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Attendance Monitoring System of Schools in the Philippines with an Inclusion of Optimization Query Algorithm

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Abstract: ***In this paper, researchers had provided definite solutions in order to check and validate student attendance with the use of computerized seat plans along with the information and image of each student. This study also discussed the inclusion of Optimization Query Algorithm in order to identify and monitor student's punctuality as well as the analysis of the reasons why they fail to attend their class. Attendance patterns are formed early in life because it validates one of the components of student's academic and scholastic performance. Regular attendance is vital part of the grading component necessary to attain some portion of the student's academic progress. You are missing out on active learning experiences and class attendance. As a result, they are more likely to to fail which tends to affect their academic performances.***

Index Terms: Drag, Drop, Re-Arrange, Images, Reports, Schedule, Load, Computer-Based Systems

Keywords*: *The Reasons Why They Fail To Attend Their Class.

I. INTRODUCTION

With today's fast technical developments, traditional methods of checking, recording and calculating data are becoming more and more obsolete. Improving productivity of the technology are the most important consideration in order to replace the manual or traditional operations. With the emergence of computer technologies today, many operations manually processed has been automated by most computer software. The automation of manual processes saves time, energy and resources. Computer technology has also become an aid in teaching. Lots of computer applications nowadays helps to facilitate risky transactions in terms of data handling and manipulation. Computers are also used as a tool to automate monotonous classroom practices such as attendance control and monitoring.

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Most schools, in level across the Philippines employ tedious and time-consuming attendance monitoring. Some use paper-based which require students to submit it with their name and section. A convenient method, especially in large classes, is a seating plan to easily check free seats and assign them to the assigned students. After collecting the data, any of these methods would still require the information collected to be encoded in order to generate an attendance report.

Students have to go to school every day to be successful. The good news from this research is that going to school leads to academic success. Achievement, especially in some subjects, is very sensitive to attendance, and it is important to be absent even two weeks during a school year. Participation also has a strong influence on standardized test results as well as graduation and rate of dropouts. Educators and policy makers cannot really understand performance slits or efforts in order to consider absenteeism.

Absenteeism is different from skiving or the regular daily attendance rate schools use for state credentials and state accountability. Chronic absenteeism means that for some reason 10 percent of a school year is absent. A school may have 90 percent regular daily attendance and yet 40 percent of its students are habitually absent because different students make up those 90 percent on different days. [1]

Thus, researchers have developed Attendance Monitoring System that will automate the process of the manual attendance checking. The system provides a user-friendly interface that even a typical user a little knowledge on the computer aspect would able to navigate the system without any problem at all. Teachers can also use it without considering highly technical skills in automating the process. That is why the system will help the teachers to effortlessly monitor the attendance as part of the grading component.

II. STATEMENT OF THE PROBLEM

Specifically, the researchers will address the following problems:

2.1 Student's Chronic-Absenteeism

Regular absenteeism is the most common problems associated with the students belongs to low-income family. Gender and ethnic origin do not seem to play a role. In school, the students tend to have the highest rates of absenteeism.

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2.2 *Absences Incurred by Teachers Had Affected Also Student's Performance in the Class*

Also, the teacher's absences can also contribute to a negative impact to student performance in a more direct way. The joint planning time in which teachers can work together to improve teaching is often so narrow that even low teacher absenteeism could almost completely undermine its purpose. Mechanism implies that the absence of a teacher adversely affects not only the students he or she works with directly, but also the students who are taught by other teachers. [2]

2.3 *Student's Sitting Arrangement/Organization*

Few studies show that seating plans or seating arrangements have influenced the learning process. Literally, students in the front rows are more attentive listeners than those in the back rows. The students at the top are the ones who usually answer the questions asked in class.

