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Personalized E-Portfolio: A Dynamic Web-based Tool for Students' Professional Growth

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Abstract

Background of study: Electronic portfolios (e-portfolios) have become vital tools for students to document learning and build professional identity. Yet, many existing platforms are hindered by technical complexity, limited personalization, and low engagement.
Aims and scope of paper: This paper introduces a personalized e-portfolio system designed to overcome these issues by applying agile and user-centered approaches, focusing on usability and adaptability in higher education.
Methods: The system was developed using HTML, CSS, JavaScript, PHP, and phpMyAdmin through six agile phases: planning, design, development, testing, deployment, and review. User needs were gathered from students and lecturers, while 30 students evaluated the system using the Website Analysis and Measurement Inventory (WAMMI) across five usability factors.
Result: Usability testing showed high satisfaction. Learnability (4.47), controllability (4.22), and efficiency (4.17) scored the highest, indicating that the system is intuitive and effective. Participants valued its role in reflection and personal branding, while suggesting improvements in visual design, customization, and integration with platforms like LinkedIn.
Conclusion: The study confirms that agile and user-centered design can produce an adaptable e-portfolio system that enhances students' professional growth and provides a scalable model for higher education institutions.

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INTRODUCTION

In today's digital age, portfolios have become an important way to showcase personal growth and professional development. Traditionally, a portfolio is a collection of an individual's achievements, reflections, and skills. It helps with self-assessment and allows others, like educators or employers, to understand a person's learning journey. According to Syatriana et al. (2025) a portfolio is more than just a folder of work—it's a tool for learning that supports self-reflection and feedback. As education moves toward learner-centered approaches, portfolios have evolved from static collections into dynamic tools that encourage both personal and professional growth.

Building on this idea, electronic portfolios, or e-portfolios, have become a powerful tool in higher education. E-portfolios take the traditional concept further by adding multimedia, interactive features, and easy access through digital platforms. Feridouni-Solimani & Ahmed-Mohamed (2024) describes an e-portfolio as a "living portal" a space where students can showcase their achievements and reflect on their learning and shape their academic identity. This shift meets the growing expectations of educational institutions and employers, who want graduates to demonstrate a range of skills, competencies, and critical thinking abilities.

However, the use of e-portfolios in higher education is not without challenges. Mobarhan et al. (2019) point out barriers such as technical difficulties, lack of training, and the struggle to fit e-portfolios into existing learning systems. Many students see e-portfolios as extra work rather than a helpful learning tool, which can lead to low engagement. Parkes et al. (2013) add that while e-portfolios are meant to support reflection, their success depends on having a clear purpose, easy-to-use design, and a system that encourages students to engage meaningfully with their work.

Another issue is the gap between the potential of e-portfolios and how they are actually used by students. Pitts and Ruggirello (2012) note that while e-portfolios can help students track their growth, many struggle with the technical side of creating and maintaining them. Many platforms have design problems, limited customization, and outdated interfaces that don't match students' digital skills. As a result, students often see e-portfolios as just another task, not as a tool that helps them grow.

These challenges highlight the need for a more effective solution that can bridges the gap between the concept of e-portfolios and their practical application. A personalized e-portfolio offers such a solution by providing a simple, user-friendly, and flexible platform that empowers students to take ownership of their learning journey. Building on earlier research on web-based educational tools and the integration of Web 2.0 technologies in learning environments (Jamaludin & Wan Ishak, 2010), this study addresses the growing demand for digital platforms that support student professional development. By tackling issues identified in previous studies: such as poor design, lack of personalization, and limited support for reflection, this web-based tool aims to make e-portfolios a more meaningful and effective part of the learning experience.

The effectiveness of e-portfolios in fostering self-regulated learning has been highlighted in multiple studies. Alexiou and Paraskeva (2010) argue that e-portfolios encourage students to set goals, monitor progress, and reflect on their learning, which are essential components of self-directed learning. Similarly, Gutiérrez-Santiuste et al. (2022) stress that e-portfolios serve as a tool for reflection, enabling learners to identify their strengths, weaknesses, and areas for improvement. Syatriana et al. (2025) further emphasizes that successful e-portfolio implementation requires features such as clear learning objectives, opportunities for feedback, and the ability to showcase diverse competencies. These features empower learners to take ownership of their educational journey and develop critical self-assessment skills (Marsegi et al., 2023).

