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User Acceptance of Online Attendance Application Using Barcode Scanner

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Abstract

Attendance needs to be well recorded to meet the subject requirements and ensure the active participation of students. Appropriate record-keeping is essential for assessing student performance adequately. There were more mistakes in larger classes because recording attendance by hand with a pen and paper was time-consuming and prone to human error. This paper's objective is to investigate the acceptance level for mobile application barcode attendance for the University of Buraimi (UoB) students. Educators will not have to bother themselves with the attendance-taking process because the application systematizes this procedure, relieving educators of manual work. The research methodology employed in this study outlines the procedures of the Design Science Research (DSR) methodology. The DSR methodology comprises five essential steps: problem awareness, suggestion, development, evaluation, and conclusion. The results showed how many respondents agreed or disagreed. Additionally, ten students from various UOB departments answered a questionnaire similar to those in the previous survey, aiming to gauge their usability and acceptance of the attendance app. This study concludes that most students accepted the use of the mobile application barcode attendance at the University of Buraimi. Students connect easily to the mobile application, identify the current class, and scan a code provided by the teacher's side, bypassing the built-in camera and automatically registering student attendance.

1. Introduction

Speaking of the dynamic environment in educational technology, the evolution of new concepts that break through previous paradigms is evident, and one such innovation is barcode technology, an observation-centered innovation aimed at addressing the challenge of attendance monitoring within academic institutions(Elaskari et al., 2021). The target of this study is barcode technology at Buraimi University (UoB), which has been applying it at check-in and receiving the students' acceptance. Compared to manual attendance recording through logbooks or desktop applications, the traditional method has some limitations regarding ease, retrievability, and the provision of real-time data. Recognizing this handicap, using barcode technology provides an alternative that might radically change how attendance tracking is done within academic environments(AlSideiri et al., 2022). This research study will focus on the feasibility and suitability of a barcode-attended facility for the University of Buraimi (UoB). The research goes beyond technical implementation. The goal is to understand how students receive and interact with this learning approach, knowing that acceptance is essential to successful integration into everyday university operations.

This study adds important new information to the ongoing discussion about how technology can improve all parts of education by looking more closely at the effects, difficulties, and benefits of using barcodes to keep track of

attendance(Burbules et al., 2020). The results are likely to shed light on the emerging tendency of students at UoB to use barcodes in terms of how far they match their needs and expectations and their suitability for broader adoption of academic attendance tracking. However, recording students' attendance is irrefutable, regardless of the current learning environment. This practice provides conditioning and a tool to promote students' appearance and calculate class participation. One of the most important things that should be considered in educational institutions is the efficient management of student information(Vasilev et al., 2020).

As manual attendance recording evolved, the verbal and logbooks were later modernized to desktop applications but prohibited access and portability factors(Tagacay & Panes, 2024). With these limitations in mind, web-based applications were designed to stroll in the territory but always require an online connection. Mobile telephone and smartphone applications have become the solution, allowing users to install them on their mobile devices(*Technology Enhancement Learning Reflection on Improving Students&...: Ingenta Connect*, n.d.). It allows updating attendance in the local subscriber device database through these terminals, which connect via a data channel to the server where attendance information is stored. This paper discusses a Java-based attendance mobile application that makes it easy to record student attendance details efficiently(*Online Student Attendance System Using Android - IOPscience*, n.d.).

This distance learning application engages the students in the attendance process, contrary to the conventional methodology where teachers read names from a registration sheet(Kuechler & Vaishnavi, 2011). It was created specifically for the al Buraimi University College (BUC), and we applied it to the University of Buraimi (UoB) for scientific research purposes only(Shannaq et al., n.d.)(Shannaq & Al-Azzawi, 2020). It is not uncommon that existing research cannot provide a comprehensive evaluation of the numerous functionalities and features integrated into mobile applications and the multidimensional impact on the educational journey that students undertake. This work aims to cover the mentioned gap of students who are not mobile application users at UOB by comprehensively analyzing the influence of mobile applications and their implications on the overall educational ecosystem of the students at UOB.

Beyond that, the cross between mobile apps targeting the attendance of students and its possible impact on the time-saving duration of the registration process remains understudied. Determining whether the application of mobile technology for registration purposes has a cause-and-effect relationship with the overall time taken for the registration is pertinent for creating an efficient administrative procedure. At present, a proper conceptual formulation of this specific relationship is to fill the gap in the literature. Thus, the need for focused research to address this issue cannot be overemphasized. Consequently, this paves the way for future discoveries about utilizing contemporary technical resources in the educational setting at UoB.

