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Extracurricular Activities Attendance Management Monitoring System with SMS Notification

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Abstract
Every activity sanctioned by the college is actively participated in by the Institute of Information and Computer Studies. Participation in all or even just one of these activities has been connected to social and academic success. The researchers created an Extracurricular Activities Attendance Management Monitoring System with SMS Notification to track students' attendance at all school events. This system is intended to assess the produced system's functionality in terms of suitability, accuracy, and security as viewed by students. Determine the level of usability of the produced system in terms of student perceptions of understandability and operability. Finally, assess the developed system's performance efficiency in terms of time behavior and resource utilization as perceived by the expert evaluators. The finding implied was very good in terms of functionality, usability and performance.

Keywords: *Extracurricular activities, Attendance, Management Monitoring System, SMS Notification, RAD Model*

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I. INTRODUCTION

Extracurricular activities are sources that have long been a part of the educational system; students participate in these activities, which are not part of the standard curriculum or teaching techniques. Students from all age groups and standards participate in these activities. Participation in all of these activities, or even just one of them has been linked to social and academic success [1]. Students who engage in extracurricular activities gain from the numerous options available to them. Having better grades, higher standardized test scores and educational attainment, attending school more consistently, and having a greater self-concept were all advantages of participating in extracurricular activities. They can develop cooperation and leadership skills while reducing the chance of alcohol and illegal drug use, as well as related problem behavior [2].

Higher education institutions are increasingly being asked to track student attendance, based on the notion that improved attendance leads to higher retention rates, better grades, and a more fulfilling educational experience [3]. In schools, school attendance is always a source of concern. School attendance and academic achievement are related [4].For that, the Institute of Information and Computer Studies strictly implement the monitoring of attendance in every school event. In order to monitor the students attendance in every school events there is a customary method of verifying IICS students' attendance is to write their names and signatures on a piece of paper, which requires students to spend a significant amount of time queuing. Falsification of attendance is also widespread in this system, making it insecure and difficult to monitor for the administrator.

The researchers discovered that this condition is a problem, particularly in terms of student and department administrator convenience, and that it has been witnessed and experienced by students at all school activities. The researchers opted to come-up an idea of developing an Extracurricular Activities Attendance Management Monitoring System with SMS Notification in order to handle these issues/situations and improve student attendance tracking by utilizing an embedded system as the primary tool for the system, with a security feature that will be discovered by the system.

In this system, it can determine the level of functionality of the Extracurricular Activities Attendance Management Monitoring System with SMS Notification in terms of suitability, accuracy, and security as perceived by the students. Also, determine the level of usability of the developed system in terms of understandability and operability as perceived by the students. Finally, evaluate the level of performance efficiency of the developed system in terms of time behavior and resource utilization as perceived by the expert evaluators.

There are some studies that can help the researchers improved the developed system. First, Student Attendance Monitoring at the University using NFC, this study designed and operated an autonomous student attendance tracking system at the BME [5]. Second, Design and Development of Activity Attendance Monitoring System based on RFID, a study on the design and development of an activity attendance monitoring [6]. Also, Fingerprint based Student Attendance System with SMS alert to parents; a research project on a fingerprint identification system based on minutiae-based fingerprint algorithms utilized in many approaches [7]. Lastly, the Mobile based Attendance Management System; it entails getting access to student information and creating reports. It consists of both static and dynamic pages. Users can enter data into this system using easy and interactive forms [8].

1.1 Conceptual Framework

This study conceptualized and developed Extracurricular Activities Attendance Management Monitoring System with SMS Notification comprising of input phase, process, and output phase. As such, the input of the study is the student's information and parent/guardian information such as contact number for them to be notified by the SMS notification feature of the system. The process involves the development of the developed Extracurricular Activities Attendance Management Monitoring System with SMS Notification. The output of the study includes the evaluation of the system as to the level of functionality, usability, and level of performance efficiency. Figure 1 showed the model of the study.

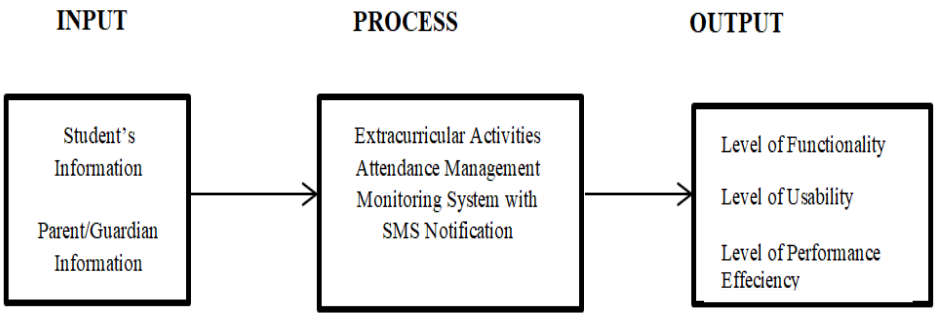

Figure 1. The Conceptual Framework of the Study.

