



**BUSITEMA
UNIVERSITY**
Pursuing Excellence

FACULTY OF ENGINEERING
DEPARTMENT OF COMPUTER ENGINEERING
BACHELOR OF COMPUTER ENGINEERING
FINAL YEAR PROJECT REPORT

AUTOMATED TEACHERS' CLASSROOM ATTENDANCE

MONITORING SYSTEM

BY NABADDA JOAN
BU/UG/2016/61

<mailto:nabaddajohan1@gmail.com>



Supervisor: Mr. ALUNYU ANDREW EGWAR

**A final year project report submitted in partial fulfillment of the
requirements for the award of a Bachelor's Degree in Computer Engineering
of Busitema University.**

JANUARY 2021

DECLARATION

I NABADDA JOAN with registration number BU/UG/2016/61, do declare that this project is my original work except where explicit citation has been made and that it has not been presented to any other institution of higher learning for an academic award.

Signature: 

BUSITEMA UNIVERSITY LIBRARY
CLASS No.:
ACCESS NO.: <u>PE 1057</u>



APPROVAL

This is to certify that the project under the title “Automated Teachers’ Classroom Attendance Monitoring System” has been done under my supervision and is now ready for examination.

Signature Date:

MR. ALUNYU ANDREW EGWAR

Department of Computer Engineering

DEDICATION

I dedicate this report to my parents, especially Ms. Nanyanzi Florence and Ms. Kanyago Justine, my siblings and to all my friends for always being there for me especially in this journey of academics.



ACKNOWLEDGEMENT

I have taken efforts in this project. However, I greatly thank the almighty God because it would not have been possible without him.

I am highly grateful to Mr. Alunyu Andrew Egwar for his guidance and constant supervision as well as for providing necessary information regarding this project & also for his support in completing the project.

I would like to extend my sincere appreciation to my dear family members Ms. Nanyanzi Florence and Ms. Kanyago Justine for their prayers, kind co-operation, financial assistance and encouragement which helped me in completion of this project. Great thanks and appreciations also go to my colleagues (Mahande Xavier, Kevin, Kukuya Ramos, Nakalyango Molly Francis and many others), and people who have willingly helped me out with their abilities in developing the project.

I would like to give a warm and well-deserved thank you to Mr. Ojok Rogers, Mr. Nyango Alex and Mr. Bukenya Xavier Francis for their hard work, dedication, advice and help towards this project.

Finally, I would like to appreciate all the BUSBCC members for all their prayers towards the finalists and I congratulate all my colleagues for completing this level of the academic journey.

ABSTRACT

The Automated Teachers' Classroom Attendance Monitoring System is designed specially to provide the school management team with proof of teachers' classroom attendances and performance. In Uganda, a teacher's presence in the classroom is an important prerequisite for learning to take place. Teachers play vital roles in the lives of the learners and therefore best known for classroom interactions with the learners and delivery of content. In fact, teachers set the tone of their classrooms, build a warm environment, mentor and nurture learners, become role models, and listen and look for signs of trouble in the student to inform their teaching and mentorship of the learners. This greatly helps the learners to grow mentally, intellectually, financially in the world of knowledge and also to broaden on their horizon towards life. However, teachers in Uganda often tend to be absent from the classrooms, thus disrupting the students learning and mentorship process. There is need for a closer and full monitoring of the entire teachers' classroom delivery and interaction with the learners. However, existing teacher classroom attendance monitoring systems in Uganda lacks the component of full monitoring of teachers' classroom attendance except in rare instances where inspector/administrators sit the full length of the lesson to invigilate the teachers' classroom delivery. This study identified various challenges to lack of a proper teachers' classroom attendance monitoring system, including, wastage of the parent's finances (money paid as school fees for the student), demoralization of the school organizational culture (timetable) and wastage of the school facilities among others. To solve the challenges, the study developed an Automated Teachers' Classroom Attendance Monitoring System with an aim to monitor and provide full proof of the teachers' classroom attendances. The developed system provides three major functionalities. One, the system records teachers' attendance through a fingerprint scanner that detects registered users and records their attendance in the system database. Two, a login interface for the system administrator and the management team to access summary information of teachers' attendance. Three, automated random recording of video clips of the teaching session. Results of the testing and validation show that the system performs the above mention functionalities. Therefore, it is anticipated that the system will reduce cases of teachers' absenteeism in schools that may adopt it.

LIST OF ABBREVIATION.

