Agree
4.	Error Prevention	Agree	Agree
5.	Help and Documentation	Agree	Disagree
6.	Aesthetic and Minimalist Design	Not sure	Agree

CONCLUSION

In conclusion, the result of the usability testing shows that in terms of efficiency, this system has a percentage of 71.51%, which means it is efficient enough for the user. For effectiveness, this system has a percentage of 83.33%, which placed this system in the good category of effectiveness. Whereas for the users' satisfaction, three (3) out of four (4) users are fully satisfied with the systems. Besides, for the heuristic evaluation, both experts agreed that this system clearly implemented all of the proposed usability principles, although some adjustment needs to be carried out later.



Thank You

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