In this research, two research questions were framed:

RQ1- Do mobile applications enhance higher education students' learning and teaching experience at UOB?

RQ2 - Does the students' participation in the attendance registration decrease the duration of the student's registration process?

The subsequent sections will discuss the factors that determine UoB students' acceptance of online attendance application using barcode scanners in Oman which are elaborated in the above background. Then, a thorough literature review will follow the study. It will look at the existing studies and theories that touch on tech acceptance, use behavior and the adoption of the attendance tracking system in educational settings.

Then, the section of methodology will describe the research design whereby the sampling strategy, data collection methods, and the analytical techniques of the study are outlined. This will be preceded by a presentation and analysis of the research results to be able to trace user acceptance, usefulness, ease of use, and UoB students' satisfaction with the application for online attendance. The implications of findings will also be assessed critically through discussing possible connections with theoretical frameworks as well as practical considerations related to the advancement of such systems in academic institutions. Furthermore, any limitations related with the study will be recognized, and the possibilities for future research will also be covered. At last, the final part of the conclusion section will show the key findings that were covered, ensure their value, while at the same time provide recommendations to UoB and other institutions on the improvement of the implementation and user acceptance of online attendance app.

2. RESEARCH METHODS

The research methodology employed in this study draws inspiration from Vaishnavi and Keuchler (Kuechler & Vaishnavi, 2011), who outline the procedures of the Design Science Research (DSR) methodology. The DSR methodology comprises five essential steps derived from the work of Takeda, Veerkamp, Tomiyama, and Yoshikawa(López-Poveda et al., 2011). These steps, illustrated in Figure 1, highlight the problem-solving nature inherent in DSR. The development and evaluation phases can be conducted concurrently, although a sequential order is recommended. The development of the mobile application prototype concentrated on a number of design criteria and regulations formulated after a review of the existing literature and consultations with the stakeholders, taking into account the diversity of the needs and preferences of the target users - the University of Buraimi (UoB) students in Oman. The specific design criteria and requirements included:

1. User-Friendly Interface: An interface that is easy to use and well-programmed should be provided, taking into account the varied levels of technological proficiency.

2. Compatibility: The application needs to support a wide range of types of mobile devices used at UoB providing accessibility and usability.

3. Attendance Tracking Functionality: The main function of the app is to ensure tracking of attendance, which is timely and accurate. As a result, the prototype should have such characteristics as barcode reading feature, direct communication with the university's database and automatic lectures attendance recording.

4. Reliability and Stability: It should show a good behavior in various operations modes being really stable and secure against the malfunctioning of the system or the loss of any data.

5. Data Security: Protecting student data must be the foremost issue. The prototype must implement strong encryption protocols and follow the regulations of data protection.

6. Customization and Flexibility: The app needs to be tailored for each course to consider the different respective course structures, attendance policies and academic departments.

7. Feedback Mechanism: Ensuring an integrated feedback system where users can give constructive suggestions, report mistakes and offer recommendations for further enhancement is vital for a continuous evaluation and engagement of users.

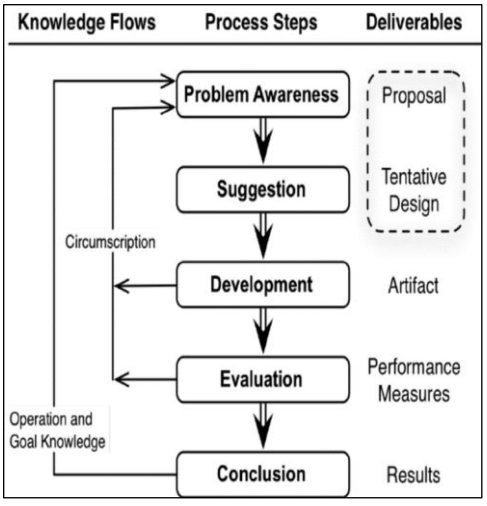

Figure 1. Research Methodology Design.

The initial step in this methodology is problem awareness. In the context discussed earlier, the time-consuming process of taking attendance in classes, particularly those with a larger number of students, serves as a focal point for problem identification. The literature review indicates that potential design solutions, such as artifacts, have been suggested (Step 2). Step 3 then involves creating a mobile application to track attendance to address the identified issue. Once the prototype

is constructed, the next step involves its evaluation against predefined criteria (Step 4). New questions may arise throughout the iterative development and evaluation process, prompting a re-formulation of the problem and leading to further iterations (Step 5). This iterative nature of the methodology ensures that the developed solution is refined and optimized based on real-world feedback and evolving requirements.