LCD	Liquid Crystal Display
LMS	Learning Management System
PCB	Printed Circuit Board
ESP	Extra Sensory Perception

Table of figures

Figure 1:showing fingerprint Scanner.....	7
Figure 2:showing ESP32 Wi-Fi module	8
Figure 3:showing a webcam.....	9
Figure 4:showing Keypad	10
Figure 5: Showing piezo-buzzer.....	10
Figure 6:showing an LCD	11
figure 7: showing Arduino mega 2560 microcontroller.....	12
Figure 8: showing jumper wires.....	12
Figure 9: Block Diagram of the Automated Teachers Classroom Attendance Monitoring System	27
Figure 10:Flow Chart of Teacher Sign in Process	29
Figure 11: Flow Chart showing automatic turn on and off of the camera process	30
Figure 12:Flow Chart showing administrator and management team login in process	31
Figure 13:System database ER-diagram	32
Figure 14: schematic diagram of the system	33
Figure 15: System Physical Design.....	34
Figure 16:system database.....	37
Figure 17: dashboard showing the graphical monthly attendances.....	38
Figure 18:General daily attendance report.....	38
Figure 19: showing graphical representation of daily attendances report.....	39
Figure 20:System designed web pages.....	45
Figure 21: Inside of the system	47
Figure 22: Outside look of the system.....	47

Table of Contents

DECLARATION.....	i
APPROVAL.....	ii
DEDICATION	iii
ACKNOWLEDGEMENT.....	iv
ABSTRACT	v
LIST OF ABBREVIATION.....	vi
Table of figures	vii
Table of Contents	viii
CHAPTER ONE: INTRODUCTION	1
1.2 Background of Study.....	1
1.2 Problem Statement	2
1.3 Objectives.....	3
1.3.1 Main Objective.....	3
1.3.2 Specific Objectives.....	3
1.4 Justification	3
1.5 Scope	3
1.5.1 Technical scope	3
1.5.2 Geographical scope	4
1.5.3 Challenges / Limitations.....	4
CHAPTER TWO: LITERATURE REVIEW	5
2.1 Key Terms	5
2.2 Description of components used	7
2.2 .1 Fingerprint scanner.....	7
2.2.2 ESP32 WIFI MODULE	8
2.2.3 Webcam.....	9

2.2.4 Keypad.....	10
2.2.5 Piezo-buzzer	10
2.2.6 Liquid Crystal Display (LCD).....	11
2.2.7 Arduino Microcontroller	11
2.2.8 Connectors (wires)	12
2.2.9 ARDUINO.....	13
2.3 Related Systems	14
2.4 DESIGNED SYSTEM	18
CHAPTER 3: METHODOLOGY.....	20
3.1 REQUIREMENTS GATHERING.....	20
3.2 REQUIREMENTS ANALYSIS	21
3.3 SYSTEM DESIGN.....	22
3.4 System Implementation.....	23
3.5 SYSTEM TESTING.....	24
CHAPTER FOUR: SYSTEM ANALYSIS AND DESIGN	25
4.0 Introduction	25
4.1 Requirements Analysis.....	25
4.2 System Design.....	26
4.2.1 System block diagram	26
4.3.4 Entity-Relationship Diagram.....	32
4.3.4 Schematic Diagram	33
CHAPTER FIVE: SYSTEM IMPLEMENTATION AND TESTING	35
5.0 INTRODUCTION.....	35
5.1 DEVELOPMENT PLATFORMS.....	35
5.2 SOFTWARE DESIGN.....	36
5.2 CODE DESIGN	36

5.3 SYSTEM TESTING AND EVALUATION.....	36
5.3.2 Integrated testing	39
5.3.3 System testing.....	39
5.3.4 System Verification.....	39
5.3.5 System Validation	40
5.3.4 System Evaluation.....	40
 CHAPTER SIX: DISCUSSION AND RECOMMENDATIONS	 41
6.0 INTRODUCTION.....	41
6.1 SUMMARY OF WORK DONE.....	41
6.2 CRITICAL ANALYSIS /APPRAISAL OF THE WORK.....	41
6.3 RECOMMENDATIONS	41
6.3 CONCLUSION	42
 Reference.....	 43
APPENDICES.....	45
APPENDIX 1: SYSTEM DESIGNED WEB PAGES.....	45
APPENDIX 2: SYSTEM PHYSICALDESIGN.	46
APPENDIX 3: SYSTEM HARDWARE CODE.	47



