**Chapter I**

# CHAPTER 1 INTRODUCTION

**introduction**

## Background of the Study

Technology becomes a powerful tool for transforming learning. It can help affirm and advance relationships between educators and students. Today, technology inventions and innovations are playing a major in everybody’s life. Many technologies were created by users of different systems. These systems are used in devices to perform a specific function. This integration may be used in different types of application including electronic appliances, transportation, power, distribution, factory automation and etc. The system also uses data communication. This technology is used to transfer data from one device to another by the use of communicating media through the use of wires cables and etc.

In school, seating arrangement and attendance monitoring of the students was getting harder and harder because of the standardization of university. In addition, the increasing number of students also contributes to the burden of subject teacher to monitor them. Another problem is that some students did not go to school on time, and their parents did not know that their children could go to school and study well. In order to help the parents as well as the teachers, and professors in monitoring the student’s attendance and seating arrangement, the researchers discover a concept of seating arrangement checker with an attendance monitoring system.

This will help to minimize the absence and checking their seating arrangement assign to them, as well as to lessen the students late so that they could go to school early as possible.

## Objectives of the Study

### General Objectives

Generally aims to develop a Seating Arrangement Checker with Attendance Monitoring System of the students.

### Specific Objectives

1. Manage student profile information
   1. Seat plan
2. Check the attendance of the students.
3. Send text messages to the parents regarding ;

3.1. Time in

3.2. Time out

1. Generate the following reports:
   1. Student Profile Information
   2. **Display image**
   3. Summary of Students attendance (Daily)
2. Evaluate the following:

5.1. Accuracy

5.2. Effectiveness

5.3. Acceptability of the system

## Significance of the Study

The study of seating arrangement checker with attendance monitoring system is helpful to the following:

**To the Students**

The study helps lessen the absence of the students in their classes by sending the notification through SMS to their parents if what time they time in to school. The system will organize the student seating arrangement and attendance

**To the Instructor**

This serves as their look out if their students attend to their classes either on time, late, present or absent. Also, the teacher will know if the student seat on the assign chair during their class. It will notify the teacher if the students have three consecutive absences.

**To the Parents**

It could be great help to them, in monitoring their children attendance through SMS notifications.

## Scope and Limitation

The study focuses on monitoring the students seating arrangement as well as attendance in their subject schedules. It is intended for the College of Engineering in Sultan Kudarat State University- Isulan Campus. The teacher will assign the seat of every student during the first day of school. It uses RFID to scan RFID card/ tags during the log in process. The system automatically display the students profile information, image, and the time when they enter and leave the classroom on the LCD monitor. Also the system will send information to the parents that their children went in school that time, The system will generate a report  to the database monitored daily.

## Operational Definition of Terms

The following terms are operationally defined as used in this study:

**Crystal Report        -** the software used by the researcher in creating the

daily attendance for the student.

**Database   -** is the collection of data gathered from the user

**GSM**   **-** kind of GSM module used in the study has a function of sending messages to the parents of the student enrolled on the Subject.

**LCD Monitor** **-** stands for Liquid Crystal Display. Used to display the data from the database after scanning the student’s RFID card.

**MySQL Database -** backend used by the researcher in SACWAMS serves as a database of the study.

**Program -** a series of codes or instruction written to do a specified task

**RFID -** stands for Radio Frequency Identification cards used

to register students and to provide access to the

system

**SACWAMS**   **-** stands for Seating Arrangement Checker with

Attendance Monitoring System

**System -** is the combination of software such as vb.net program and hardware such as microcontroller, GSM module and personal computer in which appears in the researchers study.

**Vb.net -** the programming language used by the researcher in the study.

**Chapter II**

# Chapter II Review of Related Literature

**review of related literature**

The researcher has found the following studies and literature as relevant to the system being proposed. The project, paper works, has been reviewed carefully in order to improve the quality and reliability of the research study.

**Related Literature**

The researcher has found the following studies and literature as relevant to the system being proposed. The project, paper works, has been reviewed carefully in order to improve the quality and reliability of the research study.