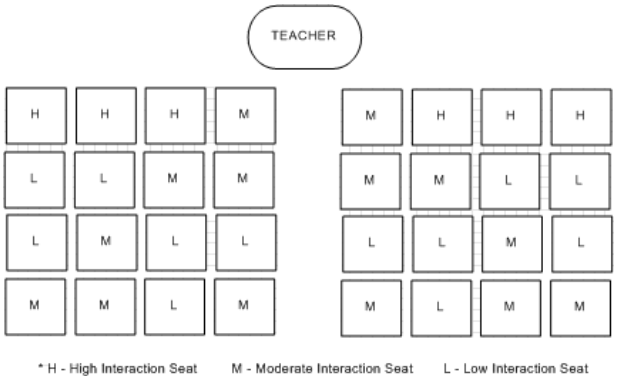

Figure 1. Traditional Seating Arrangements in Government and some Private schools

Arrangement in classroom; symbolizes their personality from the perspective of the students. Often the hard-working, focused students occupy the first rows so as not to miss any important information, while the relaxed, easy-going students choose the back seats so that educators do not notice them.

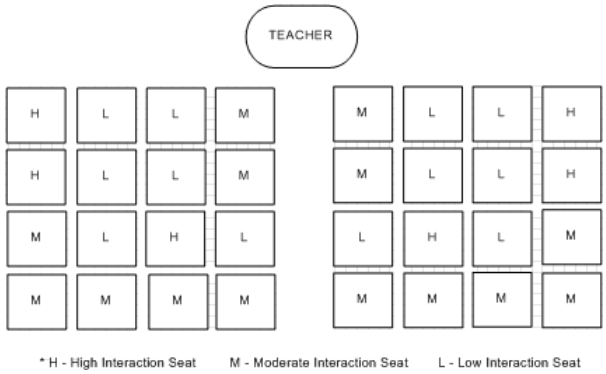

Figure 1.1 Suggested Seating Arrangements in Government and some Private schools

Some students prefer to sit near doors and windows as this provides enough distraction to escape the monotony of the class. Pranks, whispers, notes, doodles, etc. are common with students who generally sit in the back. Therefore, seating arrangements can be a cause of decline in student performance as attention span, concentration, understanding, and storage of information can all affect student seating. [4]

2.4 *Human Errors in Recording and Calculations*

Manually counting and tallying the total number of absences leads to errors and misperception although school staff or specifically the educators itself have instructed to impost school attendance policies and procedures and those personnel with tasked responsibility for maintaining attendance records are supervised.

2.5 *Huge Volume of Paper and Massive Struggle to Generate Report Regarding Attendances of Students and Sections*

The system will also help the organization (e.g. Department of Education or DepEd and Commission of Higher Education or CHED) to minimize the paper materials and peripherals used to monitor the attendance of the students. Instead of using class cards or booklets containing the names and basic information of students and divided into sections that is handled by the teacher or educators, the system will provide a one or more sheet of paper to show the statistical total number of absences of the students and also the exact time when the attendance is checked by the teacher.

III. STATEMENT OF RESEARCH OBJECTIVES

Computers are used to assist everyone in business organizations, research, and other areas of life. Some of these areas are examined to provide an indication of a very wide range of activities in which the computer is involved: some of the applicants may surprise given the limited capabilities of the machine. Adaptability, however, was created by man's ability to reduce often very complicated problems to the simple level at which the computer can be used, and to design and implement ingenious computer systems that enable myriad interactions of basically simple tasks that the computer can handle. Something that can really be attained quickly can also be achieved in a very short time. The first computer was developed as little as forty-five years ago and ten years passed before the industry was established on a firm footing. [3]

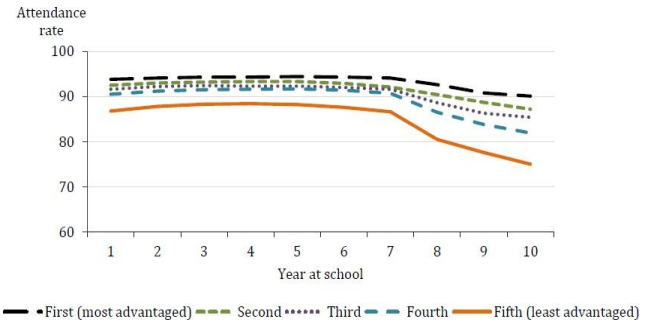

Figure 2. Average attendance rates, by year of school.

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The nature of the relationship between absenteeism and performance in all subgroups of students, it is highly suggested that each day of school attendance contributes to the student's learning and that school outcomes are improved by maximizing school attendance. There is no safe edge. [7]

The learning process can be enriched in many subjects because of the scale and range of information which a computer data bank can provide. The computer is having been utilized in order to facilitate electronic process. Computer programs such as AMS or Attendance Monitoring System will play a vital role as an educational tool to improve the students' punctuality and avoid absenteeism. Also, this computer application will help the teachers or educators to maintain everyday checking and monitoring the attendance of the students.

