AN INTERACTIVE AND AUTOMATED TIMESHEET MONITORING FOR THE OJT PROGRAM WITH QR CODE TECHNOLOGY

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Abstract

Integrating new solutions is essential in today's fast-changing technology environment to increase production and efficiency across various industries. The optimization of processes is essential for successful learning experiences in many fields, including education and professional growth. This research uses the power of QR Code technology to propose an Interactive and Automated Timesheet Monitoring System designed exclusively for On-the-Job Training (OJT) programs. Traditional time monitoring techniques in OJT programs sometimes have problems with efficiency, accuracy, and accessibility to real-time data. The approach that the researchers utilized in the study was to use QR Code technology to provide an automated and interactive platform to address these issues. Participants in the OJT receive personalized QR Codes that are connected to their accounts. Mobile devices read these codes, immediately reporting their attendance and work hours.

Keywords: *Automated, Interactive, OJT Program, QR Code Technology, Timesheet Monitoring*

INTRODUCTION

Technology has become a necessity in people's daily lives, from students to parents, institutes, and organizations. The goal of technology to enhance and make lives easier has been a key factor in the innovations and improvements made with today's current technology as well as for future generations. Varying improvements include using traditional methods and utilizing varying technologies such as biometrics, RFIDs, and the more widely known Quick Response Code or QR code. QR codes have become mainstream due to their much more flexible capabilities than traditional barcodes. They can hold more data and are more secure. This also makes the users streamlined towards the information stored in the QR code. This allows for a much more efficient and quick way to open or access certain information.

QR codes can be utilized in a wide variety of use cases due to their nature of being able to store relatively large amounts of information in a compact form factor. This allows for

secure and fast authentication that can be applied especially to students even outside the classroom. Such examples can be those in on-the-job training programs, which can greatly benefit from the technology's increased security that can mitigate false registrations.

On-the-job training programs (OJT) are essential in developing the skills and knowledge of the trainees/students in various industries. However, tracking the attendance and time spent by trainees/students in training can be burdensome for employers and supervisors. To solve this problem, an interactive and automated timesheet monitoring platform using QR code technology can be developed to optimize the management of OJT programs. This platform can provide accurate and reliable time sheets and facilitate tracking the trainee's/student's attendance during training. The use of QR code technology can also increase the efficiency of attendance monitoring and record keeping. Based on the series of tests, the system can provide easier and more convenient recording and verification of

attendance by means of the QR Code scanner (Casunuran et al., 2020).

According to previous research by (Yelve et al., 2023), the manual method of monitoring attendance includes punctured locks or another manual system. There is evidence that there are related problems, such as lost time, false attendance, and loss of attendance sheets, making the system inefficient and ineffective. However, such a method requires constant human supervision. Fortunately, the evolution of technology has led to the introduction of an automated attendance system with much better results.

Statement of the Problem

The existing manual approach of monitoring time sheets for student training programs is inefficient and prone to errors, which results in inaccurate and unreliable records of the student's rendered hours. The main goal of this study is to develop an interactive and automated platform that simplifies the recording, saving, and monitoring of trainees' time sheets of rendered hours while enhancing their reliability and accuracy. The platform will also make it easier for the trainees to keep track of their On-the-job training attendance. Specifically, the study aims to answer the following:

1. The current system for logging rendered hours for students lacks efficiency, posing challenges in accurately assessing their progress
2. Difficulty for trainees/students to track attendance and rendered hours.
3. Difficulty in Real-time monitoring of trainees/student's attendance
4. Inaccurate and time-consuming to manually monitor attendance during the students

Objectives of the Study

The study's main objective is to design and develop an interactive and automated platform that makes it easier to track and create time sheets for on-the-job trainees.

1. To improve the ease of logging of rendered hours for students
2. To provide a platform that allows for easier and more accurate tracking of rendered hours by students in their training
3. To Implement real-time monitoring for OJT students to track their progress in meeting required hours and learning objectives
4. To mitigate the discrepancies that may be present with manual tracking hours

Scope of the Study

This study focuses on fourth-year City College of Angeles ICSLIS students who are participating in On-the-Job Training programs. The main goal is to develop and implement an automated, interactive timesheet tracking platform with QR code technology specially designed for off-the-job training programs. The research explores architectural design, system implementation, accuracy and user-friendliness assessment. Administrators will be able to effectively track OJT participants using the suggested system's simple online user interface, enabling users to effortlessly log their hours. The project focuses on creating and deploying a web-based real-time monitoring system specifically designed for on-the-job training (OJT) trainees.