**RFID (Radio Frequency Identification)**

In recent years, there have been rise in the number of applications based on Radio Frequency Identification (RFID) systems and have been successfully applied to different areas as diverse as transportation, health-care, agriculture, and hospitality industry to name a few. RFID technology facilitates automatic wireless identification using electronic passive and active tags with suitable readers. In this paper, an attempt is made to solve recurrent lecture attendance monitoring problem in developing countries using RFID technology. The application of RFID to student attendance monitoring as developed and deployed in this study is capable of eliminating time wasted during manual collection of attendance and an opportunity for the educational administrators to capture face-to-face classroom statistics for allocation of appropriate attendance scores and for further managerial decisions. (Arulogun O. T., Olatunbosun A., Fakolujo O. A., & Olaniyi O. M. 2013)

There are several complex business processes in the higher education. As the number of university students has been tripled in Hungary the automation of this task become necessary. The Near Field Communication (NFC) technology provides a good opportunity to support the automated execution of several education related processes. Recently a new challenge is identified at the Budapest University of Technology and Economics. As most of the lecture notes had become available in electronic format the students especially the inexperienced freshman ones did not attend to the lectures significantly decreasing the rate of successful exams. This drove to the decision to elaborate an accurate and reliable information system for monitoring the student's attendance at the lectures. Thus we have developed a novel, NFC technology based business use case of student attendance monitoring. In order to meet the requirements of the use case we have implemented a highly autonomous distributed environment assembled by NFC enabled embedded devices, so-called contactless terminals and a scalable back office. Beside the opportunity of contactless card based student identification the terminals support biometric identification by fingerprint reading. These features enable the implementation of flexible and secure identification scenarios. The attendance monitoring use case has been tested in a pilot project involving about 30 access terminals and more than 1000 students. In this paper we are introducing the developed attendance monitoring use case, the implemented NFC enabled system, and the experiences gained during the pilot project. (Benyo B., Sodor B., Doktor T., Fördős G. 2012, April).

The development of an attendance management system using biometrics is proposed. Managing student attendance during lecture periods has become a difficult challenge. The ability to compute the attendance percentage becomes a major task as manual computation produces errors, and also wastes a lot of time. For the stated reason, an efficient attendance management system using biometrics is designed. This system takes attendance electronically with the help of a finger print device and the records of the attendance are stored in a database. Attendance is marked after student identification. For student identification, a biometric (fingerprint) identification based system is used. This process however, eliminates the need for stationary materials and personnel for the keeping of records. Eighty candidates were used to test the system and success rate of 94% was recorded. The manual attendance system average execution time for eighty students was 17.83 seconds while it was 3.79 seconds for the automatic attendance management system using biometrics. The results showed improved performance over manual attendance management system. Attendance is marked after student identification.( Shoewu O., Idowu O. A. 2012).

Nowadays higher education students are exposed to high levels of stress, and are constantly harassed with distractions that compromise objectives and performance levels found in terms of study and learning outcomes. Correspondingly, higher education institutions do not have at their disposal appropriate tools to follow in real time students’ curricular performance. This provides a significant delay in problem identification and will, in turn, have a negative impact on the institutions quality. The problem can be addressed by using a business activity monitoring system that monitors the curricular performance of students throughout their academic endeavour. By providing teachers and students with an informational cockpit that outlines a set of indicators, providing clear context awareness about their performance, we allow them to follow their evolution and progress in accordance with the acquisition of knowledge objectives expected by each Higher Education Institution. Allied with alarming mechanisms, such a cockpit would greatly increase the control students and institutions would have on their activities. By applying corporate concepts used today in the business world, we propose a real time business activity monitoring tool by defining key structural elements such as information models, activity monitoring models and dashboard design applied to a higher education environment. (André D. M. P. 2014).

RFID is the latest technology that has been used in library theft detection systems. RFID-based systems move beyond security to become tracking systems that combine security with more efficient tracking of materials throughout the library, including easier and faster charge and discharge, inventorying, and materials handling.

RFID is a combination of radio-frequency-based technology and microchip technology. The information contained on microchips in the tags affixed to library materials is read using radio frequency technology regardless of item orientation or alignment (i.e., the technology does not require line-of-sight or a fixed plane to read tags as do traditional theft detection systems) and distance from the item is not a critical factor except in the case of extra-wide exit gates. The corridors at the building exit(s) can be as wide as four feet because the tags can be read at a distance of up to two feet by each of two parallel exit sensors. <https://www.rfid-library.com/eng_index.html>

RFID technologies may improve the potential benefits of supply chain management through reduction of inventory losses, increase of the efficiency and speed of processes and improvement of information accuracy. Various RFID systems can be obtained by combining different tags, readers, frequencies and levels of tagging, etc. The cost and potential profit of each system change in a wide range. In this paper, a state-of-the-art on RFID technology deployments in supply chains is given to analyze the impact on the supply chain performance. Potential benefits, particularly against inventory inaccuracy problems, the bullwhip effect and replenishment policies, are briefly surveyed. Various works addressing analytic modelling, simulations, case studies and experiments as well as ROI analyses are reviewed. (Sarac A., Absi N., Dauzère-Pérès S. 2010).