Despite their potential, the adoption of e-portfolios in higher education faces several challenges. Mobarhan et al. (2019) conducted a systematic review and identified key barriers such as lack of technical skills among users, limited integration with existing learning systems, and unclear pedagogical goals. These issues often result in low engagement, where students view e-portfolios as an administrative task rather than a meaningful learning experience. Parkes et al. (2013) argue that for e-portfolios to be effective, they must be intuitive, easy to use, and provide clear benefits to users, particularly in supporting reflective practice and personal growth.

Several studies have proposed frameworks and best practices for improving e-portfolio design and implementation. Pitts and Ruggirello (2012) introduce a conceptual framework for using e-portfolios to document and evaluate growth in reflective practice, emphasizing the importance of aligning e-portfolio design with learning outcomes and reflective goals. Richards-Schuster et al. (2014) demonstrate the value of e-portfolios in assessing program goals and fostering integrative learning, highlighting their role in promoting civic engagement and connecting academic learning with real-world experiences. These findings underscore the importance of designing e-portfolios that are not only user-friendly but also purpose-driven and integrated into meaningful learning activities.

Moreover, studies have explored the features that make e-portfolios effective tools for learning and assessment. Agudo et al. (2013) emphasize the importance of monitoring tools within e-portfolios, allowing users to track progress and receive feedback. Pablo Amaya et al. (2013) discuss how e-portfolios support both formative and summative assessment, enabling continuous feedback and

showcasing learning over time. Romero et al. (2019) propose the use of semantic learning paths and personalization to enhance self-regulated learning, while Rezgui et al. (2018) advocate for a common semantic structure in e-portfolio systems to facilitate interoperability and data reuse. These features contribute to creating a robust, flexible, and engaging e-portfolio platform.

The literature highlights a growing consensus that while e-portfolios have the potential to transform learning, their effectiveness depends on user experience, personalization, and integration with broader learning ecosystems. Zhang and Tur (2022) emphasize the need for future-ready e-portfolios that are adaptable, learner-centered, and capable of supporting continuous professional development. As Balaban, Mu, and Divjak (2013) argue, developing an effective e-portfolio system requires careful consideration of information system design principles, user needs, and learning objectives to ensure successful adoption and long-term sustainability.

METHODOLOGY

This study adopts an agile methodology. Agile was chosen for its iterative and flexible approach, allowing for continuous feedback and adaptation throughout the development process. The methodology is divided into six phases: Planning, Design, Development, Testing, Deployment, and Review (Guo & Li, 2024).

Phase 1: Planning
The planning phase began with a comprehensive analysis of the project's goals and objectives, focusing on developing a user-friendly and customizable e-portfolio web application for students. The team conducted interviews with students and lecturers at Universiti Utara Malaysia (UUM) to gather detailed user requirements, understand expectations, and identify specific features needed in the platform. A project timeline was created, outlining milestones, deliverables, and deadlines for each phase. Additionally, a comparative study of existing e-portfolio platforms, such as FolioSpaces, portfoliobox, and Webflow, was performed to identify best practices, limitations, and user preferences. This analysis informed the design and functionality of the personalized e-portfolio application.

Phase 2: Design
During the design phase, the requirements gathered from the planning phase were translated into wireframes and prototypes using tools such as Figma and PowerPoint. The design emphasized an intuitive and visually appealing interface, ensuring ease of navigation for users with varying levels of technical proficiency. User interface (UI) elements were structured to support core functionalities, including registration, login, e-portfolio management, and account administration. Unified Modeling Language (UML) diagrams, including use case diagrams, sequence diagrams, and class diagrams, were developed using StarUML to model the system's structure and behavior. These models provided a blueprint for the subsequent development phase.