2.1 Collected Information

The data was gathered through the utilization of the prevailing attendance systems employed at UOB, in addition to employing literature review methodologies. The procedure for documenting attendance at UOB is as follows: Initially, the teacher accesses the college website and then proceeds to authenticate by entering their username and password. Following this, the instructor views the timetable. Subsequently, he will access the attendance page and designate the specific part for which he intends to record attendance. He will then proceed to announce the names of each student verbally. The student not currently in attendance has a mark beside his name indicating his absence.

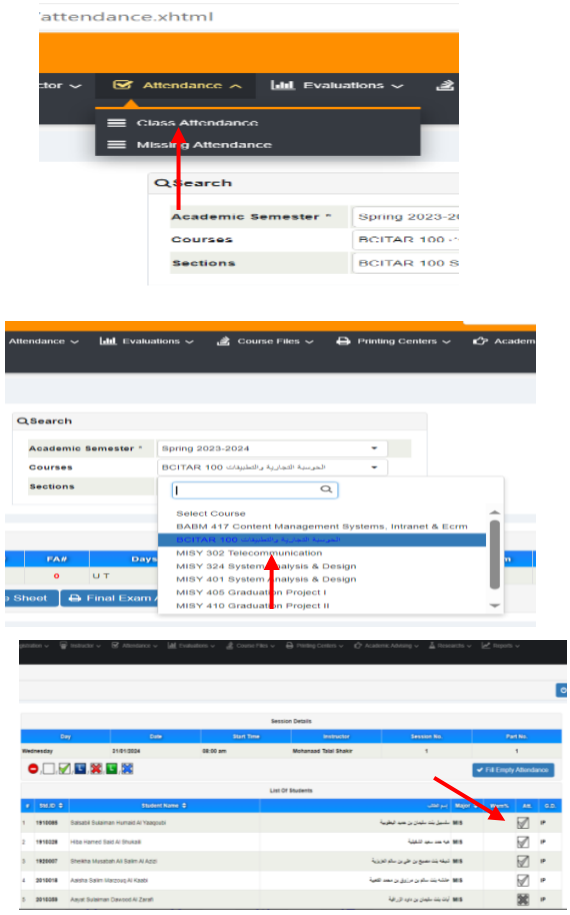

Figure 2. Steps of doing the traditional attendance in UOB SIS.

The application was developed and deployed in many locations by a Buraimi University College (BUC) research team, in which I participated alongside Dr. Abir AlSideiri (AlSideiri et al., 2022). The utilization of barcodes as a unique identifier in the attendance application for students shown its efficacy, prompting me to explore its implementation in a different setting. The ownership of the application lies with al Buraimi University College (BUC). The purpose of using this application in the study is to scientifically showcase the students' acceptance of this contemporary approach to tracking their attendance. The device used to appraise the utility of Attend by Cam is a mobile application that detects elements through which UOB students, test samples, and a lecturer for two different work-group courses are further identified. Furthermore, the research

has a questionnaire for students through which the study pieces are carried out after testing the application to address these research questions. Being a questionnaire, the questionnaire involves inquiries applicable to the student's characterization of the effects of the mobile app upon learning. Also, it touches on the perception by which the lecturer appreciates efficiency in simplification or streamlining the registration process. The conclusions of this study will offer valuable productive information regarding the potential advantages that mobile applications offer to higher education and their impacts on student engagement as well as administrative effectiveness. Thus, this study is interested in testing the following hypotheses:

H1: The greater ease of use (PE) positively affects the perceived usefulness (PU) of Barcode scanning application.

H2: The usage behavioral intention (BI) of the barcode scanning application is positively affected by perceived ease of use (PE).

H3: Usefulness (PU) is perceived as positive by people, which affects their use a technology (AU). Barcode scanning application.

H4: the behavioral intention (BI) to use an increasing the use (AU) of the Barcode scanning.

2.2 System Implementation

This section provides a concise overview of the mobile application's development and outlines the research questions defined in this paragraph.

For the student population:

1) Deployment: Students must install the software on their mobile devices.

2) Authentication: To access the application, the initial process entails the sequential verification of students' login credentials, specifically their username and password (College ID).

3) Customized Page: After verifying their identity, the students will be directed to their individualized homepage, where they may access their course-specific schedule for the current semester, which includes information about various subjects.

