Advanced Automated Result Processing and Management System: (A Case Study of Mai Idris Alooma Polytechnic Geidam, Yobe State)

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ABSTRACT: The current method of student result assessing and processing with the aid of only Microsoft Excel Template is cumbersome, stressful and erroneous. This research studied the difficulties faced with the current result processing system and proposed an improved system using XAMP full stack. In the proposed system, two related software were designed, one to be used by course lecturer to enter students' score and generates students' grade. The other software would be used by the departmental exams officer (DEO) who is the Admin of the system to generate their Grade Point (GP), Cumulative Grade Point Average(CGPA) and Graduating Grade Point Average(CGPA) easily, the exams and record office would use it to generate Transcript. The advanced result processing and management system is highly secured and protected from unauthorized users and this helps to reduce cases of missing student records. It also enhances the reliability and convenience in computation of student score and generate their respective grade point in each course. The database contains the complete and comprehensive details of students and their academic performance. The advanced automated result processing and management system was designed using XAMP full stack where HTML, CSS and JavaScript were used for frontend while PHP and MySQL Database were used to design the students record database.
IJSB
KEYWORDS: result, GPA, GGPA, database, automated, processing system

I. INTRODUCTION

One of the most vital elements in schools is Student's Examination result. Thus, processing these data must be under critical management, while requiring simple operations for processing the examination results. The need for student to have access to their result timely and accurately cannot be overemphasized. Scores from examinations taken by students need to be returned to these students to enable them know their fate in the various courses written.

Also, students need to know what courses they failed in order to retake the exams. On the other hand, there are a lot of burden on the Staff in charge of student result processing, such burdens include but not limited to project supervision, lecturing, research, marking of exams and attending to other administrative task. These other duties tend to affect the timeliness, efficiency and accuracy of processing the results.

Result is a complete record of the students' education coursework, grades and quality points a student has earned in his/her stay in the institution. Results provide a standard format for recording all study activities carried out by students. It is an essential tool for academic recognition.

When planning to further one's education after their National Diploma or Higher National Diploma, the need to present one's certified result arises. A certified result is one that has been certified as a true copy of the original result by someone in the issuing department who has the authority to do this, such as the exams and record officer or the head of department (HoD).

The effort been exhausted in the process of computation of students' examination results is awesome. These processes are carried out at the end of every semester of every academic session, putting the operators in a continuous and ever demanding cycle. This makes the process so cumbersome.

It is a pity that lecturers in the polytechnic at this age where computers are necessary instructional partners for academic activities are still submitting manually-written results, any school operating on this appears not to be moving with time as manually written Results can be prone to many disadvantages such as human errors are most likely (there is no way one will count As, ABs, Bs, BCs etc from 1000 students manually without making mistake). Another disadvantage is the fact that Preserving manual results for a long time may be

problematic. These apart from time taken for manual computation of the result.

With manual presentation of results, some lecturers are using some software tools like Microsoft Excel in presenting their Results. Excel is a software for Financial Calculations, though it may slightly cater for Result presentation too, but with much rigour and thorough effort.

In fact, using Microsoft Excel for Result processing can simply be described as **Advanced Manual System**. In fact, it will be like somebody who wants to move from Maiduguri to Kano and is moving with a tractor. Though it will eventually do the work, but with much effort and cost.

Here at Mai Idris Alooma Polytechnic Geidam, lecturers use an Excel Template to input

II. LITERATURE REVIEW
Computerized or automated result processing system is not a new intervention in today's education system, however, the approach has differed depending on how the targeted institution performs its own manual result processing. For example, a software designed for secondary school may be different from that designed for polytechnics or university.

Thus, student result processing management system is an automated system that makes use of software to enhance the reliability, confidentiality and convenience in computation of student score, generate their respective grade in each course, most of the report are simple text format, for the purpose of fast printing. It also has a document (that is database document) that contains complete comprehensive details of each student and their academic performance. The database keeps track of each student course like exams requirement and subjects.

Researchers categorised two methods of handling and processing students' results these methods include the conventional (manual) method and the electronic/computerized method [1]. The manual method is the first known method of result processing which requires the use of paper and pen to aid processing in addition to some other primitive tools such as tables or calculators and sometimes typewriters [2]. The processing of student's result by machines in general in such a way as to reduce to a large extent the need for manual processing is referred to as automatic student result processing which is in-between the manual and electronic method which is also obsolete [3] and [4]When computers are used to carried out such procedures,

the Continuous Assessment (C/As) and Exam scores of the students.

