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Evaluating User Experience in Web Applications Using WAMMI

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Abstract

In the digital era, web applications play a crucial role in modern life by offering dynamic platforms for communication, service delivery, and task execution. Despite their importance, ensuring a positive user experience (UX) remains a significant challenge, with usability issues such as non-intuitive navigation, poor responsiveness, and accessibility gaps leading to user frustration and reduced effectiveness. This study evaluates the usability of two web applications—HobbyHaven and the Personalized E-Portfolio Website (PEW)—using the Website Analysis and Measurement Inventory (WAMMI) framework. WAMMI assesses usability across five dimensions: Attractiveness, Controllability, Efficiency, Helpfulness, and Learnability. Data collected from 65 participants reveal distinct usability strengths and weaknesses. HobbyHaven demonstrated moderate satisfaction, with areas for improvement in visual design, system responsiveness, and user support features. Conversely, PEW achieved high satisfaction levels, particularly in controllability, efficiency, and learnability, highlighting its well-rounded, user-centric design. The findings underscore the utility of WAMMI in identifying usability gaps and enhancing web applications to align with user expectations. By providing actionable insights, this study contributes to the growing body of research on usability evaluation, emphasizing the need for systematic assessments to create impactful and user-friendly web applications.

Keywords: Web application usability; WAMMI framework; user experience evaluation; usability assessment; digital platforms

1. Introduction

In the evolving digital era, web applications have become integral to modern life, serving as dynamic platforms for communication, service delivery, and task execution. From e-commerce and online banking to virtual learning environments and government portals, these applications facilitate a wide range of user interactions. Unlike static websites, web applications are interactive and highly functional, catering to specific user needs with features like real-time updates, personalized content, and seamless task processing. As their adoption increases across sectors, the demand for delivering efficient, intuitive, and engaging user experiences has become more pressing than ever. However, ensuring a positive user experience (UX) in web applications remains a significant challenge. Despite technological advancements, many applications fall short in meeting user expectations due to factors such as non-intuitive navigation, inefficient task flows, slow responsiveness, and limited accessibility. These usability flaws often result in user frustration, decreased satisfaction, and ultimately, the abandonment of the application. Furthermore, the implications extend beyond individual dissatisfaction—poor UX can significantly hinder productivity, reduce customer retention, and diminish the overall success of digital initiatives (Ahmad et al., 2017; Salman et al., 2022).

Usability—the ease with which users can interact with an application to achieve their goals—plays a central role in determining the success of web applications. It encompasses key attributes such as system performance, visual design, ease of learning, error tolerance, and user satisfaction. High usability contributes not only to better task performance but also fosters user loyalty and trust. Conversely, applications with low usability often experience reduced engagement, negative user feedback, and failure to achieve intended business or organizational outcomes (Yaqub et al., 2017). To address the complexity of measuring usability, various frameworks and tools have been developed, among which the Website Analysis and Measurement Inventory (WAMMI) has gained considerable recognition. WAMMI is a standardized, questionnaire-based tool designed to assess the perceived usability of websites and web applications. It evaluates user experience across five dimensions: Attractiveness (aesthetic appeal), Controllability (ease of control), Efficiency (speed of task completion), Helpfulness (availability of support), and Learnability (ease of understanding how to use the system). This multidimensional assessment provides both quantitative scores and qualitative insights that help developers and designers diagnose specific usability issues (Elling et al., 2012).

The strength of the WAMMI framework lies in its user-centered approach, making it particularly effective in identifying not only surface-level design flaws but also deeper interaction challenges that users face. Its structured methodology ensures consistency in evaluations while allowing comparisons across different applications or versions of the same application. By interpreting WAMMI results, development teams can prioritize usability enhancements that align with user expectations and improve overall satisfaction. Moreover, WAMMI has been successfully applied across various domains—including education, healthcare, e-commerce, and public services—demonstrating its versatility and reliability in usability assessment. This study aims to assess the usability of web applications using the WAMMI framework, focusing on identifying usability strengths and weaknesses, analyzing their impact on user satisfaction, and providing actionable recommendations for improvement. Through a systematic evaluation process, the study seeks to highlight key usability dimensions that contribute to or hinder positive user experiences. Ultimately, the findings will serve as a guide for designers, developers, and stakeholders to create more user-friendly web applications that are not only functional but also intuitive, engaging, and accessible.

2. Literature Review

The Website Analysis and Measurement Inventory (WAMMI) is a well-established framework designed to evaluate website usability through a user-centered lens. It emphasizes the importance of real-world user interactions over theoretical or laboratory-based assessments, providing a more authentic and reliable reflection of usability challenges encountered during actual use (Ahmed, 2019). Unlike technical or heuristic methods that rely on expert reviews, WAMMI captures the user's subjective experience by collecting structured feedback across key usability dimensions. This makes it particularly valuable in detecting nuanced issues that may not be apparent through conventional analysis. Numerous studies have demonstrated the versatility and effectiveness of WAMMI across diverse application domains. For instance, Salman et al. (2022) applied WAMMI to assess the usability of Blackboard Ultra, a learning management system, during the COVID-19 pandemic. Their study revealed critical usability issues, particularly in terms of interactivity and accessibility, which impacted students' learning experiences in remote settings. Similarly, Ahmad et al. (2017) employed the framework to evaluate e-commerce platforms, identifying key concerns related to navigation, information retrieval, and transactional efficiency. These findings underscore WAMMI's ability to provide actionable insights that drive iterative design improvements tailored to user needs.