The AMS Attendance Monitoring System aims to:

3.1 Minimize Efforts of Teachers in Monitoring the Attendance

One of the important factors in recording student's information is by doing it in a computerized way. In school, this task becomes more difficult and a lot of time is wasted if the attendance of the students is recorded daily and maintained over a long period of time. This will help the educators to minimize their effort in doing a hassle task in checking the attendance.

3.2 Maintain the Daily Records of Attendance

Managing attendance record is required for any school or other organization. This can be done either in manual process or in an electronic form, but with today's fast technological development, traditional methods of reviewing, recording and computing data are becoming more and more obsolete. There are many benefits to tracking student attendance. The supervision of the attendance list by the supervisor provides information about the absence or leave of absence phenomenon of the students.

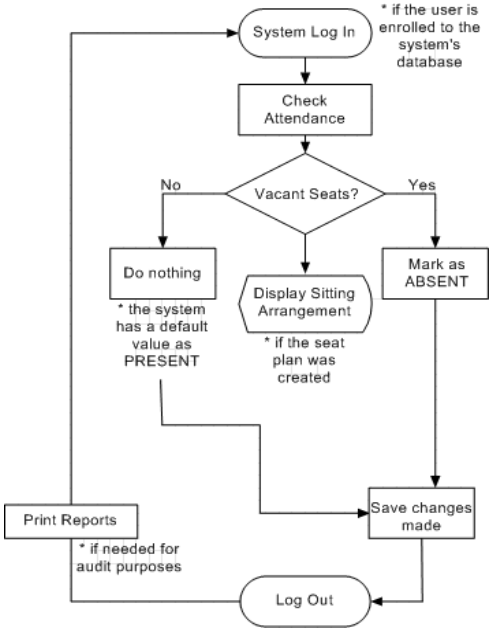

Figure 3. Process Flow Diagram of Attendance Monitoring System

3.3 Automatic Generation of Reports

The manual system in monitoring the attendance is really time- consuming. Most schools, in all levels in the Philippines use tedious and time-consuming attendance monitoring. Some use attendance lists, index cards, and others require students to hand in a piece of paper with their names and their section written there on a piece of paper. A convenient method, especially in large classes, is a seating plan to easily check free seats and assign them to the assigned students. After collecting the data, any of these methods would still require that the information collected be encoded in order to generate an attendance report.

IV. PURPOSE AND SIGNIFICANCE OF RESEARCH

As the usual classroom setting, the teacher is the one who is authorized to check or monitor the attendance. The teacher and the system administrator (the researcher) play a vital role in response with monitoring and checking (for the teacher or the school administrator) and maintaining (for the system administrator) the attendance.

The significance of the study is to develop a system to help locals monitor the presence of teachers. The applicant developed the system to improve the manual recording of attendance. The attendance monitoring system proposed by the applicant records attendance based on time and date. The created Attendance Monitoring System will benefit the following persons and entities:

4.1 Teachers and Educators of selected private/public schools

Essential part of the attendance is by recording student information, but it is only during follow-up that the added value is added by identifying a student with a problem and helping to resolve it. The researcher would like to improve the teachers' Attendance Monitoring System for selected Government/Private schools in the Philippines in order for the academic institution and the school administration lessens the hassle in recording the daily students' attendance, evaluation of the instructors and daily activities in a grading period or semester.

4.2 School Administrators

Also, the school administrators and principals will benefit from the system; automatic generation of reports will make their work faster than the manual processes of counting and tallying the total number of absences of each student enrolled in the school.

Gathering attendance and absence data is a daily task that every member of the school community is involved in. In schools where the average attendance is consistently over 90%, attendance checks are easier.

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Where the average presence falls in the range of 80-90%, day-to-day work is very time and labor consuming. [8] For other purposes, the system helps school administrators to easily collect information on the number of dropouts using this system.