CHAPTER ONE: INTRODUCTION

1.2 Background of Study

School management interest themselves with ensuring that teachers engage the students in an attempt to sustain or improve the quality of education. However, they struggle in monitoring classroom attendance and performance of teachers. The World Bank estimates that in developing countries 11% to 30% of teachers are absent on a given day [1]. This represents a huge loss in teaching time and in student learning opportunities. Some of the studies on teacher absenteeism on the African continent reveal the following; a study developed in Botswana, Malawi and Uganda found that teacher absenteeism was around 3–6% at the primary level, with Botswana showing the highest rate (6%); and between 3% and 11% at secondary level, with Uganda showing the highest rate (11%). A study in Kenya suggested that teachers from rural schools were absent 20% of the time. In Zambia, teachers were absent 18% of the time. Finally, in Papua New Guinea, the absence rate was 15%. In summary, therefore, teacher absenteeism rates vary across African countries, ranging from 3% in Malawi to 27% in Uganda [2].

In Uganda, the education system is comprised of both private and public (government) schools (from primary level to tertiary level). The rate of teacher absenteeism in public schools is three times higher than that in private schools [3]. However, teacher absenteeism remains a serious challenge in Uganda in both private and public schools with an estimate rate of absenteeism as high as 27% [4].

Some research has suggested that high employee absenteeism indicates poor worker morale [5]. In addition, another study focused specifically at absenteeism in relation to how teachers report their absences [6]. This research established that teachers are most likely to be absent less often if they are required to notify their principal by telephone about impending absences [7]. According to research, when a teacher is absent from the classroom, student learning is disrupted. This shows that the more days a teacher is out of the classroom, the lower their students score on every test [7]. Therefore, the consistent presence of the teacher in the classroom is of supreme importance to provide effective instruction to students [5].

Current methods used to record teacher's attendance in Uganda include staff attendance registers, finger print scanners, and student-based teachers classroom register among others. The most common being staff attendance registers. Staff attendance register system is where every teacher sign in and out, at the start and end of each work day [8]. However, signing in the register on arrival and departure does not necessarily

Reference

- [1] “Technologies to improve teacher attendance and motivation _ Unesco IIEP Learning Portal.” .
- [2] C. Sugimaru, *Systematic review What works to improve teacher attendance in developing countries ? A systematic review Gabriela Guerrero*, no. October. 2012.
- [3] “The Hidden Cost of Corruption_ Teacher Absenteeism and Loss in Schools.” .
- [4] J. Cilliers, I. Kasirye, C. Leaver, P. Serneels, and A. Zeitlin, *Improving Teacher Attendance Using a Locally Managed Monitoring Scheme : Evidence From Ugandan Primary Schools*, no. April. 2014.
- [5] T. Singh, N. Chetty, and A. M. Karodia, “An Investigation into the Impact of Absenteeism on the Organisational Performance of a Private Security Company in Durban , Kwazulu-Natal,” *Singaporean J. Bus. Econ. Manag. Stud.*, vol. 4, no. 11, pp. 105–159, 2016.
- [6] G. Motors and W. Europe, “the impact of teacher absenteeism on student achievement,” no. June, 2016.
- [7] MoES Uganda, “Teacher issues in Uganda: a diagnosis for a shared vision and the designing of a feasible, indigenous and effective teachers’ policy,” no. August, p. 132, 2013.
- [8] A. Registers and A. Books, “School Registers & Records,” pp. 45–56.
- [9] “Teacher Absenteeism_ Pupils Best Placed To Fight Vice.” .
- [10] A. Absenteeism, “Policy Brief,” 2010.
- [11] K. C. Knoster, “Strategies for Addressing Student and Teacher Absenteeism: A Literature Review,” *North Cent. Compr. Cent.*, no. November, p. 22, 2016.
- [12] “what is an exegetical paper - Yahoo Search Results Yahoo Search Results.” .
- [13] G. Zombwe, “Who is a Teacher?,” *Reading only*. 2014.
- [14] “who is a student - Yahoo Search Results Yahoo Search Results.” .
- [15] “Goal and Objectives of the Training.”.
- [16] S. Aguti, “School inspection and its influence in the quality development of inclusive education practices in Uganda,” 2015.
- [17] “What is a Virtual Classroom? - Definition from Techopedia.” .
- [18] A. Utilisation and A. Change, “Evidence & Policy *,” vol. 5, no. 4, pp. 4–6, 2009.

- [19] M. Olagunju, A. E., and T. O., "Staff Attendance Monitoring System using Fingerprint Biometrics," *Int. J. Comput. Appl.*, vol. 179, no. 21, pp. 8–15, 2018.