In the realm of higher education, several researchers have adopted WAMMI or similar approaches to assess institutional websites. Caglar and Mentes (2012) investigated the usability of the European University of Lefke's website, finding that poor information architecture and inconsistent design significantly hindered user satisfaction. Mentes and Turan (2012) reached similar conclusions in their study on Namik Kemal University, suggesting that despite growing digitalization, usability remains a persistent challenge. These studies reinforce the need for systematic usability evaluation methods like WAMMI that can identify design inefficiencies and improve digital service delivery. While web application design has advanced considerably in recent years, common usability problems remain widespread. Studies continue to report issues such as complex navigation structures, delayed system responses, and poor mobile optimization as primary factors contributing to user dissatisfaction (Yaqub et al., 2017; Thaneshan et al., 2021). With the increasing reliance on mobile and cross-platform access, the failure of web applications to adapt responsively to different screen sizes or devices further exacerbates exclusion for a significant portion of the user base. This highlights the critical role of comprehensive usability assessment frameworks in addressing the multifaceted nature of user experience.

WAMMI addresses these challenges by offering both quantitative metrics and qualitative insights across five dimensions: Attractiveness, Controllability, Efficiency, Helpfulness, and Learnability. This multidimensional evaluation not only pinpoints performance bottlenecks but also captures users' emotional and cognitive reactions. Elling et al. (2012) emphasized WAMMI's effectiveness in both controlled and online environments, affirming its adaptability and robustness across different testing conditions. Moreover, the integration of user feedback into the evaluation process aligns with best practices in human-centered design, ensuring that usability improvements are grounded in user expectations and behaviors.

3. Methodology

This study evaluates the usability of two self-developed web applications using the Website Analysis and Measurement Inventory (WAMMI) framework. The first application, **HobbyHaven** (Figure 1), is a web-based digital repository designed to help users catalog and manage their personal collections of hobby items, such as stamps, coins, or action figures. The second application, the **Personalized E-Portfolio Website (PEW)** (Figure 2), enables users—particularly students and professionals—to create, update, and showcase their digital portfolios in a structured and visually appealing manner.

The usability of both applications was assessed through the five core dimensions defined by the WAMMI framework:

- **Attractiveness** assesses users' initial impressions and overall visual satisfaction with the interface. This dimension captures how appealing, modern, and engaging the application appears, influencing users' willingness to explore and continue using the system. A visually attractive interface can enhance perceived credibility and user trust.
- **Controllability** measures the extent to which users feel in control while navigating the application. It focuses on intuitiveness, responsiveness to user inputs, and the clarity of available options. A controllable interface reduces cognitive load and supports task completion by minimizing confusion and error.
- **Efficiency** evaluates how quickly and smoothly users can accomplish their intended tasks. This includes the application's response time, system performance, and the number of steps required to complete common actions. Higher efficiency contributes to a seamless user experience, especially in time-sensitive tasks.
- **Helpfulness** refers to the degree to which the application offers useful guidance, feedback, and support when users encounter difficulties. This includes the availability of instructions, tooltips, error messages, and help documentation. Helpful systems empower users by making it easier to recover from mistakes or learn new features.
- **Learnability** reflects how easily new users can understand and begin using the application without extensive training or prior experience. It assesses whether users can quickly grasp the system's structure, functions, and interface logic. High learnability is essential for retaining new users and reducing onboarding time.

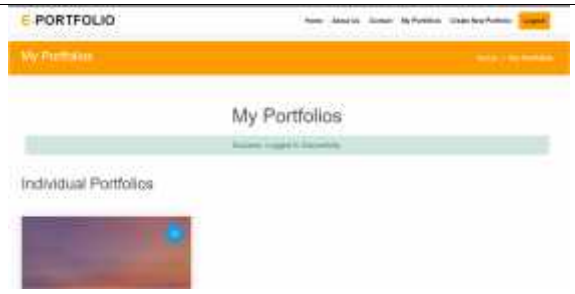
Participants interacted with both applications and provided feedback through a structured WAMMI questionnaire, allowing for both quantitative and qualitative insights into their usability experiences. The results were analyzed to identify strengths and weaknesses across the five dimensions, guiding further improvements in application design and functionality.