Phase 3: Development
The development phase involved translating design prototypes into a functional web application. The front-end of the application was built using HTML, CSS, and JavaScript, ensuring responsiveness across various devices and browsers. The back-end system was developed using PHP and phpMyAdmin to handle user authentication, portfolio data management, and interaction functionalities. Key features implemented included user registration, secure login, personalized e-portfolio creation, editing, deletion, and sharing capabilities. Administrative functionalities were also developed, such as account management and the ability to deactivate inactive student accounts.

Phase 4: Testing
Extensive testing was conducted to ensure the functionality, usability, and reliability of the application. The respondents were selected based on their voluntariness to participate in the evaluation process and their prior knowledge of web application development. This criterion ensured that participants were capable of providing fair assessments and offering constructive feedback for system improvement. A purposive sampling approach was therefore employed,

involving 30 students from Universiti Utara Malaysia (UUM). As the system under evaluation is a web-based application, IT students were identified as the most suitable target group due to their relevant knowledge and skills. The participants represented varying age groups and levels of digital proficiency within the IT program, thereby ensuring a balanced and comprehensive evaluation of the application.

The students were tasked with completing five pre-defined tasks, including account registration, e-portfolio creation, editing, viewing, and sharing. Participants then provided feedback through a Google Forms questionnaire, adapted from the Website Analysis and Measurement Inventory (WAMMI) framework, which assessed key usability factors: attractiveness, controllability, efficiency, helpfulness, and learnability (Ishak et al., 2025). The survey comprised 24 questions across six sections, employing a five-point Likert scale ranging from "strongly disagree" to "strongly agree." This evaluation provided insights into user satisfaction, identifying strengths and areas for improvement in the application's design and functionality.

Phase 5: Deployment
The application was deployed using Jimat Hosting, a reliable web hosting service selected for its security, uptime, and scalability. The deployment phase involved configuring the server environment, uploading files, and ensuring that the application was accessible to users. Security measures, such as secure login mechanisms and data encryption, were implemented to protect user data and maintain system integrity. The application was tested in the live environment to verify its performance and responsiveness.

Phase 6: Review
The final phase involved reviewing feedback from the usability testing and identifying areas for further enhancement. Issues such as minor interface inconsistencies, additional customization requests, and suggestions for more engaging visual designs were documented. These insights informed the development of a product backlog for future iterations. Proposed improvements include offering additional e-portfolio templates, integrating social media sharing features, and optimizing the mobile experience. Continuous feedback loops were established to ensure that the application remains user-centric and responsive to evolving user needs.

RESULTS AND DISCUSSION

Result:

The Proposed System Features and Design

The personalized e-portfolio was developed to address the challenges and limitations of existing e-portfolio platforms by providing a user-friendly, customizable, and secure digital space for students to document and showcase their academic and professional achievements (Razali et al., 2022) . The design focuses on creating an intuitive interface that supports various user roles: students, administrators, and visitors—with distinct functionalities tailored to their needs. The system's features are categorized into core modules: User Registration and Authentication, Personalized E-Portfolio Management, Administrative Control, and Visitor Access and Sharing Capabilities.

a) User Registration and Authentication
The registration module allows students to create an account by providing essential personal information such as name, email, phone number, address, and password. The system performs data validation to ensure completeness and accuracy. A secure login system is implemented for both students and administrators, verifying email and password credentials. Additional features include a password reset option for users who forget their credentials and role-based homepage redirection (admin or student) upon login. These features ensure secure access and protect user data.

b) Personalized E-Portfolio Management

The heart of the proposed application lies in its Personalized E-Portfolio Management module, which offers students the ability to create, edit, view, delete, and share their e-portfolios. The platform supports the input of diverse content types, including:

a. Personal Information (name, profile picture, contact details)
b. Academic Details (qualifications, transcripts, achievements)
c. Skills and Competencies (technical skills, certifications)
d. Images and Multimedia (photos, certificates, project samples)

Students can update and customize their portfolios easily through an intuitive form-based interface. Each action—such as adding new content, editing existing entries, or deleting a portfolio—triggers success messages, ensuring clear feedback and enhancing user confidence. The sharing feature enables students to generate unique portfolio links, which can be shared with potential employers, educators, or peers.