Significance of the Study

1. **To the OJT Coordinator** - The automated timesheet monitoring platform will improve the accuracy and reliability of trainee/student records, thereby reducing the risk of errors and

the administrative burden of manually monitoring time sheets.

2. **To the Students/Trainees** - The platform will provide a centralized platform for recording and tracking attendance and hours of work, which will facilitate tracking the progress of trainees and students.

3. **To the Instructors** - The study may serve as evidence for a system that can be implemented not only for trainee monitoring but as well as within the classroom

4. **To the Schools** - The study offers a functioning system that can be implemented within their academic organization for future implementation.

5. **To the Researchers** - The researchers will gain more knowledge and skills in building useful programs.

6. **To the Future – Researchers** - This study references automated timesheet systems and QR code tech in education. Use it as a starting point for your ideas and improvements. The researchers hope it inspires the development of a mobile app for enhanced timesheet monitoring.

Conceptual Framework

Figure 1
Conceptual Framework
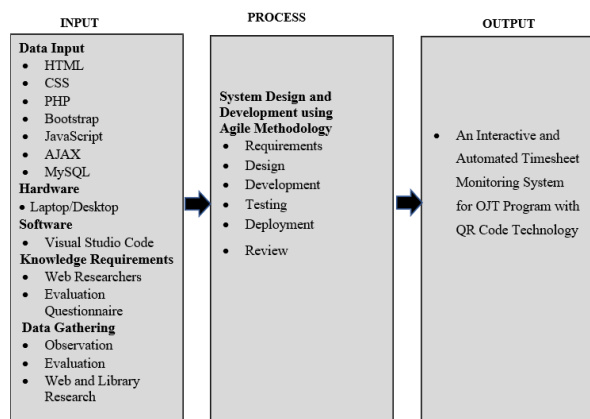
The input-process-output model shows the steps flow throughout the proposed system's research and development. The model provides insight into the tools, data, and equipment used for the development that all work together to form a cohesive research and system whilst providing an understanding of each part of the research. The Input segment presents us with the language, program, and hardware that the researchers have utilized. The Process section shows the development process, which includes the methods of development and the trial phase of the system, allowing for refining and debugging of the system. The output then shows the final product, including its functions and the system as a whole.

METHODOLOGY

The following methods will be employed to accomplish the objectives of this study. The research design is the cornerstone of this investigation, while the system development methodology is central to creating and implementing the Interactive and Automated TimeSheet Monitoring System. A descriptive research approach will be employed to conduct this study. Descriptive research observes, records, and analyzes phenomena without manipulating variables. This approach is particularly suitable for understanding current affairs and exploring participants' experiences and perceptions regarding the Interactive and Automated TimeSheet Monitoring System.

Algorithm

Figure 2

Flowchart for Time in and time out recording and retrieving Algorithm
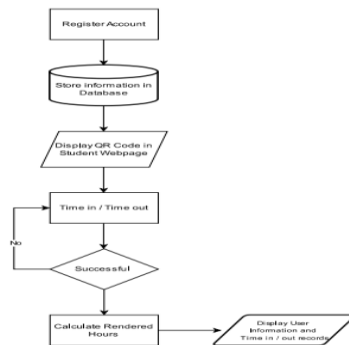
This QR code-based attendance system for On-the-Job Training (OJT) students starts by registering an account for OJT students. Next, the system will generate unique QR codes containing unique identification data from each student account. When students arrive or leave, they will time in or time out their respective QR codes in the system, denoting their 'Time In' and 'Time Out.' Upon scanning, the system captures the QR code data, extracting the necessary information encoded within. This information, including the student's identification data and timestamps for entry and exit, gets stored in a MySQL database. The database's tables are structured to manage time-in, time-out, student identification, and other relevant details. The system is designed to perform database management tasks, facilitating the insertion of records into the database whenever students time in or time out. Furthermore, it enables retrieving stored information and presents it in a tabular format on a web page for easy access and viewing.