**GSM Modem**

A GSM modem is a specialized type of a modem which accepts an SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem just looks like a mobile phone. When a GSM modem is connected to a computer, this allows the computer to use the GSM modem to communicate over the mobile network. While this GSM modems are most frequently used to provide mobile internet connectivity, many of them can also be used for sending and receiving SMS and MMS messages. A GSM modem exposes an interface that allows application such as SMS to send and receive messages over the modem interface. The mobile operator charges for this message sending and receiving as if it was performed directly on a mobile phone. To perform this task, a GSM modem must support an extended AT command set for sending/receiving SMS message, as defined in the ETSI GSM 07.05 and 3GPP TS 27.005 specifications. (<http://www.nowsms.com/faq/what-is-a-gsm-modem,2015>)

According to K.S K Weranga, the GSM module is used for communicating between the meter and the server. The module and sim configuration are done according to reference. Due to good area coverage and cost effectiveness, sending data via SMS turns out to be a very handly tool. Therefore, SMS is preferred to transmit data from meter to the server. This illustrates only the data formats and configuration. GPRS can also be used for data transmission. When GPRS is selected, a socket listener should be used at the server side. (K.S K Weranga, 2013)

According to Rongbo Zhu and Yan Ma, insert a SIM card into the GSM module, then connects to computers through a serial port. When sending a short message, the system encodes the short message at first, then sends AT instructions to GSM module. After confirm by the response of GSM module, sends the previous coded SMS data. GSM module is responsible for GSM network Access. After the SMS gets into GSM network, it will be firstly received and stored in SMC (Short Message Center) of mobile company. After processed by SMC, it will be transmitted to target mobile terminal. When a message arrives, GSM module delivers AT commands to the computer through a serial port notifies computer that there is a new short message arriving, then the local computer takes action to read data from GSM module after decoding, the data knows the specific of a text message. (Rongbo Zhu, 2011)

**Seating Arrangement**

Studies have reported that seating arrangements impact the learning process. Students occupying the front rows are more attentive that those in the back. The students in front are the ones who generally answer questions asked in class. From a students’ point of view, symbolizes their personality. Often, the diligent, focused students occupy the front rows, in order not to miss out any vital information whereas the laid back, more casual students opt for the back benches to avoid being noticed by the educators.

Some students prefer sitting near doors and windows as it provides them with sufficient distractions to escape the monotony of lessons taught. Pranks, whispering, passing of notes, doodling, etc. is frequent among students who generally sit in the back. Therefore, seating arrangements may be a cause for the decline of student performance as attention span, concentration, comprehension and the retaining of information can be influenced by where the student chooses to sit.

<https://k12teacherstaffdevelopment.com/tlb/do-seating-arrangements-have-an-impact-on-student-learning/>

Seating arrangements are important classroom setting events because they have the potential to help prevent problem behaviours that decrease student attention and diminish available instructional time. The purpose of this synthesis of empirical literature is to determine which arrangements of desks best facilitate positive academic and behavioural outcomes for primary through secondary high school students with a range of characteristics. Eight studies that investigated at least two of three common arrangements (i.e., rows, groups or semi-circles) were considered. Results indicate that teachers should let the nature of the task dictate seating arrangements. Evidence supports the idea that students display higher levels of appropriate behaviour during individual tasks when they are seated in rows, with disruptive students benefiting the most. ([Wannarka](https://www.researchgate.net/scientific-contributions/78274719_RACHEL_WANNARKA) R., Ruhl K. 2008)

As a part of classroom management, teachers face the question of how and where to seat their students. However, it is far from clear what considerations teachers have when making seating arrangements. Therefore, in this study seating arrangement considerations from 50 teachers in grades 4–6 of elementary school were assessed. In Phase 1, teachers were interviewed about their goals and considerations for classroom seating arrangements. Teachers mentioned between 2 and 19 reasons for placing students at specific places in the classroom, with mostly academic considerations. They mainly preferred arrangements in small groups to promote student cooperation. In Phase 2, teachers completed a questionnaire about seating arrangements. This allowed us to examine individual differences between teachers related to gender, years of experience, and beliefs, and the concurrence between the interview and questionnaire data. Teachers reported multiple and various considerations for seating arrangements. Correlations with their general student-oriented or subject-oriented beliefs and personal characteristics were low. The concurrence between measurement methods also was low. The discussion focused on teacher awareness of classroom seating arrangements as an important part of classroom management and a tool for prevention and intervention. (Gremmen M., Van Den Berg Y., Segers E., Cillessen A. 2016).

