MENTORVERSE: The Development and Assessment of a Cross-Platform Mentor Finder Using React JS and MongoDB

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Abstract

The purpose of this study was to investigate the design, development, and assessment of a cross-platform application called Mentorverse. The system was developed using React JS and MongoDB. The study aimed to describe the activities of the system development life cycle (SDLC). Additionally, it sought to determine the assessments made by Information Technology (IT) experts and end-users based on International Organization for Standardization (ISO) 25010. A developmental research design was employed, involving IT experts and end-users. The results indicated that the SDLC was an efficient and effective method for designing the system. Moreover, the system fulfilled its intended functions according to the assessment made by IT experts. It also met the quality of use standards for software from the perspectives of the end-users. In conclusion, Mentorverse was successfully developed using a software development model and received positive assessments regarding its technical qualities from IT experts and its usability from college students and professors as end-users. The findings demonstrated the system’s potential benefits, as it performed well in terms of technical aspects and usability. The researchers recommended utilizing the system to enhance learning outcomes and improve the skills and expertise of both mentees and mentors. They also suggested employing it as a strategy to enhance students’ skills. Additionally, future research related to this study should consider the findings presented here as a guiding reference.
Keywords: Cross-Platform, Developmental research, Mentorverse, MongoDB, NodeJS


Introduction

The relationship of mentoring involves two individuals who share common goals in professional and personal development. According to MindTools (2022), the mentor, typically an experienced individual, imparts their knowledge, experience, and advice to a mentee who possesses less experience. A skilled mentor assists their mentee in improving workplace productivity, acquiring new skills, enhancing self-confidence, and making informed decisions to foster long-term professional growth. The benefits of mentoring encompass the satisfaction gained from witnessing the growth of others, exposure to diverse perspectives from different generations and cultures, the development of technical, leadership, and interpersonal skills, and continuous exposure to fresh viewpoints. Moreover, TogetherPlatform (2022) emphasizes the role of apps in enhancing workplace mentoring programs by promoting connectivity and communication among mentors and mentees, thus unlocking a wide range of mentoring opportunities. With the global presence of over a billion app users, the integration of apps into mentoring programs has resulted in greater success in matching mentors and mentees and increased levels of engagement among employees. As stated by Benyon (2019), apps are widely recognized as the future of learning, driven by the popularity of mobile devices and desktop computers and the widespread adoption of e-learning, leading to a shift from traditional learning models to alternative approaches.

According to Corlett et al. (2005), the utilization of apps has emerged as a recognized and effective approach for enabling successful digital transformations in mentoring strategies. These apps now function as virtual teaching and tutoring environments, providing platforms to facilitate the academic, technological, and personal development of virtual students (Grund et al., 2017). By adopting this approach, educators transition into the role of facilitators, prioritizing the autonomy of learners in terms of time, space, learning style, rhythm, and methods (Grund & Gonzales, 2015; Grund et al., 2017). This collaborative effort between teachers, students, and institutions culminates in the creation of a virtual learning community. Consequently, integrating a mentoring strategy through the use of an app becomes an exceptional choice for both formal and informal training. Moreover, apps serve as an ideal platform for providing performance support, seamlessly integrated into learners' daily workflows (Luna, 2016). By ensuring the availability of these apps on learners' mobile devices or desktop computers, they are more likely to be utilized for accessing timely information and on-the-job support, thus enhancing the learning experience (Aretio, 2018).

According to Drouin et al. (2015), apps have become one of the most popular learning trends in the market, providing numerous benefits for mentoring strategies. These
benefits, as highlighted by Drouin et al. (2015), include increased accessibility for learners who seek on-the-go information, the capability for online and offline viewing, high popularity among Millennials, improved connection with mentors, the provision of accurate and timely information, and suitability for performance support. Recognizing the growing demand for mobile and desktop learning experiences, learning professionals are now dedicating more time to expanding their learning environments onto these platforms (Drouin et al., 2015). Moreover, mentors play a vital role not only in guiding subject mastery and facilitating the use of technology but also in encouraging students to develop confidence in managing their own learning. Virtual students often set high expectations for themselves and may feel overwhelmed by the challenges of balancing distance studies with multiple personal activities (Qian et al., 2016). In such situations, mentors can leverage their communication skills, along with customized techniques and resources, to motivate students, foster a sense of security, and instill the confidence necessary to achieve their goals.