As known to many, the application of computer is very relevant in every aspect of human life and there is need for everyone to be conversant with the new technology. The computer is used to carry out a task and assist man in business organization, research, education and many aspect of life. The development of computer to be used in office industries, homes as a replacement of manual method of data processing is the best technology that has ever happen to office management.

In view of this, it is necessary for an improved student result processing management system for Mai Idris Alooma Polytechnic Geidam in other to aid the processing of student record on time and accuracy.
then it is referred to as electronic student result processing.

Table 1 shows the summary of some works conducted on electronic result processing system. The terms electronic, automated and computerized are sometimes used interchangeably by some authors.
From the literature, it was observed that different works have different issues that need to be addressed, thus, this research has identified the following gaps and devised a means of filling the gaps. The limitations of the previous works include but not limited to the following.
i.   Still manual inputs are required at some level like the departmental exam officer who can also make error while entering the scores submitted by course lecturers;
ii. Some works are carried out 100% online, this would not be suitable to places like Mai Idris Alooma Polytechnic where network and/or problem may arise;
In view of the above, this research produced a software as follows with two main parts :
a.   Software to be used by course lecturers to input their results, the software then computes the result. The lecturer would then send the softcopy of the course result electronically to the departmental exam officer.
b.   Software to be used at the department and above, this software would automatically read the result produced by course lecturers and compute the GPAs and CGPAs of students. The result would then be sent to the polytechnic academic board electronically.

Details of the procedure, methods and materials used in the research are stated at the methodology section.

Table 1 :Some Related Works on Result Processing

Definition of Terms

S/No	Author(s)/Year	Title	Material and Method	Comment
1.	(Ukaoha & Amadin, 2014)	Computerized Result Processing System: A Case Study of the Department of Computer Science, University of Benin	Java programming language was used to design the program, SQL was used for database	Has the disadvantage of not working offline. A lecturer must be online to post his result.
2.	(Bolanle, 2018)	Development of Computerised Students' Results Processing System for Secondary Schools in Kwara State.	C# was used to design the package,	The package is quite ok for secondary schools but not for high institutions where more computations such as CGPA and transcripts
3.	(Dar, 2018)	Result Processing: Issues And Solutions	Use additional software to verify human error while inputting students score for computation	The work is cumbersome to understand by non-computer professionals
4.	(Osagie & Mallam, 2014)	Students Record Analysis And Examination Result Computation Algorithm (SRAERCA)	FORTRAN programming language was used to design the computation algorithm	Still multiple manual inputs are required at some phases like the office of departmental exam officer
5.	(Omogbhemhe & Akpojaro, n.d.)	Development of Centralized Transcript Processing System	The system was implemented using C#. SQL server was used to implement the back end. The interface of the application was developed using ASP.NET while cascading style sheet was used to maintain the application colours	The system concentrates on Transcript generation, it is also one-size-fits-all, that ie, one program to perform many actions, it is difficult to trace error.
6.	(Chinedu et al., 2017)	Automated Students' Results Management Information System (SRMIS)	CSS, JavaScript, HTML, PHP, MySQL Server.	Cost implication

The term use in this research work are defined as follows:

- **Automation**: refer to the use of machine to perform a certain task that is been done manually through human efforts.
- **Implementation:** A way of executing or performing a certain task or problem using automated process.
- **Student:** refer to somebody who study a certain profession or carrier. In education, student refers to somebody who study a certain course in an institution. E.g. computer science, engineering, accounting, architecture.
- **Result:** This is information, outcome obtained from an experiment or calculation, research, in a certain field of study. It is also a final score or mark in the context of an examination.
- **Processing:** This is a subjection series of procedure used in treating or analyzing a data to acquire information or record.
- **Management:** It is the act of managing or supervising a certain task. This covers the planning, control, and administration of an operation of concern. The top management handles planning, the middle management concentrates on controlling, and the lower management is concern with the actual administration. It also has the ability to control or supervise a managerial skill.
- **Database:** This is an organized collection of data files or file that contains data of a certain object.

Computerization:This is the act of computing a manual work done into an automated process via the use of computer.