4) Class Selection: After reviewing their itinerary, students can choose a particular class to obtain further information, such as the specific opening time during the day and the assigned instructor.

5) Attendance Recording: Once a class is chosen in the app, the student's device will be automatically activated to utilize the camera.

6) Code Scanning: Simultaneously, the professor will present a certain barcode, and students must scan this code using the camera function on their mobile phones (refer to Figure 3).

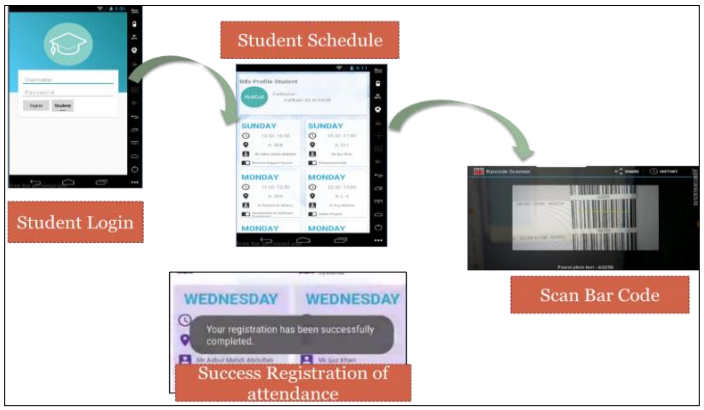

Figure 3. Steps of students interfaces to follow when registering their attendance.

For Instructure:

1) Code Display: The second phase entails the teacher presenting the class bar code.
2) Student Scanning: Upon opening the application, students will be given a barcode to scan using the cameras on their mobile devices.

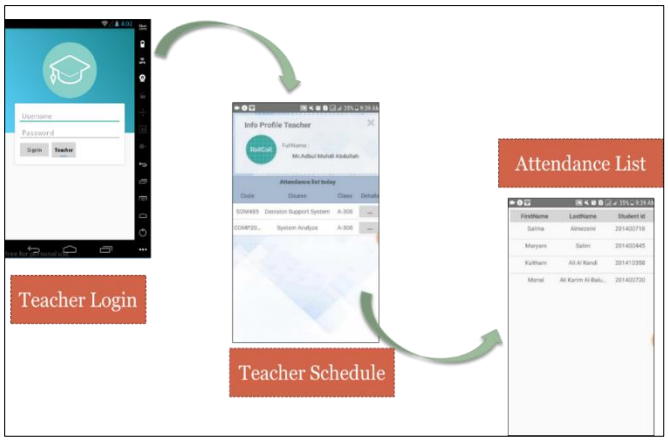

Figure 4. Steps of students interfaces to follow when checking the attendance

2.3 Descriptive Statistics

In order to acquire this information, the study's authors created a questionnaire to assess users' opinions on the usability of a mobile application built for scanning attendance and evaluating potential clients, including students and faculty members. The paper proposes a method for tracking student attendance by suggesting barcode scanning using smartphone mobile applications instead of the conventional method of signing in at the office. This study examines three crucial factors in assessing the effectiveness of the barcode scanning process: the implementation of distinct passwords for each student and the inclusion of timeliness as acceptance and usability standards. The chosen approach for constructing a validated framework is the Technology Acceptance Approach (TAM). In this section, the author employed diverse assessment techniques previously utilized in research to evaluate the acceptance and usability of the suggested attendance application(AlSideiri et al., 2022; M. Shakir et al., 2021; M. T. Shakir, 2020). In addition, a second-year associate professor specializing in software engineering and a native English speaker conducted a thorough study of the questionnaire responses to assess linguistic accuracy and content validity. Additionally, three IT specialists reviewed the survey and made any necessary minor adjustments after comparing it to the requirements. Appendix a provides an overview of the questions mentioned in this case.