There are various important aspects that are fulfilled through the use of a mentoring application. Firstly, the application facilitates the establishment of a virtual community by implementing strategies that encourage participants in the mentoring process to become advocates and collaborators in sharing knowledge. This not only fosters ongoing collaboration and knowledge-sharing beyond the initial mentor-mentee relationship but also ensures the sustainability of these communities, enabling further advancements in research within this field of knowledge. Secondly, mentoring apps effectively address the issue of isolation experienced by distance students, particularly when they encounter difficulties that are challenging to overcome without timely resolution. By facilitating a stronger connection between students, mentors, and peers, these apps create a sense of community and support, alleviating feelings of isolation. Lastly, mentoring apps assume a motivational role that complements students' efforts and perseverance. Leveraging technology, these apps provide platforms for interaction beyond mere knowledge exchange, offering continuous engagement, encouragement, and motivation to the students.

In conclusion, the utilization of mentoring apps in both formal and informal learning settings fosters continuous learning, collaboration, and support, as demonstrated by the cited authors. By capitalizing on the advantages offered by technology, mentoring apps establish virtual communities that encourage the exchange of knowledge, diminish feelings of isolation, and inspire students to persevere in their educational pursuits. Integrating mentoring strategies through apps not only enhances the overall mentoring experience but also empowers individuals to overcome obstacles and successfully attain their learning goals in an ever-evolving digital landscape.

**Statements of the Objectives**

The general objective of this study was to develop a cross-platform application that enabled individuals to connect with experienced mentors online, facilitating their professional growth.

Specifically, it sought to answer the following questions:

1. How may the Mentorverse be developed based on the stages of the System Development Life Cycle in terms of:
   1.1. Planning;
   1.2. Analysis and Design;
   1.3. Coding;
1.4. Testing; and
1.5. Maintenance?

2. How may the Mentorverse be assessed by IT expert based on ISO 25010 standards which include
   2.1. Functional Suitability;
   2.2. Reliability;
   2.3. Usability;
   2.4. Performance Efficiency;
   2.5. Compatibility;
   2.6. Security;
   2.7. Maintainability; and
   2.8. Portability;

3. How may the Mentorverse application be assessed by end-users as regards its:
   3.1. Functional Suitability;
   3.2. Reliability; and
   3.3. Usability;

**Materials and Methods**

The study utilized developmental research, which systematically studied the design, development, and evaluation of instructional programs, processes, and products to ensure internal consistency and effectiveness. The study of Olipas (2019), and Olipas and Esperon (2020) are some of the studies conducted in the past who used developmental research design.

Researchers conducted the study at the College of Information and Communications Technology of the Nueva Ecija University of Science and Technology. The respondents consisted of IT experts and selected students who the researchers purposefully chose based on specific criteria identified for this study. Table 1 displays the frequency and percentage distribution of the respondents.

<table>
<thead>
<tr>
<th>Type of Respondents</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT Experts</td>
<td>5</td>
<td>20.00%</td>
</tr>
<tr>
<td>End-Users</td>
<td>20</td>
<td>80.00%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>25</td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>

The researchers employed two sets of survey questionnaires to assess the technical aspects of the system based on ISO 25010 quality standards. The first set evaluated the system’s technical features, while the second set gathered feedback from end users to assess the system’s usage quality.
During the data gathering process, the researchers communicated the objectives of the study to the respondents, ensuring that their participation was voluntary. They obtained informed consent from the respondents and provided comprehensive explanations. The researchers prioritized maintaining the highest level of confidentiality and anonymity for the collected data. Moreover, the researchers strictly utilized the collected data solely for the study's purpose.

Results and Discussion

The Development of Mentorverse based on the phases of the System Development Life Cycle

The development of the system underwent five phases of the system development life cycle as follows.

A. Planning Phase

The main goal of this phase was to construct the system and build a sound strategy. During this phase, the researchers conducted a series of observations and interviews to develop a plan addressing the research problems. They developed a Gantt chart of activities to guide their progress. The figure below illustrates the schedule of activities undertaken by the researchers throughout the system development process.