c) Administrative Control

The administrative module is designed to give admins oversight of the platform. These features ensure the platform remains well-maintained, secure, and aligned with academic goals. The features are:

a. View student profiles and account activity
b. Deactivate inactive accounts to maintain an updated and relevant user base
c. Monitor and moderate content for quality assurance

d) Visitor Access and Sharing

To facilitate professional networking and public sharing, the application includes a visitor module. This feature empowers students to build a professional presence and allows external stakeholders, such as employers or academic institutions, to access and evaluate their work. The features are:

a. Browse public portfolios using provided links
b. View details such as personal information, academic background, and skills
c. Share portfolio links with others to expand reach

The system design follows modular architecture, promoting scalability, flexibility, and ease of maintenance. The design process utilized Unified Modeling Language (UML) diagrams to clearly visualize system structure and interactions:

a. Use Case Diagram: Illustrates user roles (admin, student, visitor) and system functionalities, including registration, login, portfolio management, account administration, and browsing (Figure 1).
b. Sequence Diagrams: Define the interactions between users and the system during key processes such as account creation, portfolio updates, and sharing.
c. Class Diagram: Outlines system entities and relationships, covering user accounts, e-portfolio entries, and system controls.

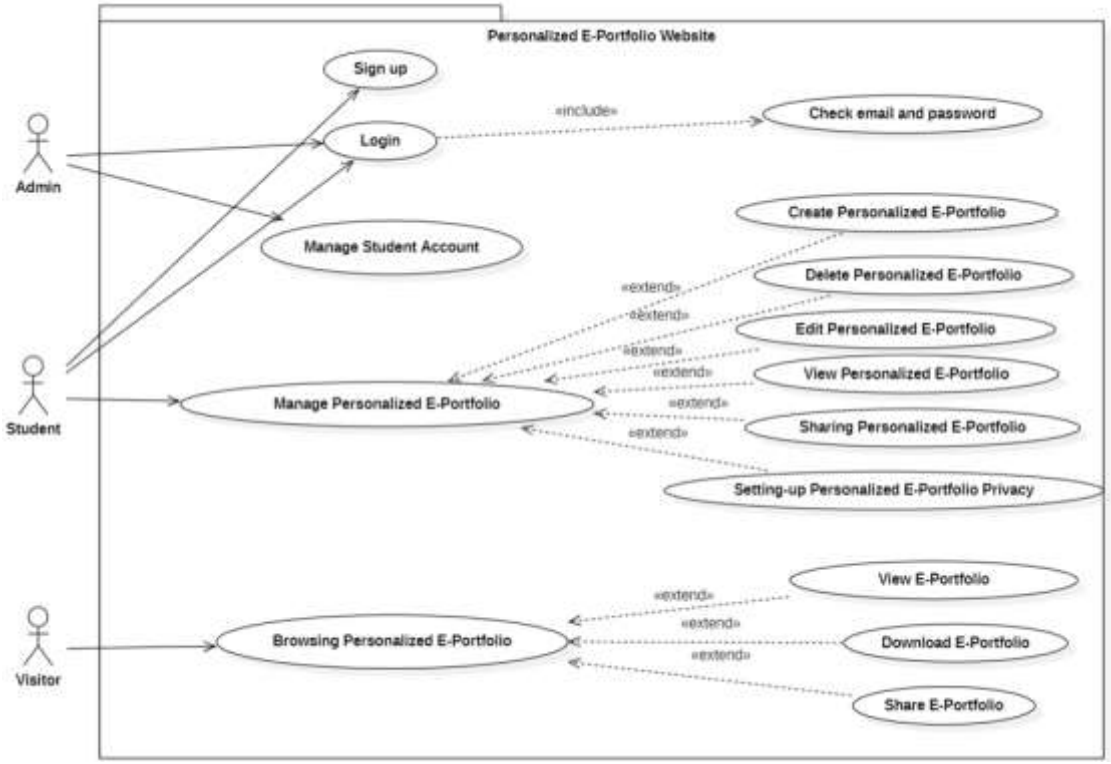

Figure 1. Use Case Diagram

The frontend design focuses on simplicity and accessibility, using clean layouts, intuitive navigation menus, and consistent design elements (colors, fonts, icons) across pages. Wireframes and prototypes were developed using Figma and PowerPoint, ensuring early visualization and iterative improvements based on feedback.