2.4 Pilot Test

The evaluation of the overall performance of the respondents to the questionnaire and to comprehend the questions quickly means that the questionnaire was easy to fill. This can be gauged by the appropriateness of the operational definitions and the study methods used in the process (PANDEY & PANDEY, N.D.)[2]. Pilot project aims to determine the level of acceptance, usability, and acceptability of the questions to be received on the Barcode scanning application questionnaire (ALNASERI ET AL., 2021). Other arguments that needed to be assessed were whether questions from the questionnaire were unambiguous and grasped by many pupils. The sample collected from the pilot project by this study constituted about 30% of the enrolled students (three individuals). These were students' year 4 of the MIS Program at UOB, and the tests were administered from May7th, 2024 to May 9th 2024. Questionnaire items are validated and researched using Cronbach's scale, which helps evaluate the validity and reliability. The Alpha Cronbach coefficient takes values between zero and one. D = 0 is interpreted as a lack of consistency in evidence, while D = 1 mirrors a complete reliability of evidence. Therefore, due to Cronbach's Alpha value of 82%, the questionnaire was regarded as an acceptable tool for measuring reliability. This is because a larger Alpha coefficient bears higher validity and reliability of the form. According to the author, deleting some questions from the questionnaire and calculating the reliability rate of SPSS periodically is an excellent strategy to obtain the highest reliability rate in SPSS. SPSS was used to calculate the average variance extracted and the formula for composite reliability. The study also used the data from five survey items to perform factor analysis. Thus, the output data were used to obtain two statistics. The function of this outcome is to assess the reliability of the items. The whole set of items does not differ except that this increases when addressing the question to the survey participants, and positive responses are determined by the responders using a scale from 1 to 5. Hair et al. (HAIR ET AL., 1998)noted that Cronbach's alpha for a questionnaire should be not less than 0.7 to be considered reliable , and the average variance extracted AVE is 0.5. In all the cases considered in this study, it is observed that AVE greater than 0.60 and CR more significant than 0 9 completely fulfilled all conditions. According to table 3 and as the principles of international community initially defined it, these values were legitimate, which made the questionnaire more reliable even though its reliance was likely interfered by the inability of the respondents to understand the questions.

TAM	Cronbach's Alpha
PU	0.752
PE	0.702
BI	0.812
AU	0.736
Total	0.789

Table 1. Reliability Statistics

	Variance(y)	y 2	ϵ
PU1	0.776	0.602176	0.397824
PU2	0.657	0.431649	0.568351
PU3	0.689	0.474721	0.525279
PU4	0.714	0.509796	0.490204
PU5	0.819	0.670761	0.329239
PU6	0.855	0.731025	0.268975
PU7	0.755	0.570025	0.429975
PE1	0.819	0.670761	0.329239
PE2	0.722	0.521284	0.478716
PE3	0.906	0.820836	0.179164
PE4	0.422	0.178084	0.821916
PE5	0.591	0.349281	0.650719
PE6	0.582	0.338724	0.661276
PE7	0.863	0.744769	0.255231
BI1	0.352	0.123904	0.876096
BI2	0.299	0.089401	0.910599
BI3	0.710	0.5041	0.4959
AU1	0.350	0.1225	0.8775

AU2	0.757	0.573049	0.426951
N	**19**		
Average Variance Extracted	**0.6023087**		
Composite Reliability	**0.937491192**		

Table 2. Variance Extracted.

3. Theoretical Framework and Research Hypotheses

A number of information systems as outlined by the IS or IS theories/models were erected to determine how effective the adopted of the new algorithm in technology was In 1987, the study by Davis presents the TAM which is the theory(Davis, 1993). TAM has been developed from the perspectives of the Theory of Reasoned Action (TRA) (Al-Suqri & Al-Kharusi, 2015). PU corresponds to the degree that a person believes that using a particular system would lead to better job performance, while the measure of degree related with user belief that using a particular system would be free from efforts comes from PEOU. Different researchers have used the TAM model on technology acceptability and its use. For instance, it has produced favorable results in studies with similar objectives, as required in the current study. The user's text is "." The identifier is 7, 8 and 9. The measure of the users' adoption of the Barcode scanning application as a tool of learning process performance Technology adoption model (TAM) TAM is used to conduct this study in (AlSideiri et al., 2022; M. Shakir et al., 2021). TAM presents a robust base for evaluating the success of advanced technologies. Furthermore, TAM also suggests that different variables have an effect on an individual's choice to adopt new technology. As a result, a lot of researchers have advanced handmade sets of hypotheses. The hypotheses used by this study were loosely adapted from the works of Mohanaad et al. (AlSideiri et al., 2022; M. Shakir et al., 2021).

4. Data Collection Instrument

Our online survey collected data, which was never handed to all registered students at UOB—two separate parts of the following survey. The first one aims to collect demographic statistics about the student body. The second one tries to gather all data on the Technology Acceptance factors Model's (TAM) elements. Such variables are the perceived usefulness, perceived ease of use, behavioral intention, and actual use. The previous study utilized factors such as Mohanaad[2], with minimal adjustment to facilitate the study's objectives. The value that was supposed to be given was more significant than or equal to the given 80% cumulative value percentage. This rate was calculated based on all the responses classified under the online survey's strongly agree and agree categories. Firstly, the data collection is limited by the available data collection method based on gathering all students' data in the shared data of the survey through gathering the ethical response directly from the subject participant.