![Figure 1. Gantt of Activities](image)

B. Analysis Phase

In this phase, the researchers gathered, understood, and documented the business requirements. The objective was to collect the necessary and relevant requirements essential for system development. The researchers also constructed several diagrams to analyze and gain a better understanding of the activities and processes involved in developing the system. They utilized process diagrams to graphically represent the processes that captured, manipulated, stored, and distributed information between the system and its environment. Furthermore, data flow diagrams were developed to illustrate the movement of data from different entities to various processes and storage locations. In addition, use-case diagrams were created to present the actors involved in the system and the scenarios that needed to be considered for optimal system functioning.
Figures 2 and 3 depict the data flow diagram and the use-case diagram utilized in this study.

Figure 2. Data Flow Diagram – Level 1
To gain a better understanding of the relationship among the entities involved in the developed system, the researchers took the initiative to develop the entity-relationship diagram. This diagram illustrates how each object relates to other objects and vice versa, based on various types of relationships. Figure 4 showcases the entity-relationship diagram utilized by the researchers in the developed system.
C. Coding Phase

In this phase, the researchers converted all the collected and analyzed information into actual implementation by writing codes. They accomplished this task using an Integrated Development Environment (IDE) such as Visual Studio Code. They utilized essential languages and tools like Javascript, ReactJS, and MongoDB in the development of the project.
D. Testing Phase

During the testing phase, the researchers verified the system's adherence to the intended functionalities defined in the analysis phase. It is crucial to conduct the coding and testing phases concurrently in order to promptly identify and resolve any potential errors. The researchers systematically tested the system under various test conditions, ensuring the proper functioning and absence of errors in every module. By employing detailed test conditions and utilizing various testing techniques, such as functionality testing, usability testing, interface testing, database testing, compatibility testing, performance testing, security testing, and crowd testing, the researchers successfully developed a high-quality system.

E. Implementation Phase

During the implementation phase, the researchers formulated a proposed implementation plan to serve as a foundation for future deployment. The implementation plan would guarantee the quality of the system by guiding the actual deployment process.

Assessment on the Technical Features of Mentorverse by IT Experts based on ISO 25010 Software Standards

The IT experts assessed the technical features of the system using the ISO 25010 software standards, which encompassed functional suitability, reliability, usability, performance efficiency, compatibility, maintainability, security, and portability. Table 2 displays the results of the assessment conducted by the IT experts.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Mean Rating</th>
<th>Verbal Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional Suitability</td>
<td>3.61</td>
<td>Highly Functional</td>
</tr>
<tr>
<td>Reliability</td>
<td>3.59</td>
<td>Highly Reliable</td>
</tr>
<tr>
<td>Usability</td>
<td>3.71</td>
<td>Highly Usable</td>
</tr>
<tr>
<td>Performance Efficiency</td>
<td>3.44</td>
<td>Highly Efficient</td>
</tr>
<tr>
<td>Compatibility</td>
<td>3.50</td>
<td>Highly Compatible</td>
</tr>
<tr>
<td>Maintainability</td>
<td>3.63</td>
<td>Highly Maintainable</td>
</tr>
<tr>
<td>Security</td>
<td>3.47</td>
<td>Highly Secured</td>
</tr>
<tr>
<td>Portability</td>
<td>3.72</td>
<td>Highly Portable</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3.58</strong></td>
<td><strong>Highly Acceptable</strong></td>
</tr>
</tbody>
</table>

Table 2 presents the results of the assessment conducted on the technical features of Mentorverse. The mean ratings for each criterion were calculated, providing an insight into the overall performance of the platform. According to the table, Mentorverse received high mean ratings in various criteria. In terms of functional suitability, the platform achieved a mean rating of 3.61, indicating that it is highly functional and meets the expected requirements. Similarly, Mentorverse was rated highly reliable (3.59), highly usable (3.71), highly efficient (3.44), highly compatible (3.50), highly maintainable (3.63), highly secure (3.47), and highly portable (3.72). These consistently high ratings suggest that Mentorverse performs exceptionally well across multiple technical aspects.

The results imply that Mentorverse excels in providing a technically sound and reliable platform for users. Its high functional suitability indicates that it meets the intended purposes and fulfills user expectations effectively. The platform's strong performance
in terms of usability, performance efficiency, compatibility, maintainability, security, and portability further enhance its overall appeal and user experience. These findings indicate that Mentorverse offers a robust and user-friendly environment for its users, ensuring a seamless and efficient experience.