II. METHODOLOGY

The research design, respondent selection, research instrument, data collection procedure, and statistical treatment are all covered in this chapter.

2.1 Research Design

A research design is a blueprint or strategy created specifically to answer the research question and control variance [9].

This study used both developmental and descriptive research designs. Developmental research design is the systematic study of developing, producing, and evaluating educational programs, processes, and products that must meet internal consistency and effectiveness requirements. It also include an examination of the entire instructional design, development, and assessment process, as well as individual process components [10].

Descriptive research aims to shed light on current challenges or problems through a data collection methodology that allows them to explain the situation more fully than was previously feasible [11]. Descriptive research is large-scale quantitative research with the goal of corfirming a theory. A descriptive finding in exploratory research could supplement an insight gained via a more in-depth, open-ended technique. An organization can evaluate if a notion is held by a small group of individuals and is therefore irrelevant, or whether it is widely held and should be applied [12].

2.2 Software Development Life Cycle

An approach for developing and changing software is the Software Development Life Cycle Model. Systems engineering, software engineering, and information systems all use the SDLC. SDLC is a concept that is used in a number of software development processes that are now available on the market or in the software industry. Any type of information system can be developed, planned, and controlled using the SDLC framework [13]. In this study, the researcher used Rapid Application Development as the software development SDLC. Rapid Application Development (RAD) is a development lifecycle that provides outputs that are substantially faster and of greater quality than the traditional lifecycle. It's designed to take full advantage of today's advanced

development software [14]. The software process and software project management improve when the RAD model is changed. This work-task upgrade can help software developers at work by helping them to achieve high productivity (performance) in less time and effort [15].

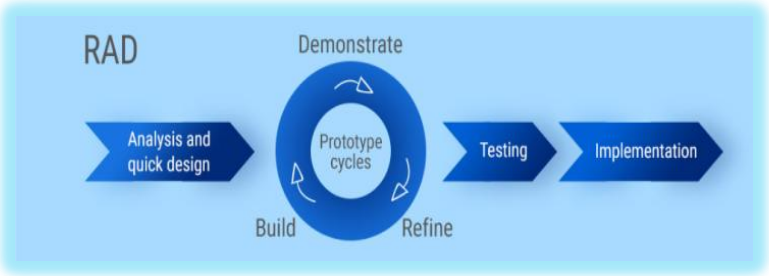

Figure 2. The Rapid Application Development Model

2.3 Entity-Relationship Diagram

A data model is provided for the entity-relationship model. Some of the most relevant semantic data from the real world is included in this model. A novel diagrammatic technique is presented as a database design tool. The model and diagrammatic technique are used to illustrate a database design and description example. Some concerns with data integrity, information retrieval, and data modification are investigated. The entity-relationship model, which includes the network model, relational model, and entity set model, can be used to unify various data viewpoints. Semantic ambiguities in these models are examined. People can derive their data views using the entity-relationship model [16].

In the database for this system, there were three entities. The student entity, attendance entity, and SMS notification entity were all categorized as strong entities, with the exception of the student entity, which was categorized as a weak entity.

Cardinalities established relationships between and among these entities. As a result, the following associations were established. The attendance entity and the student entity have one-to-many relationships. This means that the attendance entity might see if the student entity had already submitted one or more criteria. The SMS notification entity and the attendance entity have a one-to-one relationship. This means that a single SMS notice could be issued to a single person.

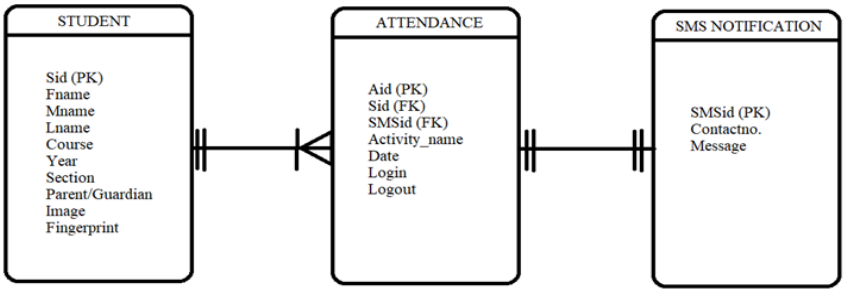

Figure 3. The Entity Relationship Diagram of the Developed System.