4.3 *Learners/Students*

Learning of students maybe in different ways, just as their teachers develop bespoke skills to incorporate teaching methods that work best for them. There is no solution to creating effective seating. Experimental results have shown that students who choose a front or middle seat are more creative, assertive, and aggressive and, according to the Education Act (1990), are committed to the well-being of the student are the focus of this consultation. [6]

The system will help the parents to monitor also if their child is really attending the classes of their teachers in schools.

4.4 *Parents of the Enrolled Students*

Parents are responsible for the regular school attendance of the students. School administrators and school staff can usually resolve problems of non-participation in consultation with the students and their parents. While parents should be reminded of their legal position.

V. EDUCATIONAL OPPORTUNITIES

5.1 *Opportunity System*

It is a fact that collecting daily class attendance is a must since it's a part of the student's grade. The students' progression would be the reason why teachers are required to take it at the beginning of the class, but the manual system that schools normally use to take attendance is tedious and somewhat redundant since after getting the data, the teacher would still need to encode it to the system that the school is currently using.

With the encountered problems, the researchers have come up with an automated Attendance Monitoring System, which would make it easier for teachers to check attendance and just directly transfer the data to the system.

5.2 *Vision Statement*

The automated Attendance Monitoring System would benefit both public and private schools as it could provide the teachers an interface for managing attendance data for every class that would be directly connected to the system.

Through computerization, the school can do their task easier compared to a manual process of taking daily attendance which in turns becomes tedious in their part. This study aims to test their functionality in terms of speed, accuracy, data handling, security, stability, and adaptability when attending class.

Therefore, researchers intend to develop an automated attendance monitoring system that will help teachers to manage attendance for the classes they have. The software is advanced, efficient, reliable and dependable in organizing attendance. The application software will be managed by the school administrator, the only one capable of adding and or altering account for the teachers, while the teacher would have access that would enable them to manage attendance for the classes enlisted to them. The proposed software will solve the existing problem encountered in the existing system.

VI. RESULTS AND DISCUSSION

Software Evaluation Criteria

This research paper had considered the Likert Scale Model in order to compute the scaling responses from the respondents.

Table 1. Likert Scale Evaluation

Ratings	Interpretations
4.51 – 5.00	Highly Acceptable
3.51 – 4. 50	Acceptable
2.51 – 3.50	Moderate acceptable
1.51 – 2. 50	Slightly Acceptable
1. 00 – 1.50	Not Acceptable

Table 1 shows the rating interpretations in Likert Scale model. The proposed System is Highly Acceptable if the weighted mean is within the range of four point fifty one to five (4.51 – 5.00); Acceptable if within the range of three point fifty one to four point fifty (3.51- 4.50); Moderately Acceptable if the weighted mean is within two point fifty one to three point fifty (2.51 – 3.50); Slightly Acceptable if within one point fifty one to two point fifty (1.51 – 2.50); and the Not Acceptable if the weighted mean is within one to one point fifty (1.00 – 1.50).

Evaluation Results

Survey is necessary to evaluate if the system meets its objectives and the requirements in accordance to with the software quality metrics. ISO 25010 is a great framework for defining software metrics that are important to a specific project. It's not a full, detailed map, but a guide that you can use depending on your circumstances. Every development project has different priorities and metrics, and this standard leaves enough leeway to work with all of them.

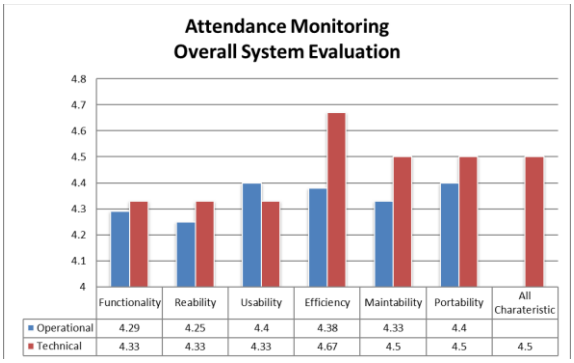

Figure 4. Overall System Evaluation

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Figure 4 shows the overall mean graph results of the system evaluation for operational and technical respondents. The results are presented in graphical form to easily compare the evaluation of two types of respondents. The blue bar represented the evaluation of the Operational respondents. Efficiency has the highest weighted mean among the other characteristics for technical respondents which is Acceptable in scale, while Usability and Portability has the highest weighted mean for Operational respondents which is Acceptable in scale.