Academic Program Evaluation at Mai Idris Alooma Polytechnic Geidam
The Polytechnic operates a system of continuous assessment which take into account, a spectrum of academic activities over the semester including formal examinations.

According to comprehensives handbook revised edition 2008
1. Student must attend lecture, laboratory, workshop, training and practical project, undertaking (where applicable)
2. Except in workshop or laboratory base course where a weighting of 20/10 hold practical text, the relative weighing for the entire semester are as follows:

Examination = 60%
Course work = 40%

Definition of Basic Terms
Session means an academic year as determined by the Academic Board/NBTE, which shall normally be of two semesters.
Semester means period of about 18 weeks including 15 contact weeks as specified by NBTE.
Contact Hour is defined as the period of classroom, laboratory, workshop or fieldwork interaction between a lecturer/tutor and students for academic instruction and supervision.
One Credit is defined as one hour of lecture or tutorial per week per semester or two to three hours of field, laboratory, studio or workshop practical per week per semester.
Compulsory Courses are courses that must be taken and passed in particular programme of studies.
Elective Courses are optional courses that once chosen would have to be passed.
Grade Point (GP) is derived from the actual percentage raw score for a given score; the score is then converted into a letter grade and a grade point.
Grade Point Average (GPA) is the ratio of the total Grade Point (GP) to the total number of Credit Units. Grade Points are calculated by multiplying the course grade point by the Credit Units of the course.
Cumulative Grade Point Average (CGPA) is the ratio of the total Grade Point for the present and previous semesters to the total numbers of Credit Units for the present and previous semesters. In other words, it is the up-to-date mean of the Grade Points Average earned by the students' in a programme of study, which in effect indicated the students' overall performance at any point in the training programme.

Grading System at Mai Idris Alooma Polytechnic Geidam
The grading system at Mai Idris Alooma Polytechnic Geidam is strictly on the provision of the NBTE guidelines of grading system. There are eight grades a student can get after summing his CA and exam scores, each grade has a number of points assigned, the grade average pointis then computed

after getting the student's grade in each course offered.

Table 2: Grading System at MIAPOLY Geidam

Score	Grade	Point
75-100	A	4.00
70-74	AB	3.75
65-70	B	3.25
60-64	BC	3.00
55-59	C	2.75
50-54	CD	2.50
45-49	D	2.25
40-44	E	2.00
0-39	F	0

III. METHODOLOGY

This section describes the methods, procedures, materials and techniques used to achieve the research objectives. The system development lifecycle was followed to implement the Improved Electronic Result Processing System. Next is the description of the proposed system.

The Existing System

Currently, result processing at Mai Idris Alooma Polytechnic Geidam is done in what some scholars called it as Advanced Manual Processing [10]. In this method, An Excel Template is used throughout the result processing phases. The lecturers would use the template to enter the CA and exam scores of each registered student that sat for that exam. The template would then compute the result of the student and give out the grades using formula. The lecturer would then forward the result (either hardcopy or softcopy) to the departmental exam officer (DEO) see Fig.1.

MAI IDRIS AALOOMA POLYTECHNIC , GEIDAM

(Office of the Registrar)

EXAMINATION SCORE SHEET

Academic Session: **2018/ 2019**   Semester: 2ND **Semester**   Department: **Computer Science**

Programme: **ND II COMPUTER SCIENCE**   Course Title & Code: **COM 221 PROGRAMMING WITH O.O. FORT**