2.4 Process Model

In this study, a context data flow diagram was used.

Context data flow diagrams, also known as Data Flow Diagrams (DFD), are graphical diagrams used to design, build, and visualize a system's model. In a graphical view, DFD is used to define the requirements. The transit of data between external entities and the operations and data stores within a system is depicted in data flow diagrams. The context diagram depicts the complete business process as a single process, with data flows to and from external entities depicted. The context diagram does not normally incorporate data repositories. As a result, the context diagram is deconstructed into a lower-level diagram, the level 0 data flow diagram. In fact, each operation on the level 0 data flow diagram can be split into a more detailed data flow diagram, referred to as the level 1 data flow diagram [17].

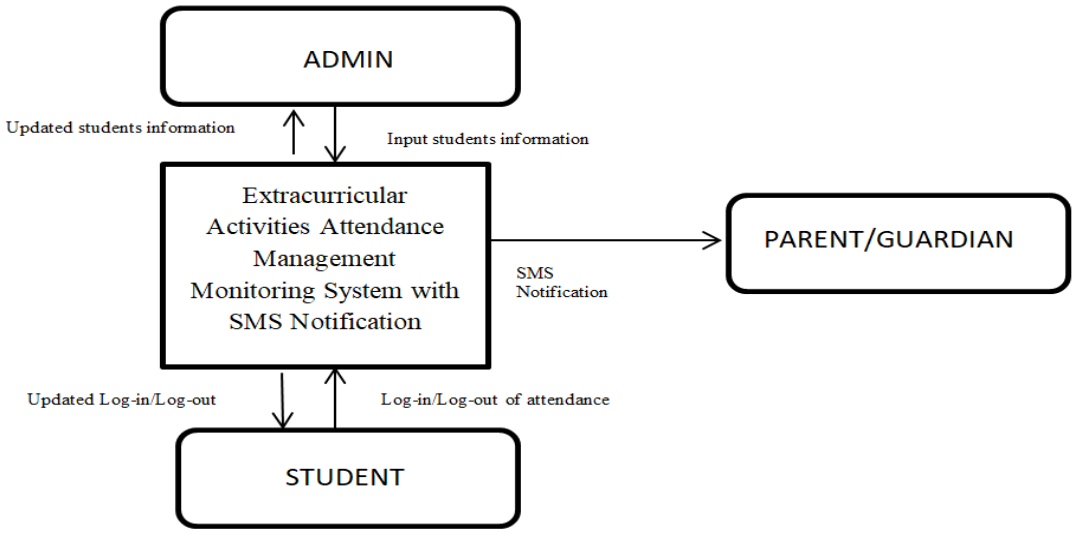

Figure 4. The Context Data Flow Diagram depicting the Process Model of the Developed System.

2.5 Testing and Evaluation

Due to the finalization of the developed system, the researcher requested the testers to evaluate the system in terms of it level of usability, level of functionality and level of performance efficiency. A survey questionnaire was given to the interface design as well as to test the system's usability, functionality and performance efficiency. A 5-point Likert scale comprising of 1 as Poor and 5 as Very Good was used on the developed system prototype. To statistically compute whether the developed system passed the evaluation criteria, the Mean statistics was applied. The Mean is computed as:

$$\bar{X} = \frac{\Sigma X}{n}$$

Where $\bar{X}$ is the mean

ΣX is the summation of individual raw scores

n is the number of populations

The obtained mean score was interpreted using the following verbal description:

Mean Score	**Description**
4.21 – 5.00	Very Good
3.41 – 4.20	Good
2.61 – 3.40	Average
1.81 – 2.60	Fair
1.0– 1.80	Poor

2.6 Software Evaluators

As mentioned in the preceding sections, the system prototype goes through software evaluation. The respondents of the developed system were three hundred ten (310) IICS Students, one hundred twenty-five (125) from the Computer Science Department, and one hundred eighty-five (185) from the Information Technology Department. To compute for the student-respondents, the sample size was derived using the Slovin's formula as follows:

$$n = \frac{N}{1 + Ne2}$$

where: N is the total population size

e is the margin of error

Faculty members that specialize in software engineering were recognized as expert evaluators. These specialists were asked to assess the produced system's performance efficiency. The distribution of respondents was shown in Table 1.