**Related Studies**

**Attendance Management System Using Barcode Identification on Students** **Identity Cards**

All academic institutions have certain criteria for students regarding their attendance in class and examinations. The importance of student attendance in class cannot be over emphasized as a result of this, administrators and lecturers of various academic institutions are concerned with the attendance irregularities. In the process of admitting students into an examination hall in most Nigerian institutions, 70% of attendance must be met and also considered for grade computation, therefore there is a huge need for monitoring and recording students’ attendance. This brings about the need to have a tool to Control students’ attendance. The existing model of manual attendance monitoring (using paper sheets and an old file system) is not efficient and it is also time consuming. These are for mentioned shortcomings among others serve as justification for migrating from manual based to the proposed system. The system is based on barcode reader technology and the details of this system represented in this paper. The system can be easily accessed by the lecturers and most importantly, the reports can be generated in real-time processing, thus, providing valuable information about the students. ( Saheed Y.K., Moshood A., Abdulmumeen A., Adeniji I.A. 2016)

Differential Effect of Seating Arrangements on Disruptive Behaviour of Fifth Grade Students during Independent Seatwork

Student seating is one of the easiest, most cost-effective classroom management tactics available to teachers. As an antecedent intervention, seating arrangements may help to minimize or eliminate problem behavior without the need for consequence interventions (e.g., differential reinforcement or punishment). For example, [Krantz and Risley (1977)](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3405935/" \l "i0021-8855-45-2-407-Krantz1) showed that simply seating students away from others was nearly as effective in increasing on-task behavior as the systematic use of differential reinforcement and delivery of tangible rewards. [Wheldall and Lam (1987)](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3405935/" \l "i0021-8855-45-2-407-Wheldall1) found that on-task behavior doubled when students were seated individually rather than in groups.

Although research on seating arrangements suggests that students behave more appropriately when they sit individually (for a review, see [Wannarka & Ruhl, 2008](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3405935/" \l "i0021-8855-45-2-407-Wannarka1)), the role of student choice on seat selection has not been investigated. Offering students choices seems to be ethically responsible and may be an important component of a comprehensive classroom management system ([Cosden, Gannon, & Haring, 1995](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3405935/" \l "i0021-8855-45-2-407-Cosden1); [Dunlap et al., 1994](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3405935/#i0021-8855-45-2-407-Dunlap1)). However, allowing students to choose their seats might occasion more or less disruptive behavior, depending on where the students are seated. Completing schoolwork is a potentially high-effort response with potentially low-rate and poor-quality reinforcers, which often are delayed. Schoolwork also is in competition with disruptive behavior, which is a potentially low-effort response that can gain immediate access to a high-quality reinforcer (i.e., peer attention). Thus, it might not be in the best interest of the student or teacher to allow students to choose their own seats or to sit in close proximity to each other during independent seatwork. The purpose of this research was to examine classroom disruptive behavior during student- versus teacher-selected seating arrangements in the context of group and individual seating arrangements during independent seatwork.  [(Bicard](https://www.ncbi.nlm.nih.gov/pubmed/?term=Bicard%20DF%5BAuthor%5D&cauthor=true&cauthor_uid=22844147) D.,  [Ervin](https://www.ncbi.nlm.nih.gov/pubmed/?term=Ervin%20A%5BAuthor%5D&cauthor=true&cauthor_uid=22844147) A.,  [Bicard](https://www.ncbi.nlm.nih.gov/pubmed/?term=Bicard%20SC%5BAuthor%5D&cauthor=true&cauthor_uid=22844147) S., and [Casey](https://www.ncbi.nlm.nih.gov/pubmed/?term=Baylot-Casey%20L%5BAuthor%5D&cauthor=true&cauthor_uid=22844147) L.2012)

**Computerized HR monitoring System**

The study named “Attendance Monitoring Sytem” for Lyceum of the Philippines-Laguna” aimed to provide a transaction system in which a database will present in order to supply needs of their employees. Along with it is the use of the RFID technology to scan attendance of faculty to serve the purpose of recording work hours and automatically process salary findings of employees. The technology would give accurate time recordings and fast retrieving functions that would make the monitoring system faster and not prone to human-conducted errors.( Banan, J.M. 2009)

**Attendance Monitoring System**

In proposed study entitled “Automatic Attendance System Using Fingerprint Verification” the fingerprint technique verification was achieved using extraction of abnormal point on the ridge of user’s fingerprint or minutiae technique. The verification confirms the authenticity of an authorized user by performing one to one comparison of a captured fingerprint templates against the stored templates in the database. The proposed automatic attendance system signals either true or false based on logical result of previous one to one verification of person’s authenticity. (Rumana A., Vijaya K.2009)

**SMS Enabled Watering System**

According to Alfredo U. Bailon JR, the SMS Enabled Watering System was designed to help users to minimize the time and labor in watering their plants. The device was place in the SKSU- Isulan Campus Garden in front of SBLR building.