Research Design

The descriptive technique was chosen as the study's research methodology because the researcher's objective is to identify and evaluate the value of implementing the recommended system for participants and the community they represent.

The researchers obtained data from current and future system users by employing sampling strategies, surveys, and questionnaires. The findings were presented numerically to facilitate quick comprehension of the data quantities acquired to project the service's future and implement the necessary improvements.

Participants

According to research methodologies outlined by experts such as (Shukla, 2020), the selection and composition of participants are crucial factors determining the validity and reliability of a study. In the conducted research, the researchers have carefully selected their participants to ensure a diverse and knowledgeable sample. The primary focus of this study will be fourth-year ICLIS students at City College of Angeles. These students represent a crucial demographic in the final stages of their academic journey. They have acquired substantial knowledge and practical skills in various areas of computing, making them well-equipped to provide valuable insights into the Interactive and Automated Timesheet Monitoring System.

Additionally, the conductors of this research have gained connections with 3 IT experts who specialize in various aspects of information technology. With their experience and expertise, these experts bring a unique perspective to the study. Their insights will enrich the understanding of the technical aspects of the Interactive and Automated Timesheet Monitoring System, ensuring a comprehensive analysis. This individual holds a pivotal role in program coordination and management. Their perspective is invaluable as it provides a holistic view of how the Interactive and Automated Timesheet Monitoring System integrates into the larger framework of OJT program management. There were 134 participants, including 3 IT

professionals and 131 fourth-year ICSLIS students. This diverse and knowledgeable participant group ensures a thorough exploration of the Interactive and Automated Timesheet Monitoring System from various angles, enhancing the depth and reliability of the researchers' findings.

In this study, the sampling technique employed is Purposive Sampling. Purposive sampling is a deliberate and selective approach where participants are chosen based on specific criteria deemed crucial to the research objectives. For this investigation into 'An Interactive and Automated TimeSheet Monitoring for OJT Program with QR Code-Technology,' participants will be purposefully selected to include individuals actively engaged in the OJT program, technology adoption experts, supervisors or coordinators overseeing OJT initiatives, users of timesheet systems, and IT professionals with relevant expertise. This targeted approach ensures that the chosen participants possess the necessary insights and experiences to provide valuable perspectives on the proposed QR code-based timesheet monitoring system. Purposive sampling allows for a focused and strategic selection process, aligning with the specific goals of the research. This method is particularly beneficial when seeking participants with in-depth knowledge and relevance to the study's objectives.

Procedure

The data was gathered through the following procedures:

Observation: Observed the current OJT program's timesheet monitoring process in action to better understand the workflow and identify areas for improvement. Noted any bottlenecks, inaccuracies, or inefficiencies in the manual process.

1. **Evaluation:** Utilized ISO 25010 criteria for evaluating software product quality characteristics to assess the proposed time sheet monitoring system:

   - **Functionality:** Assessed the system's ability to accurately track and record OJT participants' attendance and work hours, generate reports, and manage various scenarios such as leave of absence.
   - **Reliability:** Ensured that the system operates reliably, minimizing errors and providing consistent results.
   - **Usability:** Designed an intuitive, user-friendly interface for easy navigation and efficient data entry.
   - **Efficiency:** Optimized the system's performance to handle many OJT participants and process data quickly.
   - **Maintainability:** Developed the system modular and extensible to facilitate future enhancements and maintenance.

2. **Web and Library Research**: Conducted extensive research on QR code technology, exploring its applications and benefits in various industries. Reviewed literature on time sheet monitoring systems and related technologies to gather insights and best practices for implementing an automated system. Studied relevant research papers, articles, and books on OJT programs, attendance tracking, and employee time management.

Data Analysis

The analysis presented below is derived from the outcomes obtained through implementing an interactive and automated timesheet monitoring system for an On-the-Job Training (OJT) program. This system leverages QR code technology to track and log OJT participants' attendance and work hours. The

primary objective of this analysis is to interpret the collected data, offering insights into the OJT program's effectiveness and the participants' experiences.