COM 221 ASSESSMENT 2018 (SCORE SHEET)
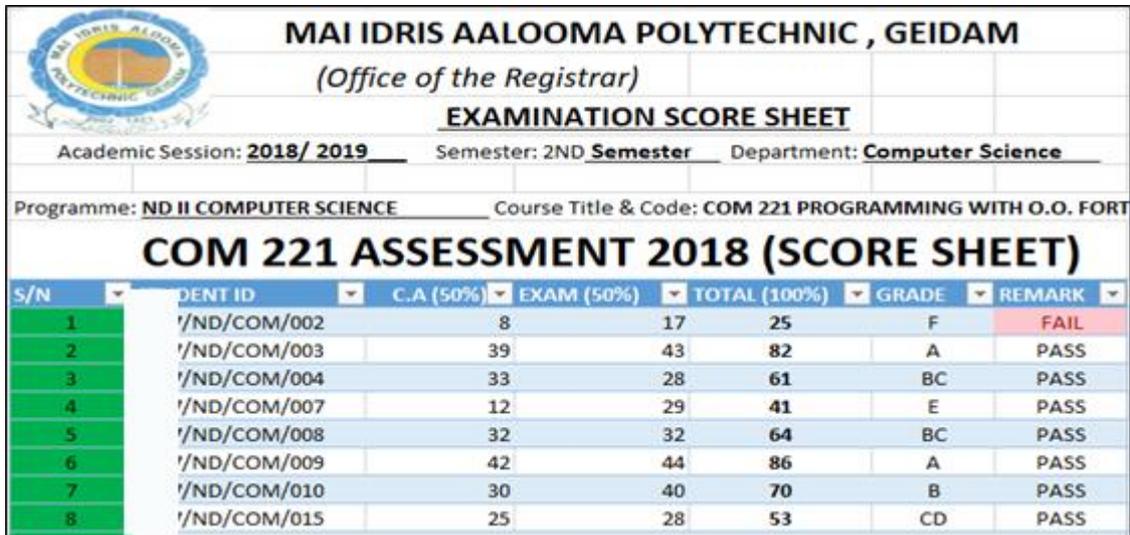
S/N	DENT ID	C.A (50%)	EXAM (50%)	TOTAL (100%)	GRADE	REMARK
1	/ND/COM/002	8	17	25	F	FAIL
2	/ND/COM/003	39	43	82	A	PASS
3	/ND/COM/004	33	28	61	BC	PASS
4	/ND/COM/007	12	29	41	E	PASS
5	/ND/COM/008	32	32	64	BC	PASS
6	/ND/COM/009	42	44	86	A	PASS
7	/ND/COM/010	30	40	70	B	PASS
8	/ND/COM/015	25	28	53	CD	PASS

Figure 1: Score Sheet from Course Lecturer

The DEO would then enter every result sent to him by each lecturer in another Excel template where the student's result of all courses written would be computed and his GPA/CGPA would be generated as shown in Fig.2.

			PROGRAMMING USING JAVA			USE OF INTERNET			COMPUTER APPL. PACKAGE I			DATA STRUCTURE AND ALGORITHM			INTRO. SYSTEM ANALYSIS & DESIGN			PC UPGRADE AND MAINTENANCE			INTRO. TO INTERPRENUESHIP			CITIZENSHIP EDUCATION			TOTAL GRADE POINT	TOTAL CREDIT UNIT	
COURSE TITLE																															
COURSE CODE			COM 121			COM122			COM123			COM124			COM125			COM126			EDD126			GNS 128				TCU	
CREDIT UNIT			4			3			4			3			3			4			2			2				25	
S/N NAMES	Reg. No.		MK	GD	PT	MK	GD	PT	MK	GD	PT	MK	GD	PT	MK	GD	PT	MK	GD	PT	MK	GD	PT	MK	GD	PT	TGP	GPA	REMARK
1 SALEH USMAN	2018/ND/COM/001		46	D	9.00	47	D	6.75	62	BC	12.00	60	BC	9.00	49	D	6.75	43	E	8.00	46	D	4.50	47	D	4.50	60.5	2.42	PASS

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A departmental meeting would be conducted after the DEO finished his work. The aim of the departmental meeting is to check for any error that may exist while manually inputting the students' grades. After the departmental meeting, a school (faculty) meeting would be held with the same aim as that of departmental meeting.