The backend is built using PHP for server-side scripting and phpMyAdmin for database management, ensuring data integrity and secure storage of user information and e-portfolio content. HTML, CSS, and JavaScript power the frontend, ensuring responsiveness across devices and browsers. Key design principles include:

a. Responsiveness: Ensuring a seamless experience on desktops, tablets, and smartphones.
b. Feedback Mechanisms: Clear success/failure prompts after each user action.
c. Minimal Learning Curve: Prioritizing simplicity in layout and interaction.
d. Scalability: Supporting future enhancements like additional themes, templates, or third-party integrations (e.g., social media sharing).

Discussion:

To evaluate the usability, functionality, and user satisfaction of the personalized e-portfolio, a structured usability testing process was conducted. The evaluation aimed to determine whether the system effectively met user needs, supported seamless interaction, and aligned with its intended purpose of helping students build and showcase their academic and professional profiles.

Prior to evaluation, participants were introduced to the system and tasked with completing five pre-defined assignments:
a) Account registration
b) Login and profile setup
c) Creating and editing a personalized e-portfolio
d) Sharing the e-portfolio link
e) Browsing and viewing other students' e-portfolios

Following the tasks, participants completed an online questionnaire administered via Google Forms. The questionnaire was adapted from the Website Analysis and Measurement Inventory (WAMMI), a validated instrument for assessing website usability across five core dimensions: Attractiveness, Controllability, Efficiency, Helpfulness, and Learnability. A total of 24 items were rated using a five-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree).

The participant pool consisted of 73.3% male and 26.7% female respondents. The majority (56.7%) were aged 22 to 25, while 33.3% fell within the 19 to 21 age range. Participants represented various academic semesters, predominantly from semester 6 (36.7%), followed by semester 5 (20.0%), semester 8 (16.7%), and semester 3 (13.3%). Notably, 63.3% of respondents had no prior experience using e-portfolio platforms, indicating that the app's usability was tested by both novice and experienced users.

The evaluation results demonstrated high satisfaction across all usability factors, as summarized in Table 1. These positive usability outcomes are consistent with prior findings that show e-portfolio adoption can improve students' practical knowledge and skills in domain-specific tasks. For example, Setyoningrum & Anistyasari (2023) reported measurable improvements in students' knowledge and hands-on skills after implementing an e-portfolio in a basic graphic design course, suggesting that usability gains may translate into tangible learning benefits.

Table 1. Evaluation Results

Usability Factor	Average Score	Positive Response Rate
Attractiveness	4.13	89.2%
Controllability	4.22	90.0%
Efficiency	4.17	90.0%
Helpfulness	4.15	84.2%
Learnability	4.47	90.8%

Learnability emerged as the highest-rated factor, with 90.8% of participants agreeing that the app's was easy to learn and navigate. Participants reported that learning to find their way around the website was intuitive, with an average score of 4.60 out of 5. This indicates the system's design effectively reduces cognitive load and supports a positive learning curve, even for first-time users.

Controllability and Efficiency also received strong ratings (both at 90.0%), with participants stating they could easily navigate the website, complete tasks efficiently, and locate desired features without confusion. Statements such as "I feel in control when using this website" and "I get what I expect when I click on things" were rated highly, affirming the system's user-friendly flow and responsiveness.

Attractiveness scored an average of 4.13, with 89.2% of participants finding the interface visually appealing. Positive feedback was received on the website's layout, font styles, and overall aesthetic, although some participants suggested further enhancement of visual design elements to create a more modern and engaging appearance.