An SMS controlled watering device that can receive and send the message to/from its user. A device for watering that can sense the moisture of the soil (Bailon JR. A., 2014)

**SMS-Based Automated Drip Irrigation**

According to Rex Banihit, the SMS- Based Automated Drip Irrigation was desingned to be as a watering system in the garden to minimize the effort on the part of the user as well as to use waater efficiently. The device has the capacity to turn on and off the faucet. It opens the faucet if it receives the approval message from the user telling that it needs to irrigate the plants (Banihit, 2014

**Conceptual Framework**

**INPUT**

Planning, Designing, Gathering of Data and Information, Gathering of Materials

**THROUGHPUT**

Construction of the Project, Development of Computer Program Codes, Interfacing the RFID into the Computer, Interfacing the GSM module to the Computer, Testing, Revising of Codes, Finishing Touches

**OUTPUT**

Development of Seating Arrangement Checker with Attendance Monitoring System

Figure 1.The Conceptual Framework of the Study

The research details presented in Figure 1 is the conceptual Framework of the study that includes three phases; Input, Throughput, Output. It shows the slow process of developing the Seating Arrangement Checker and Attendance Monitoring System.

Under the Input phase are the following procedures: Planning, Designing, Gathering of Data and Information, Gathering of Materials. Under the Throughput phase are the following procedures: Construction of the Project, Development of Computer Program Codes, Interfacing the RFID into the Computer, Interfacing the GSM module to the Computer, Testing, Revising of Codes, Finishing Touches and under the Output phase is the finished product.

**Chapter III**

This chapter presents the project development procedure material used in the study, software development methodology, system development life cycle, context diagram, data flow diagram, entity relationship diagram, database structure, file structure, hardware development methodology, perspective plan, construction procedures, block diagram, schematic diagram, and the evaluation methodology of the project.

**Project Development Description**

**Hardware Requirements**

The hardware requirements of the SACWAMS are the following:

Table 1. The materials used in the study

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Quantity** | **Unit** | **Description** | **Unit Price** | **Amount** |
| 3 | pc | RFID(13.56Mhz RFID Reader 14443A Proximity Smart IC Card USB Sensor Reader Access Control Card Reader) | P450 | P1350 |
| 30 | pc | RFID CARD(White 125Khz 1.9mm RFID Access Proximity Card – intl) | P8.8 | P264 |
| 1 | pc | GSM(USB Surf Stick Dongle Mobile Broadband Modem) | P540 | P540 |
| 1 | pc | Sim Card (TM- Globe) | P30 | P30 |
| **Sub –Total** |  |  |  | P2,184 |
| Contingency (10% Materials) |  |  |  | P218.4 |
| **TOTAL** |  |  |  | **P2,402.4** |

**Methods**

Various materials were used in constructing the Seating arrangement checker with attendance monitoring system. The researcher has a computer unit that controls the GSM module to send and receive the message and used for saving and retrieving data from the database that will displayed on LCD monitor. Then a, RFID Reader scanner used to read the RFID card of the students, a GSM module and a sim card for sending and receiving messages.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Quantity** | **UUnit** | **Description** | **Unit Price** | **Amount** |
| 3 | pc | RFID(13.56Mhz RFID Reader 14443A Proximity Smart IC Card USB Sensor Reader Access Control Card Reader) | P450 | P1350 |
| 30 | pc | RFID CARD(White 125Khz 1.9mm RFID Access Proximity Card – intl) | P8.8 | P264 |
| 1 | pc | GSM(USB Surf Stick Dongle Mobile Broadband Modem) | P540 | P540 |
| 1 | pc | Sim Card (TM- Globe) | P30 | P30 |
| **Sub –Total** |  |  |  | P2,184 |
| Contingency (10% Materials) |  |  |  | P218.4 |
| **TOTAL** |  |  |  | **P2,402.4** |