Likert Scale Analysis: The Likert scale, a widely used method for measuring respondents' attitudes, perceptions, or experiences, will be utilized. This scale typically involves multiple statements or questions, with respondents rating their agreement or disagreement numerically. In the analysis performed by the investigators, the Likert scale will assess OJT program participants' perceptions or satisfaction levels. The scale will encompass statements related to various aspects of the program, including training quality, mentorship, workplace environment, and overall experience.

1. **Likert Scale:** Likert Scale questions are among the most frequently employed methodologies in public opinion research. They are instrumental in analyzing individuals' viewpoints by gauging their degrees of agreement with a set of questions.

2. **Frequency Distribution:** Frequency distributions, as descriptive statistics, furnish condensed and insightful data sets (Allen, The SAGE Encyclopedia of Communication Research Methods, 2019). This distribution provides categorical information on the number of participants. Researchers utilized it to analyze and characterize the frequency distribution of the system evaluation.

3. **Arithmetic Mean:** The arithmetic mean, a central tendency metric, characterizes a specific input value that is more "common" or indicative of a data collection (Allen, The SAGE Encyclopedia of Communication Research Methods, 2019 Often referred to as the "total" or simply the "mean," it is the numerical average of all values in the data. Researchers

employed it to calculate the system evaluation per categorization and overall total.

Arithmetic Mean = s / n
Where: s = sum of all variables
　　　　n = number of variables in the data set

Descriptive Rating Scale: The descriptive rating scale carefully explains each numerical value for respondents' comprehension. As depicted in Table 1, researchers used it to convert quantitative results into qualitative data.

Table 1
Scale for Interpreting the Evaluation Result.

Numerical Rating	Description
4.20-5.00	Excellent
3.40-4.19	Very Good
2.60-3.39	Good
1.80-2.59	Fair
1.00-1.79	Poor

RESULTS

System / Application Output

The proposed system contains various modules, providing an interactive interface for the users, coordinators, and trainees alike. Such modules include a sign-up interface for the two different roles in the system. This allows the system to categorize and identify trainees from coordinators. And a login page with the credentials that were used during the sign-up process. The students are given access to a general dashboard that shows fellow trainees who have clocked in their hours and announcements done by the coordinators. The trainees are also given a page with their time in and time out interface, allowing them to record rendered training hours and a copy of their records that contain their total hours rendered and remaining time. Within their

presented pages, the trainees are also provided a record of their full attendance from their starting date up to the current date. The system also provides contact features with other students and the coordinators through the messaging page. The coordinators are also provided with closely similar pages; however, they are given additional access through the announcements dashboard to post and remove announcements to be disseminated to the trainees. The coordinator is also capable of overseeing trainee attendance and rendered hours. They will be the only ones with access to the records of all trainees categorized by their sections upon sign-up for ease of access and navigation.

Along with this, the coordinators are also capable of modifying, deleting, and updating records as needed in the case that a student needs some changes to their recorded hours. These copies of records can further be filtered to present data for a specific date. The messaging page is also given to communicate with the trainees and other coordinators handling their respective groups of trainees. The system provides centralized access to student records and means of communication through the messaging features and the announcement dashboard.

EVALUATION RESULTS

In the evaluation results, the content in Tables 2 and 3 delves into the evaluations carried out by participants, which include three IT experts. The data was gathered using ISO-25010 as a survey instrument. The study involved 131 non-IT experts and three IT experts, totaling 134 respondents.

Table 2
Evaluation Results of IT Experts

Criteria	Mean	Descriptive Rating
Functional Suitability	4.33	Excellent
Performance Efficiency	4.00	Very Good
Compatibility	4.25	Excellent
Usability	4.00	Very Good
Reliability	4.17	Very Good
Security	4.13	Very Good
Maintainability	4.13	Very Good
Portability	4.22	Excellent
Overall Mean	4.03	Very Good

Table 2 presents the results of the evaluation completed by three I.T. experts. The overall mean of the evaluation scores for the system was 4.03, which corresponds to very good. This suggests that the system meets the needs of the user, is reliable, and is easy to use.

The system's functional suitability achieved a score of 4.33, reflecting an excellent rating. This indicates that the system has successfully met its main objective, characterized by its completeness and accuracy.

The performance efficiency was rated 4.00, indicating a very good level. This score clearly shows that the system has achieved its main objective, as seen through its operational behavior, resource efficiency, and capacity.