Finally, an Academic Board Meeting (ABM) would be held to endorse the result as official one. Any result that scales the ABM would be pasted on the noticeboard for students to see their result, it would also be sent to the Exams and Record Officer who is responsible for issuing the students their graduating result that is, either National Diploma or Higher National Diploma. Fig. 3 shows the flow of result processing at Mai idris Alooma Polytechnic Geidam.
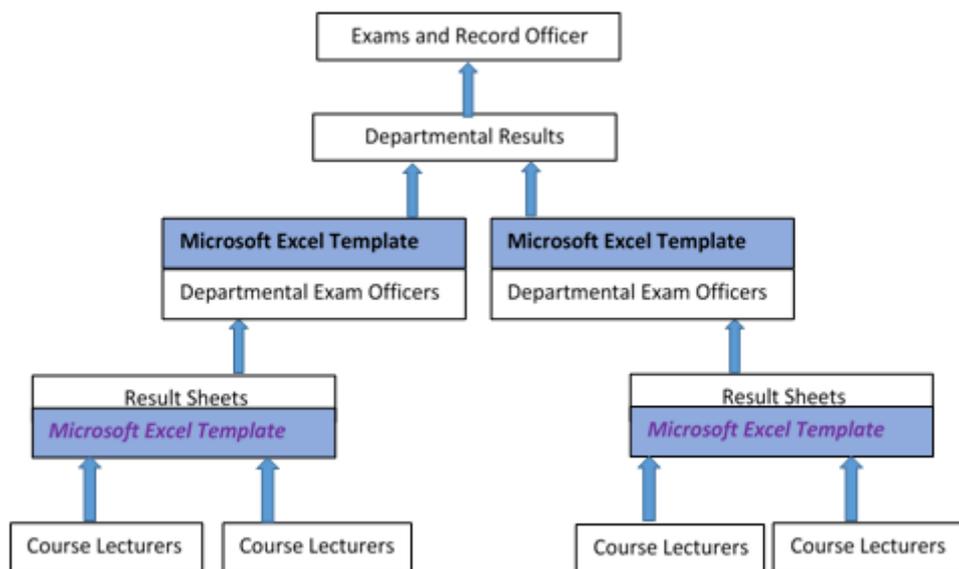
Figure 3: Data Flow Diagram for The Existing Method of Result Processing

From the flow diagram of Fig.3, it can be vividly seen that, despite using the Excel template for computing the result, other processing steps (phases) are done manually. This makes the work cumbersome, error prone, time and storage consuming.

Likewise, the process involved in validating the results takes a long way, there exist three (3) different meetings- at departmental level, school level and Academic Board (Management) level. There are two weeks interval between every meeting. The departmental level meeting takes place two week after the end of semester exams. This implies that, **there is a minimum of six weeks before result is been processed**.

The exams and record office also keeps the entire institution result in hard copy. By implication, there is no safety of result loss. Fig.4 shows the steps

involved.

The proposed system

The proposed system was built using multiple technologies for each layer of the system. HTML, CSS and JavaScript were used to design the front-end of the system. For the middle layer, Apache component of XAMP was used.   The backend functionalities of the Data layer were powered by PHP and MySQL which manipulate the database on the web server. A code editor called Visual Studio Code (short form is VS Code) was used for scripting and debugging presentation layer languages
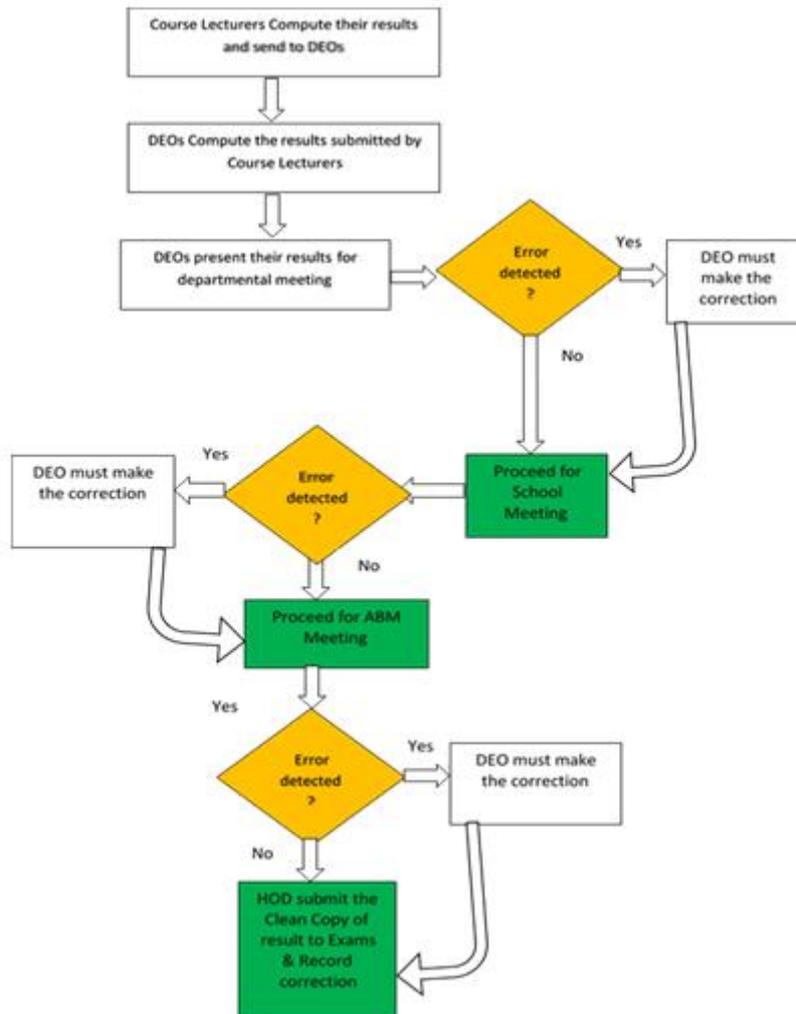
Figure 4: Steps involved in Result Processing of the Existing System