Table 1: Distribution of Respondents

Category	Frequency	Percentage
Entire Population	315	100%
Students	310	98.41%
Expert Evaluators	5	1.59%

III. PRESENTATION OF DATA AND INTERPRETATION OF RESULTS

This chapter demonstrated the display, analysis, and interpretation of results related to the established system's goals.

3.1 Level of Functionality of the Extracurricular Activities Attendance Management Monitoring System with SMS Notification as Perceived by Students in terms of Suitability, Accurateness and Security

The results showed that the level of functionality of the Extracurricular Activities Attendance Management Monitoring System with SMS Notification was composed with a mean of 4.67 being interpreted as "Very Good". In terms of suitability Mean= 4.60, accurateness Mean = 4.68 and security Mean = 4.75 were interpreted as "Very Good.

Table 2. Level of Functionality of Extracurricular Activities Attendance Management Monitoring System with SMS Notification as Perceived by students in terms of Suitability, Accurateness, and Security.

Implementation Indicators	Mean	Interpretation
Level of Functionality	4.67	Very Good
Suitability	4.60	Very Good
Accurateness	4.68	Very Good
Security	4.75	Very Good

Legend: 4.21-5.00 (Very Good); 3.41-4.20 (Good); 2.61-3.40 (Average); 1.81-2.60 (Fair); 1.00-1.80 (Poor)

3.2 Level of Usability of Extracurricular Activities Attendance Management Monitoring System with SMS Notification as Perceived by students in terms of Understandability and Operability

The results showed that the level of usability of Extracurricular Activities Attendance Management Monitoring System with SMS Notification was composed with a mean of 4.67 as "Very Good". In terms of understandability M= 4.65 as "Very Good". For the operability, the computed mean score was M = 4.70 which were all interpreted as "Very Good".

Table 3. Level of Usability of Extracurricular Activities Attendance Management Monitoring System with SMS Notification as Perceived by the students in terms of Understandability and Operability.

Implementation Indicators	Mean	Interpretation
Level of Usability	4.67	Very Good
a. Understandability	4.65	Very Good
b. Operability	4.70	Very Good

Legend: 4.21-5.00 (Very Good); 3.41-4.20 (Good); 2.61-3.40 (Average); 1.81-2.60 (Fair); 1.00-1.80 (Poor)

3.3 Level of Performance Efficiency of the Extracurricular Activities Attendance Management Monitoring System with SMS Notification as Perceived by Expert Evaluators in terms of Time Behaviour and Resource Utilization.

Table 4 showed the result for the respondent's feedback on the level of performance efficiency in terms of time behaviour and resource utilization. The level of performance efficiency represents the performance relative to the number of resources used under the stated condition. The results showed that the developed

system for the level of performance efficiency of the Extracurricular Activities Attendance Management Monitoring System with SMS Notification was composed with a mean of 4.47 as "Very Good". In terms of time behavior M = 4.56 is verbally interpreted as "Very Good". While in terms of resource utilization M = 4.59 is also interpreted as "Very Good".

Table 4. Level of Performance Efficiency of Extracurricular Activities Attendance Management Monitoring System with SMS Notification as perceived by experts in terms of Time Behaviour and Resource Utilization.

Implementation Indicators	Mean	Interpretation
Level of Performance Efficiency	**4.57**	Very Good
a. Time Behaviour	**4.56**	Very Good
b. Resource Utilization	**4.59**	Very Good

Legend: 4.21-5.00 (Very Good); 3.41-4.20 (Good); 2.61-3.40 (Average); 1.81-2.60 (Fair); 1.00-1.80 (Poor)

IV. CONCLUSION

Based on the results of the study, the following conclusions were drawn:

The respondents said the Extracurricular Activities Attendance Management Monitoring System with SMS Notification had a high level of functionality in terms of applicability, accuracy, and security. This indicated that the built system had a high level of functionality, allowing it to protect the users' profiles and other personal information.

In terms of understandability and operability, the Extracurricular Activities Attendance Management Monitoring System with SMS Notification was rated as excellent. The flow of the system was easy to learn, control, and grasp, according to the respondents, and the onscreen message was clear. It has a high level of usability, meaning that users find the system's functionalities simple to learn and the information it provides is clear and easy to comprehend. The system was also simple since the interface design is simple to learn due to the simpler and succinct interface, which just requires the users to provide the bare minimum of personal information.