The implications of these results are significant for Mentorverse and its stakeholders. The high ratings across various technical criteria highlight the platform's strength and competence in delivering a reliable and efficient learning environment. This can boost user confidence and satisfaction, leading to increased user adoption and retention. Additionally, the positive assessment results may attract new users and enhance the platform's reputation in the market. The emphasis on security and maintainability also reassures users about the safety and long-term viability of their data and the platform itself. These findings position Mentorverse as a highly acceptable and promising platform in the educational technology landscape, with the potential to drive positive outcomes for its users and stakeholders alike.

Assessment on the Quality of Using the Mentorverse by End-Users based on the Selected ISO 25010 Software Standards

The end-users assessed the quality of use of Mentorverse in terms of functional suitability, reliability, and usability. Table 3 illustrates the results of their assessment on the selected software standards.

<table>
<thead>
<tr>
<th>Criteria</th>
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<tbody>
<tr>
<td>Functional Suitability</td>
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<td>Highly Usable</td>
</tr>
<tr>
<td>Total</td>
<td>3.63</td>
<td>Highly Acceptable</td>
</tr>
</tbody>
</table>

The results of the assessment on the quality of using the Mentorverse revealed that the mean rating for functional suitability, reliability, and usability is 3.63, which corresponds to a verbal interpretation of "highly acceptable". Specifically, the mean rating for functional suitability, which pertains to the software's ability to meet user requirements, was 3.63, indicating that it was highly functional. Meanwhile, the mean rating for reliability, which refers to the software's ability to perform without errors, was also 3.63, indicating that it was highly reliable. Finally, the mean rating for usability, which pertains to the software's ease of use and user satisfaction, was 3.64, indicating that it was highly usable.

The results of the assessment suggest that the Mentorverse is highly functional, reliable, and usable, which can provide significant benefits to users. Based on the high ratings for functional suitability and reliability, users can expect that the software will effectively meet their requirements and operate without errors. Moreover, the high rating for usability suggests that users will find the software easy to use and navigate, which can improve their overall satisfaction with the product. The combination of these factors can make the Mentorverse a valuable tool for users in achieving their goals.

The results of the assessment have important implications for the development and use of software applications. By demonstrating the importance of functional suitability, reliability, and usability, the results highlight the need for developers to prioritize these factors in the development process. Moreover, the high ratings for these criteria suggest that users place a premium on these aspects of software quality, which can inform marketing strategies and user support efforts. Ultimately, the results of the
assessment can serve as a guide for improving software quality and enhancing user experiences.

**Conclusion and Recommendations**

The Mentorverse was created to address the needs and challenges associated with finding mentors. The study employed a developmental research method, which involved the systematic design, development, and evaluation of instructional programs and products. Following the seven steps of the system development life cycle (SDLC), the Mentorverse was meticulously crafted, encompassing planning, analysis and design, coding, testing, and maintenance stages. To gauge its effectiveness, the developed Mentorverse underwent assessment by IT experts, adhering to the International Organization for Standardization's (ISO) 25010 standards for software development. Notably, the assessment encompassed various criteria, including functional suitability, reliability, usability, performance efficiency, compatibility, security, maintainability, and portability. Additionally, the software was evaluated based on its functionality, reliability, and user-friendliness by college students and professors, who served as the end users in this study. As a result of these evaluations, the Mentorverse demonstrated satisfactory performance and successfully met the established standards and user expectations.

Based on the results of this study, the researchers offer several recommendations. First, the Mentorverse can be utilized to foster positive learning outcomes. Second, it can serve as a platform for enhancing the skills and expertise of both mentees and mentors. Additionally, the Mentorverse can be employed as a strategy to enhance technological proficiency. Lastly, future researchers can utilize the findings of this study as a guiding framework for further research in this area.

**Further Study**

For future studies, it is recommended to conduct longitudinal research to assess the long-term impact of utilizing the Mentorverse on learning outcomes and skill development. Additionally, exploring the effectiveness of different strategies for incorporating the Mentorverse into educational and professional contexts can provide valuable insights for maximizing its benefits.

**Acknowledgement**

The researchers express their gratitude to the respondents for actively participating in the conduct of this study.

**Conflict of Interests**

The researchers express no conflict of interest.
References