The compatibility score of 4.25 is regarded as excellent, indicating that the system has successfully achieved its main objective. This success is further evidenced by its suitability, ease of learning, functionality, protection against user errors, visual appeal, and accessibility.

Usability received a rating of 4.00, which is regarded as very good. This indicates that both users and evaluators found the system to be easy to learn and use.

The system's reliability performance received a score of 4.17, indicating a very good outcome. This result shows that the system has successfully achieved its main objective, characterized by its maturity, availability, and fault tolerance.

The security characteristics of software include confidentiality, integrity, accountability, and authenticity. This attribute was rated 4.13, which is deemed very good.

The system maintainability function earned a score of 4.13, which is regarded as very good. Indicators of system maintainability include modularity, reusability, analyzability, modifiability, and testability.

In the ranking, Functional Sustainability has the highest rating of 4.33. Followed by Compatibility with 4.25, Portability with 4.22, Reliability with 4.17, Security and Maintainability with 4.13, and getting the lowest Performance Efficiency and Usability with a 4.00 rating. Overall, the system performs well within the parameters and achieves the goals and expectations.

Table 3
Evaluation Results of Non-I.T. Experts

Criteria	Mean	Descriptive Rating
Functional Suitability	4.57	Excellent
Performance Efficiency	4.53	Excellent
Usability	4.53	Very Good
Reliability	4.54	Excellent
Overall Mean	4.54	Excellent

The researchers brought the system to potential users and trainees for evaluation and was received positively and was evaluated highly by the non-IT experts.

Table 7 presents the results of the evaluation completed by 99 respondents. ICSLIS 4th year Students. The overall mean of the evaluation scores for the system was 4.54, which corresponds to excellent. This suggests that the system meets the needs of the user, is reliable, and is easy to use.

The system's functional suitability received a score of 4.57, which is considered excellent. This proves that the system has achieved its main objectives, which is further indicated by its appropriateness, accuracy, and completeness.

Performance efficiency has received a score of 4.53, which is considered excellent. Based on the system's capability, resource efficiency, and operational behavior, it is evident that the main objective has been achieved.

Usability was given a 4.53 rating, which is considered excellent. This indicates that regardless of their prior computers and system-related experience, both users and evaluators found the system to be easily learnable and user-friendly.

The system's reliability performance was scored 4.54, which is an excellent result. This indicates that the system has been successfully completed.

The evaluation scores show the system functions well and aligned with expectations within its advertised use-case for end-users. Across all users that have evaluated the system, the scores show the system performs well and is intuitive enough for future trainees to find the system effective and very usable.

DISCUSSION

The proposed system has been accepted and has gathered positive reviews based on the data gathered from the survey and evaluation conducted from a user perspective. The insights of IT experts were also taken into consideration, and the system has received positive feedback along with some tweaks to ensure the system functions as intended. The

mentioned system specifications referred to the specifications of the devices that the researchers used for development, implementation, and testing. The researchers find it important to note that the specifications should be taken with a grain of salt as the system can run on lower-tier hardware.

Summary of Findings

The proposed system has been accepted and has gathered positive reviews based on the data gathered from the survey and evaluation conducted from a user perspective. The insights of IT experts were also taken into consideration, and the system has received positive feedback along with some tweaks to ensure the system functions as intended. The mentioned system specifications referred to the specifications of the devices that the researchers used for development, implementation, and testing. The researchers find it important to note that the specifications should be taken with a grain of salt as the system can run on lower-tier hardware.

Conclusions

In conclusion, in the capstone project, the researchers have developed a system that allowed trainees, administrators, and/or coordinators to have a faster and easier method of logging rendered hours through a web-based platform that accurately tracks rendered and remaining hours for student trainees. This information is tracked through records in real-time, which can be viewed through a dashboard that also shows the students who have logged in and are in their training. Tracking of rendered time has also been more secure and accurate through the automated calculation of time, which helps mitigate the discrepancies and inaccuracies present with manual tracking.

Recommendations

The system remains accessible only through a web browser, but the researchers are open to having a dedicated standalone application that further improves the goal of making an easier and faster system for logging hours for student trainees.

The researchers also recommend an improved User Interface design to create a more pleasant and user-friendly interface that makes the website easier to navigate and use with all devices.

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