The Extracurricular Activities Attendance Management Monitoring System with SMS Notification was perceived to have a high level of performance efficiency in terms of time behavior and resource utilization, wherein the system provided efficient and real-time information to the user and required minimal disk storage space and ran on servers with standard physical memory, implying that the system can be installed in a variety of locations.

REFERENCES

[1]. R. Kapur, "Importance of Extra-Curricular Activities in Education," *Researchgate.Net*, 2018, [Online]. Available: https://www.researchgate.net/profile/Radhika_Kapur/publication/323794759_Importance_of_Extra-Curricular_Activities_in_Education/links/5aab2feb0f7e9b8826712dde/Importance-of-Extra-Curricular-Activities-in-Education

[2]. N. Wilson, "Impact of Extracurricular Activities on Students," *Impact Extracurricular Act. Students*, vol. 53, no. 9, p. 39, 2009, [Online]. Available: https://www2.uwstout.edu/content/lib/thesis/2009/2009wilsonn.pdf

[3]. J. Muir, "Student Attendance: Is It Important, and What Do Students Think?," *ResearchGate*, vol. 6, no. 2, pp. 50–69, 2009, doi: 10.11120/tran.2009.06020050.

[4]. H. Adelman and L. Taylor, "School Attendance Problems : Are Current Policies & Practices Going in the Right Direction ?," vol. 1563, no. 310. pp. 1–29, 2006.

[5]. B. Benyo, B. Sódor, T. Doktor, and G. Fördös, "Student attendance monitoring at the university using NFC," *IEEE*, 2012, doi: 10.1109/WTS.2012.6266137.

[6]. R. A. J. M. Gining, S. S. M. Fauzi, I. M. Ayub, M. N. F. Jamaluddin, I. Puspitasari, and Okfalisa, "Design and development of activity attendance monitoring system based on RFID," *Indones. J. Electr. Eng. Comput. Sci.*, vol. 17, no. 1, pp. 500–507, 2020, doi: 10.11591/ijeecs.v17.i1.pp500-507.

[7]. K.Jaikumar, M. S. Kumar, S. Rajkumar, and A. Sakthivel, "Fingerprint Based Student Attendance System With Sms Alert To Parents," *Int. J. Res. Eng. Technol.*, vol. 04, no. 02, pp. 293–297, 2015, doi: 10.15623/ijret.2015.0402038.

[8]. V. Somasundaram, M. Kannan, and V. Sriram, "Mobile based Attendance Management System," *Indian J. Sci. Technol.*, vol. 9, no. 35, 2016, doi: 10.17485/ijst/2016/v9i35/101807.

[9]. L. Helen, "Design : Descriptive Research Definitions of," *J. Pediatr. Oncol. Nurs.*, vol. 10, no. 1, pp. 154–157, 1993, doi: 10.1177/104345429301000406.

[10]. R. C. Richey, J. D. Klein, and W. a Nelson, "Developmental research: Studies of instructional deisgn and development," *Handb. Res. Educ. Commun. Technol.*, no. February, pp. 1099–1130, 2004.

[11]. W. & B. Fox, "A Guide to Managing Research," vol. 8, no. 1. p. 45, 2007.

[12]. G. S. Erickson, "Research Design: Descriptive Research," *J. Pediatr. Oncol. Nurs.*, pp. 51–77, 2017, doi: 10.4337/9781786432698.00009.

[13]. R. D. Amlani, "Advantages and Limitations of Different SDLC Models," *Int. J. Comput. Appl. Inf. Technol.*, vol. I, no. Iii, pp. 6–11, 2012.

[14]. Casem. Totem, "What is Rapid Application Development?," *Thesis*. 2000.

[15]. M. Rizwan and M. Iqbal, "Application of 80/20 rule in software engineering Rapid Application Development (RAD) model,"

Commun. Comput. Inf. Sci., vol. 181 CCIS, no. PART 3, pp. 518–532, 2011, doi: 10.1007/978-3-642-22203-0_45.
[16]. P. P. S. Chen, "The Entity-Relationship Model—toward a Unified View of Data," *ACM Trans. Database Syst.*, vol. 1, no. 1, pp. 9–36, 1976, doi: 10.1145/320434.320440.
[17]. R. Ibrahim and S. Y. Yen, "Formalization of the Data Flow Diagram Rules for Consistency Check," *Int. J. Softw. Eng. Appl.*, vol. 1, no. 4, pp. 95–111, 2010, doi: 10.5121/ijsea.2010.1406.