5. Results And Discussion

In this section, we discuss three factors according to the Technology Acceptance Model (TAM): direct perceptions and situational factors that impact are CU, PU, and PEOU. In a related context, the processes of BI and AU were in deed intermediately perceived and influenced. The tools for surveying were custom in relation to Mohanaad et al. (AlSideiri et al., 2022; M. Shakir et al., 2021) . This statistical processing and assessment of data involves mean in variance, variance, average variance extracted, composite reliability, and percentage. The relation analysis was attributed to the use of SPSS for the statistical comparison. The arithmetic means and median among some other statistics that were observed in this study were described as mean and median with the repeated values also referred to as mode. Further, the including of standard deviation as part of the measures implies a measure of data from its mean where the greater the deviation the broader the spread of data. In this respect, it can be interpreted to be the squared value of this variance which depicts the scattering of the data points around their mean. To do so, he used the variance, which can be described as a mathematical representation of the square of the deviations from the mean. Moreover, the buckling point of percentage, which is the highest value point of an option of a five-level Likert scale, was used.

Thus, out of 10 females ten represent 90%, and the amount of males makes up 10%. The sample population can be described considering the age of the respondents, beginning from participants aged 21 – 23 years with regards to the nature

of computer literacy, participants that are most proficient encompass 80%, followed by 20% for intermediate and 00% for the primary levels. The acceptance of the system and attendance time change enabled the use of 2-person survey forms distributed to the speaker and students. The aspect of visiting lecturers had 5 of them from the UOB and 10 students. The TAM helped to assess the acceptance of the mobile application on the basis of the orientation and the convenience factor. The Technology Acceptance Model (TAM), constructed invoking the Theory of Reasoned Action (TRA), established in the official form in 1989 was developed by Tracie Davis. For the measurement of item reliability factor loading was used in such a manner that those items, which had a factor loading of 0.7 and beyond, are considered as reliable scores. Cronbach's Alpha and composite reliability values should also be in the range of 0.7 but improve upon. Given that the low Pearson's correlation between the two variables suggests weak collinearity, it is indicated in Table 2 that all the items fulfill this criterion as they yield the factor loadings above 0.7. However, PU6 and PU7 could not meet this factor loading, and thus, they were eliminated. The critical value of AVE equal and more than 0.5 was used to demonstrate convergent which as the primary value of AVE equal and more than 0.5 indicates the measurement consistency. As is clear from Table5, all constructs including Cronbach's Alpha are higher than 0.7, this is a proof that the validity of all variables is convergent.

Constructs	**Cronbach's Alpha**
Perceived Usefulness	0.76
Perceived Ease of Use	0.72
Behavioral Intention to Use	0.808
Actual Use	0.738

Table 3. Cronbach's Alpha

To ensure the acceptance and usability of the new barcode scanning mobile application among UOB faculty members, an online questionnaire consisting of five questions has been developed. The questionnaire generates a report indicating both agreement and disagreement from participating lecturers. Our study survey aimed to assess lecturers' acceptance and teaching experience of the new mobile application through five open-ended questions. The results showed how many respondents agreed or disagreed. Additionally, twenty students from various UOB departments answered a questionnaire with similar questions to those in the previous survey, aiming to gauge their usability and acceptance of the attendance app. Overall analysis demonstrated positive feedback for both faculty members and students who used it; they found that this technology improved learning experiences markedly compared with traditional methods.

6. PRACTICAL IMPLICATIONS

The research results denote many essential implications for the University of Buraimi (UoB) and the institutions that operate in that way or are going to, which are meant to improve online attendance applications with the help of barcode scanners.

6.1 User Training and Support

The results show two things: on one side, training, and proper support are necessary for making users more willing to use the online presence app; on the other side, there are still parts that require extra care to make everything work smoothly. Consequently, it will be possible for the university to create end-to-end educational programs and provide appropriate assistance to all students who use the application to learn to navigate it and fix any problems they may face.

6.2 Enhancing Application Usability

The study points out that it's a futile project without a clearly illustrated usability to be accepted by users. To get the most out of the attendance web app, UoB can collaborate with experts in software development who can optimize the user interface, streamline the navigation, and improve the overall experience of the attendance web app.