Helpfulness scored 4.15 on average, with 84.2% of participants agreeing that the website provided logical information and useful features. While most participants found the system supportive in their e-portfolio tasks, some noted areas for improvement, such as providing more in-app guidance or tooltips for first-time users.

Implications:
The findings of this study have several implications for both practice and theory. For educators and higher education institutions, the personalized e-portfolio system demonstrates how user-centered and agile-driven software development can effectively enhance students' engagement in reflective learning and professional identity building. For practitioners in software engineering, the study provides an applied example of integrating usability testing into iterative development, ensuring that

end-user needs remain at the center of the process. The study also informs policy makers and academic administrators about the importance of providing adaptable digital platforms that align with students' evolving skills and employability requirements.

Research Contribution:
This study contributes to the growing body of knowledge on educational information systems and sustainable software engineering in three ways. First, it extends existing research on e-portfolio adoption by introducing a personalized and user-friendly platform that addresses common usability challenges. Second, it applies agile methodology in the design and evaluation of an educational technology, offering insights into its effectiveness for small-scale academic projects. Third, the empirical usability testing with IT students adds evidence on the system's capacity to support reflection, self-regulated learning, and professional readiness, thereby validating its practical and pedagogical value.

Limitations:
Despite the promising results, this study has several limitations. The evaluation was conducted with a relatively small sample size of 30 students from a single institution, which may limit the generalizability of the findings. The respondents were also limited to IT students, who may possess higher levels of digital literacy compared to students from other disciplines, potentially influencing usability outcomes. Furthermore, the evaluation focused primarily on usability dimensions, without measuring long-term impact on academic performance, employability, or professional development.

Suggestions:
Future research should expand the evaluation to include a larger and more diverse sample across multiple institutions to improve generalizability. Further testing with students from non-technical backgrounds could provide deeper insights into the system's accessibility and ease of adoption. Additionally, longitudinal studies are recommended to examine the sustained impact of personalized e-portfolios on students' learning trajectories and employability outcomes. From a technical perspective, the system could be enhanced by integrating advanced features such as AI-driven feedback, gamification elements, and interoperability with widely used learning management systems and professional networking platforms like LinkedIn.

CONCLUSION

The development and evaluation of the proposed personalized e-portfolio highlight its effectiveness as a dynamic and user-friendly platform for students to document and showcase their academic achievements, skills, and professional experiences. The usability evaluation, conducted with 30 students from Universiti Utara Malaysia, revealed consistently high satisfaction across key usability dimensions—learnability (90.8%), controllability (90.0%), efficiency (90.0%), attractiveness (89.2%), and helpfulness (84.2%). These findings affirm that the app successfully addresses the limitations of existing e-portfolio systems by offering an intuitive interface, responsive functionality, and a structured yet flexible space for students to manage their personal and professional growth.

Beyond usability, the platform offers significant benefits to students. The propose app empowers users to create a professional online presence by enabling them to organize, present, and share their learning artifacts in a visually appealing and accessible format. By supporting reflection, self-regulated learning, and personal branding, the system helps students stand out in competitive academic and professional environments. It also fosters a sense of ownership and accountability in learning, aligning with educational best practices that emphasize active, learner-centered engagement.

Despite these strengths, the evaluation also identified areas for future improvement. Participants expressed interest in having more customization options, such as design templates, color schemes, and font choices, to better align their portfolios with personal branding goals. Additionally, the inclusion of in-app guidance tools, like tutorials, tooltips, and onboarding walkthroughs, would support novice users and enhance the platform's accessibility. Expanding integration with external

platforms such as LinkedIn and other social media could also increase the visibility and reach of students' e-portfolios, promoting networking and professional opportunities.

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AUTHOR CONTRIBUTION STATEMENT

Muhammad Syamil Manaf carried out the literature review, system design, development of the personalized e-portfolio, data collection, and preparation of the initial manuscript. Wan Hussain Wan Ishak supervised the overall study, provided guidance on methodology and system validation, and refined the manuscript. Fadhilah Mat Yamin contributed to methodology consultation, supported data analysis, validated the findings, and assisted in editing and finalizing the manuscript.

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