Beside, in XAMPP, the main components are preconfigured to facilitate communication among various layers. The functionalities of VSCode include its ability of having rich ecosystem extension for PHP. The system allows two types of users, the Admin who is the Exam Officer or his equivalence and the student as a User. Student must be added by the Admin before he gains access to view his result. Student can only view (read) his result but cannot edit it. Fig. 3 shows a screen shot for the administrator's interface of the system.

current, the core moves to increase the flux linkage by closing the air gap between the cores. The movable core is usually spring-loaded to allow the core to retract when the current is switched off. The force generated is approximately proportional to the square of the current and inversely proportional to the square of the length of the air gap.

IV. EXPERIMENTAL RESULT AND ANALYSIS

The software was tested using sample results generated from the existing system. Results

of over 200 students were randomly selected to test the accuracy of the new system. The system has performed the expected function which implied that the objectives of the research were achieved.

V. CONCLUSION

This paper presented an advanced automated result processing system. The researcher studied the existing systems of result computation at Mai Idris Alooma Polytechnic Geidam. The existing system was found to have several difficulties in computing and handling the student results. These difficulties include the tediousness, error prone processes and the inability to protect confidentiality and security of the results. The proposed system has successfully solved most of the limitation in the exiting systems. The research contributions include the entire automation of the results processing, the integrity of results processed, elimination of data redundancy and time saving. Accuracy is another merit of the new system, finally, students can now gain access to their result when they log in to the system.

VI. ACKNOWLEDGEMENT

REFERENCES

[1] O. A. Ise, "A Novel Framework for Student Result Computation as a Cloud Computing Service," pp. 1–15, 2015, doi: 10.12691/ajss-3-1-2.

[2] A. U. Osagie and A. Mallam, "Students Record Analysis And Examination Result Computation Algorithm (SRAERCA)," vol. 2, no. 8, pp. 49–59, 2014.

[3] E. O. Ukem, "A SOFTWARE APPLICATION STUDENTS RESULTS FOR THE PROCESSING OF," vol. 17, no. 4, pp. 487–502, 2011.

[4] U. Emmanuel and U. C. P. Hd, "A Theoretical Framework for an Intelligent Result Processing Expert System in Nigerian Universities," vol. 5, no. 1, pp. 9–16, 2018, doi: 10.9790/0050-0501010916.

[5] K. C. Ukaoha and F. Amadin, "Computerized result processing system : A case study of the department of computer science , University of Benin Computerized Result Processing System : A Case Study of the Department of Computer Science , University of Benin Department of Computer Scienc," no. October, 2014, doi:

10.1109/ICASTECH.2014.7068148.

[6] I. Bolanle, "Development of Computerised Students' Results Processing System," vol. 9, no. 4, pp. 730–740, 2018.

[7] S. A. Dar, "TECHNOLOGY (With reference to J & K State Board of Technical Education)," vol. 7, no. 4, pp. 267–269, 2018.

[8] M. Omogbhemhe and J. Akpojaro, "Development of Centralized Transcript Processing System," pp. 235–243.

[9] L. Chinedu, U. Paul, E. Henry, and A. H. H, "Automated Students ' Results Management Information System (SRMIS)," vol. 4, no. 10, pp. 8587–8601, 2017.

[10] O. K. Akputu, K. F. Attai, A. Usoro, and A. O. Abiodun, "Policy-Driven Academic Result Computation and Transcription : Ritman University Case," vol. 9, no. 1, pp. 168–174, 2020, doi: 10.17148/IJARCCE.2020.9132.