VII. CONCLUSION

Based on the result of the survey that the researchers conducted, the system is acceptable to the future user and experts. The result of the survey indicates that the system will be great help to the student, faculty member and also to the dean of the school. In addition, query optimization such as binary search has been incorporated in the system. The algorithm provides much more efficiency than the traditional attendance monitoring.

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AUTHORS PROFILE

Arman Bernard G. Santos, Prof. Arman Bernard G. Santos is a full-time professor of Asia Technological School of Science and Arts-Sta. Rosa, Laguna. He is a graduate of Bachelor of Science in Computer Science at Colegio San Agustin-Binan, Laguna Philippines in the year 2008. He obtained his Master of Science in Computer Science at Technological Institute of the Philippines-Manila and currently completing his dissertation under Doctor of Philosophy in Computer Science in the same school. He is also affiliated in a professional organization, the Philippine Society of Information Technology Education and in a non-profit organization, the Rotary Club of San Pedro Magic. Prof. Arman is a national and international author and technical reviewer of several publications under IEEE, ACM, Springer, Elsevier and Scopus Indexed Journals. He presented several research papers locally and internationally focusing mainly on computational complexity, algorithms, information system, information technology, machine learning, data science, image processing, natural language processing, artificial intelligence, data mining and deep learning.

Dr. Neil Perez Balba, is an International IT and Engineering consultant and an educator. He is currently the Director of Center for Innovation and Development of LPU-Laguna, works as a dean, a professor and conducts lectures in different countries. He became Corporate IT Director of Group of Companies and MIS Director. He is also active in different professional organizations and became the President of the Philippine Society of Information Technology Educators Incorporated-National (PSITE). He also became the Regional President of PSITE-Region 4, National Board of Institute of Computer Engineers of the Philippines (ICPEP), a member of Institute of Electronics Engineers of the Philippines (IECEP), Board of Integrated Southern Tagalog Association of Information Technology Education (ISITE), Board of Mechatronics and Robotics Society of the Philippines (MRSP-R4) and International Association of Engineers (IAE). He is a graduate of 2 Doctorate Degrees, 4 master's degrees and 6 undergraduate programs focused on Engineering, Information Technology and Management He also received different awards in different countries and in the Philippines. One of his great achievements as a teacher was being the recipient of Outstanding Professor Award - Top 1 in the Philippines under Consortium of the South COTS. Currently, he is the Technical Panel for Information Technology of ISO/IEC – TC 60 under Philippines' Department of Trade and Industry (DTI), the Vice Chair of Sub Committee 1 of TC 60- ISO/ICE, Technical Panel of Malaysian Scientist Technical Association (MALSETAS), and Honorary Fellowship Member of Institute for Engineering Research and Publication (IIFERP-International). He is also an International and Local Accreditor for Washington Accord (PTC), Seoul Accord (PCAB) and PACUCOA and also a member of Regional Quality Assessment Team (RQAT) of Commission of Higher Education in the Philippines. Dr. Balba presented and published several numbers of research locally and internationally and became keynote speakers in different conferences in different countries.

Dr. Corazon B. Rebong, is presently the Vice President of Academics and formerly the College Dean at the Colegio de San Juan de Letran Calamba. She is also a member of CHED Regional Quality Assurance Team of (RQAT) Region IV-A, Philippine Association of Colleges and Universities on Accreditation (PACUCOA), the officer of the professional organizations namely, Philippine Society of Information Technology Education (PSITE) Region IV-A and Institute of Computer Engineers of the Philippines, Inc. (ICpEP). She earned her PH.D. in Management major in Information Technology Management (PhD-ITM) at the Colegio de San Juan de Letran Calamba; Master in Engineering major in Computer Engineering (MengCoE) from Pamantasan ng Lungsod ng Maynila and BS in computer Engineering at Adamson University. Before the pandemic, she is also teaching in the Technological Institute of the Philippines as exchange faculty under the faculty exchange program of Letran Calamba and TIP. She is also a Professor in the Graduate School of both institutions.

Her academic training and years of experience working in the academe prepare her to be an effective researcher and professor. Some of her research papers were published locally and in the Scopus index like the International Journal of Innovative Technology Engineering (IJITEE).

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