6.3 Feedback Mechanisms

The institution of mechanisms, where students can leave feedback and complain in case they experience challenges with the online attendance app, plays a critical role. UoB can run snap surveys or feedback forms routinely to get users' impressions and lower-bound the issues.

6.4 Promoting Awareness and Communication

The online attendance application must be made famous among the students so that they are knowledgeable about its benefits. As such, an effective communication strategy is the right way to make it a success. UoB can benefit from various communication channels like emails, social microphones, and orientation meetings to raise the issue and actively influence students to use the SA platform.

6.5 Integration with Student Management Systems

Online attendance application integration in existing students' management systems improves administrative units' operation and data precision. To save UoB from these cumbersome procedures, think about avenues to strengthen the smooth functioning of these systems.

6.6 Continuous Monitoring and Evaluation

Regular monitoring and evaluation of the application's performance from online attendance app and users is needed to avoid future mistakes. To achieve this, the UoB can set targets and rate of performance (KPIs) and regularly evaluate the application's efficiency to figure out where there is room for improvement and ensure that the users are always happy.

7. HYPOTHESIS TEST & CONCLUSION

Earlier, the attendance recording system of the UoB was premised upon the cumbersome announcement of students' names in class. This habitual approach squandered precious lecture time and hindered proper time management. Taking only ten students together on a roll call might take a long time. Luckily, a new mobile technology using barcodes was developed as a solution. The lecturers present the barcode image on the screen; students log in and register their presence electronically on the app. This novel approach presents several advantages – registration is more powerful – giving academics and pupils pleasant classroom experiences. Second, electronic registration does not allow hard-earned classroom hours by registering manually – all those classroom hours could be used more creatively, offering additional related information or study material, so there would be no wasted time spent on filling boring registers. In addition, the newly implemented mobile technology authenticates the attendance records to estimate a more precise accuracy than the means previously utilized by the faculty/staff members of UoB.

This analysis analyses the four theories suggested as the basis for understanding why the barcode scanning application was adopted. The hypotheses build on the Technology Acceptance Model (TAM model) which explores the factors in technology adoption process.

H1: The greater ease of use (PE) positively affects the perceived usefulness (PU) of Barcode scanning application.

The correlation result is 0.79, considered a powerful positive relationship. Thus, the result aligns with H1 that people who think the app is easy to use will probably consider it useful and valuable. This corresponds to the TAM concepts, the purpose being that they are more willing to accept a technology if they think it is simple to learn and use. Therefore, the University of Buraimi (UoB) can adopt a barcode attendance application because most of the students agreed to use this application.

H2: The usage behavioral intention (BI) of the barcode scanning application is positively affected by perceived ease of use(PE).

The PEU (perceived ease of use of the product) and BI (usage behavioral intention of the product) had a strong positive relationship with a correlation result of 0.68. It is implied that there exists a strong tie between users' opinions as to how easy-to-use the application is, and their intention to continuously use it. For the first reason, the PE and BI scores are remarkably high, which suggests that they have a linear relation of 0.68. This indicates that paying attention to the perceived ease of use of the software makes the user's intention to use the application increase. Also, the rather high PE and BI correlation evidenced the operational importance of the swift development of the barcode scanning app that has human-centered User-Friendly feature as well as now intuitive interface. A favorable user experience distinguished by the factor of the perceived ease of use, can stimulate the motivation and the commitment of the users to apply the application for their tracking needs.

The data correlation result of 0.68, it can be said in support of the hypothesis that the use behavioral intention (BI) of the barcode scanning application is positively affected by the perceived ease of use (PE) of the fuel cell vehicle technology. This finding goes to prove the fact that user-friendly technology is a very important factor to consider when designing and developing user-accepted and engaging technology solutions. This will lead to successful implementation and utilization of the barcode scanning application within the academic setting of the University of Buraimi (UoB) in Oman.

H3: Usefulness (PU) is perceived as positive by people, which affects their usage behavioral intention (BI). Barcode scanning application.

The working hypothesis (H3) states that perceived usefulness (PU) is what determines behavioral intention to use (BI) of the barcode scanning software. By the analysis it is showed that the correlation coefficient between PU and BI is 0.6 which means that there is a moderately strong positive relationship between two constructs. the path coefficient exam of 0.60 is the outcome of the statistical proof that the perceived usefulness (PU) is the positive influencer to the users' usage behavioral intention (BI). The fact that "perceived usefulness" is a major factor in shaping the attitude of users and their intention to adopt technologies demonstrates the great impact of it as an important factor in the process of promoting the acceptance of technology and its use within the academic environment of the University of Buraimi (UoB) in the Sultanate of Oman.