(a) Landing page

(b) Manage list collection

Figure 1: Interfaces of HobbyHaven

(a) Landing page



(b) Manage e-Portfolio

Figure 2: Interfaces of PEW

HobbyHaven was evaluated by a group of 35 participants with varying levels of experience in collecting and managing hobby-related items. The sample included novice collectors, casual hobbyists, and experienced enthusiasts, ensuring a broad range of perspectives. Each participant was asked to explore the application's core functionalities—such as item

cataloging, image uploads, tagging, and search features—and then complete a structured usability questionnaire grounded in the five WAMMI dimensions. Their feedback was aimed at capturing both immediate reactions and deeper usability perceptions.

Similarly, the Personalized E-Portfolio Website (PEW) was assessed by 30 participants, primarily university students from different academic disciplines and with differing levels of technical proficiency. These users interacted with the platform's tools for creating, editing, and organizing digital portfolios, including features for uploading resumes, embedding multimedia, and customizing layout elements. After using the system, participants completed the same WAMMI-based questionnaire to evaluate their experience. The responses from both groups were systematically analyzed to assess overall user satisfaction and to identify usability strengths and areas requiring improvement across the five WAMMI constructs—Attractiveness, Controllability, Efficiency, Helpfulness, and Learnability. This comparative analysis provided valuable insights into how each application performed in real-world usage scenarios, informing targeted recommendations for enhancing user experience and system effectiveness.

4. Findings

The usability evaluation of HobbyHaven revealed a moderate level of user satisfaction across all five WAMMI dimensions. In terms of Attractiveness, 64% of participants responded positively, recognizing the relevance and organization of content. However, several users suggested that the visual presentation could be improved through better use of color schemes, typography, and layout aesthetics to enhance visual appeal. The Controllability score stood at 71%, indicating that most users found the interface navigation intuitive and consistent. Nevertheless, some respondents expressed a desire for greater customization options, such as adjustable display preferences and personalized dashboards. The Efficiency dimension received a 66% satisfaction rate, with participants acknowledging that the system generally supported task completion, but performance issues—such as page load delays and occasional lags—were frequently mentioned. Helpfulness was rated at 70%, reflecting user appreciation for the structured layout and categorization of features. However, the absence of contextual help tools, FAQs, or interactive tutorials was noted as a limitation. Regarding Learnability, the application achieved a 66% score, indicating that although users initially encountered some navigation challenges, repeated use led to better familiarity and improved task performance over time.

In contrast, the evaluation of the Personalized E-Portfolio Website (PEW) demonstrated high user satisfaction across all WAMMI dimensions. Attractiveness received an impressive 89.2% satisfaction rate, with users praising the interface's clean design, engaging visual elements, and overall aesthetic coherence. The Controllability factor scored 90%, as participants consistently highlighted the intuitive interface layout, clear menu structures, and consistent interaction flow, which made the application easy to navigate even for first-time users. The application also performed strongly in Efficiency, with a 90% satisfaction rate. Respondents reported that tasks were executed smoothly and quickly, with minimal system delays, which contributed to a seamless user experience. In terms of Helpfulness, PEW received 84.2% positive feedback. Users appreciated the logical organization of features and the availability of prompts and labels, although some suggested integrating brief tooltips or a quick-start guide to further enhance the onboarding experience. Learnability was the highest-rated factor, scoring 90.8%. Users found the platform highly intuitive, reporting that most features could be understood and used effectively with minimal instruction, which is especially important in a student-oriented system.

Overall, these findings highlight that while HobbyHaven has a solid usability foundation, targeted improvements—particularly in visual design, system responsiveness, and user support—could significantly enhance the user experience. Meanwhile, PEW demonstrated exemplary usability across all measured aspects, offering valuable design cues and best practices for similar educational or portfolio-based applications.

5. Conclusion

The application of the WAMMI framework in this study proved highly effective in capturing user perceptions and translating them into actionable insights for both web applications. For HobbyHaven, the evaluation identified key usability challenges, particularly in the areas of visual design, system responsiveness, and user support. These findings serve as a practical guide for refining the platform, with an emphasis on enhancing user experience for collectors through improved aesthetics, faster performance, and the integration of supportive features like tutorials and guided help. In contrast, the Personalized E-Portfolio Website (PEW) exhibited consistently high usability across all WAMMI dimensions. Its strengths in controllability, efficiency, and learnability point to a well-designed, user-centric system that effectively meets the needs of its target users—students developing professional digital portfolios. The platform's intuitive layout, engaging interface, and smooth performance reflect thoughtful design decisions that prioritize user

satisfaction and functional usability. These outcomes underscore the value of WAMMI as a systematic usability evaluation tool. By combining quantitative and qualitative feedback, WAMMI facilitates a deeper understanding of user interaction and provides measurable evidence to support continuous improvement. While HobbyHaven illustrates how usability evaluations can identify development priorities, PEW exemplifies how strong design practices can yield high levels of user satisfaction. Taken together, the two case studies demonstrate the importance of embedding usability assessments into the development lifecycle. They reaffirm that aligning design with user expectations not only improves application performance but also enhances user engagement and long-term adoption.

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