H4: the behavioral intention (BI) to use an increasing the actual use (AU) of the Barcode scanning

The proximate value of the 0.69 Pearson correlation coefficient between the two dimensions of construct's user usage behavioral intention (BI) and actual use (AU) found above shows that they have quite a strong positive relationship. This best shows the fact that it meets the users' needs as it is not used on a perfunctory basis but for actual outcomes. One of the findings is that a higher percentage of respondents which are sampled from UoB appreciates the apps developed by participants of Barcode. The positive value is thus the answer of the question whether the relationship is existing as such, which points to correctness of the hypothesis that the behavioral intention is in the sense of real usage. Understanding the basic principle of the Technology Acceptance Model (TAM) that user behavioral intention to use and adoption of the technology is driven the behavioral intention of the technology initially that received and accepted by the user which triggers the usage of the technology finally by the user. It is the conclusion that the relationship between the two values, behavioral intention and actual usage, had supported the hypothesis made. The Pearson correlation coefficient measured to be 0.69 correlated positively as expected. From this data, we may propose technologies and solutions to be user-friendly, user-driven, beneficial, and solutions that lead to UoB scholarly excellence in the academic arena of Oman (see figure 5).

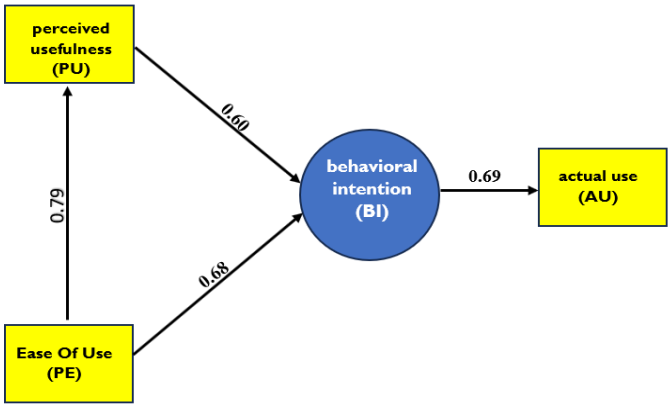

Figure 5. The correlation results.

The outcomes validate TAM appropriateness as a guideline for investigating drivers of adoption of barcode scanning applications. This perceived ease of use is the main factor that shapes perceived usefulness and user behavioral intention to use. Users will prefer to use apps that are simple to use and of use. Usefulness and behavioral intention are both positively correlated, but the latter may also be caused by the former or other factors. Through further research, such factors can be examined. In fact, behavioral intention to use displays strong predictive power, thus proving its utility in the matter of user adoption patterns.

Though aesthetical in design as it is now also functional, opportunities exist that would, if improved, increase its usefulness even more. For instance, it is possible for such security protocols to be instituted, even – password protection, in the case whereby incorrect login attempts are made more than three times. Furthermore automatic daily creation of personalized Barcodes per student would significantly affect accounting and reduce the risk of cheating, that is, fake participation. Lastly, to assess potential future development opportunities, a comprehensive questionnaire will be administered to faculties across numerous academic institutions throughout the region for staff feedback, allowing growth tailored for real-world participatory attention for modern, contemporary educational environments. The comparison between the old manual routine at the University of Buraimi (UoB), where the teacher logged student attendance personally, and the new mobile application shows significant rapid progress.

The simplified auditing process also eases the load for teachers as they only need to scan the barcode picture, sign in, and choose the row from which they can electronically wipe out the barcode and conduct an audit. This practice saves students and instructors a lot of time; additionally, it makes registration more dynamic by determining students to jot down attendance. This tool has brimming future outlooks storing endless capabilities within it; it can enhance users with ease of use settings that include specifications such as password authentication measures that ensure precise data entry even post miss-re-entry. Also, assembling broader perspectives on several teams that belong to the UOB's faculty and staff will help build these functions constantly to develop in the future. They should put much emphasis on developing simple and clear interfaces and instructions which in turn enhances the perceived ease of use. Demonstrating application benefits and value propositions will contribute to the perceived usefulness that results in the user's adoption. Explore other indirect effects impinging on behavioral intention such as social influence or security perception to obtain more details on user adoption patterns. Given these conclusions and suggestions, developers and designers are able to develop and design more user-centered and useful applications for barcode scanning that will certainly increase popularity of these applications, which in turn leads to increased use of these apps.

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