Asian Journal of Research in Computer Science

Volume 16, Issue 3, Page 34-42, 2023; Article no.AJRCOS.101214
ISSN: 2581-8260

Designing and Implementation of Academic Based Network Software

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Authors' contributions

This work was carried out in collaboration between both authors. Authors SC and UNI participated in the design of the structure and interface of the system. Both authors did code the platform. Both authors are involved in the clearing of site and networking of the center meant for the project test running. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJRCOS/2023/v16i3343

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/101214

Review Article

Received: 05/04/2023
Accepted: 09/06/2023
Published: 20/06/2023

ABSTRACT

Aims: Design of an Academic Network Based Software (ANBS) for teaching, learning and more collaboration between the teachers and learners.
Study Design: An agile software was used to assure subsystem effective before moving to another.
Place and Duration of Study: Federal Polytechnic Kaura Namoda Zamfara State Nigeria 2021.
Methodology: The designing of the online learning module of this kind using Agile software development method which is necessary in certain situations, especially where research and development is being conducted. It involves the development process of incremental and iterative approach from different schools in the institution which includes School of Business Management Studies, School of Engineering Technology, School of Science Technology, School of Environmental Science, School of General Studies respectively. The system was structured in module which includes Administrator, Instructor and Learner modules respectively.
Conclusion: It is expected that the new system will effectively and efficiently handle most of the problems of students learning experience and teacher mode of delivery of lectures in Federal Polytechnic Kaura Namoda.

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Keywords: Learner; instructor; assignment; portal; programming; intranet; internet.

1. INTRODUCTION

The information technological revolution has changed the native way of teaching and learning. You need not to be in the class to learn as a student or deliver your lectures as a teacher. Learning process has over the years evolving due to the dynamic nature of human and quest to improve our thoughts. eLearning have been evolving over a decade and still evolving as the level of its utilization is still low, must especially in the developing country like Nigeria. eLearning is the effective utilization of web technological experience toward effective delivering of educational activities. No any country has ever reached its economical potentials without education. eLearning, ilearning, online learning, and web-based training are used synonymously to mean same thing [1]. It was observes that eLearning are made to improve the learning experience of the learning using web facilities by the use of computer and other electronic tools [2]. Meanwhile, Hamid, et al. [3] opined that learning 2.0 is an educational accomplishment which implores the creative usage of web tools that encourage produces different learning experience. They went further to highlight facilities used by the Learning 2.0, which includes web tools, social networking, self learning and self directed learning. It is the view of Mlitwa, [4] that technology cannot and will never make a poor student brilliant notwithstanding the quality of the content, teacher and learning method. And Du, et al. [5] believes that Elearning is a learner's centered approach to teaching which has given learners much better experience. He wants further to say that; it brings out innovative experience of the student.

Different Elearning activities has evolved over the years in Elearning, they includes self-paced, instructor-led and video. While the self-pace is the process whereby the learner is allowed to work through the resources learning on its own. The instructor-led is when an instructor engages learners and guides them through resources to perfection. Lastly, video learning is the act of having the instructor an learning interact through an online video streaming. Elearning was categorized [6] into knowledge databases, online support, asynchronous learning and synchronous learning respectively.

A list of benefits has been highlighted from the usage of Elearning, one which is that learners can choice to be taught at any place, any time, at their speed of assimilation [7]. The observed Florea, [8] that elearning is an important element in many knowledge economy countries, because it has assisted government, cooperate bodies, individuals and educational institutions in becoming innovative and effectual in learning experience delivery. All these bodies deliver their training without thinking of the time or space for it [9]. It encourages a learner-centered learning which improves the collaborative learning, interaction and communication [5] thereby giving learners enhanced academic experience.

It was expected that today's learning experience would have improved and pierce through developed, developing, and under developing countries of the world today, had it been that the rate at which the digital natives and digital immigrants [10] were embracing computer technology was given a full backing. But this is far from the truth as number of institutions who has adopted elearning is still low most especially in the developing world like us. Nigerian educational system is far to adopting that although some school has started using elearning. An interactive Elearning was developed [11] to improve learning and collaborative tools for student. The design of Collaborative Learning Management System (CLMS) was done by Ikwunne, et al. [12] using rapid application development method which is robust, interactive and reliable for learning. The online-based learning model was analyzed and grouped [13] to content interaction which includes learning resource for effective lecture delivery and social interaction to access learners learns their fellow student social well-being in school. An integrated Academic Management Model with LMS [14] was design to improve the teaching and learning experience for Peruvian Private University. Hanafin and Peck approach model [15] was used in designing and implementation of LMS which they emphasize its usefulness for teaching and learning. An online course management system [16] which adopted waterfall model to addresses the problem of examination was developed. The advantages and disadvantages of the online learning method [17] was reported and they concur that teachers and students enjoyed the platform.

Furthermore, Academic Network software properly designed for academic institution plays very important role in helping lecturer to integrate

advance technology in delivering lectures to students. Considering the present methods of delivering lectures at Federal Polytechnic Kaura Namoda, lecturers either dictate their lecture notes or explain it verbally. The use of white board and projector are commonly referred to as application of Information Communication Technology in teaching, learning and research process. This approach is predominantly being adopted since the 1990s and being that we are in the 20th century, this approach of delivering lectures may not desirable by students any more with the high interest on social media.

2. MATERIALS AND METHODS

2.1 Aim and Objectives of Study

This project is aimed at designing and developing an efficient on-line learning solution which will enable the student interact and work on their pace.

The objectives of the project are

i. To design and implement an online learning tool
ii. To create an interacting element which facilitate student's learning experience
iii. To design platform which makes teaching and evaluating students more easy

2.2 Methodology

The mode of teaching presently in Federal Polytechnic Kaura Namoda as mentioned earlier is by dictating noted, white marker board, and just about 0.009% is using projector which is very poor. This prompted the designing of the online learning module of this kind using Agile software development method. It O'Sheedy, [18] holds that an agile method is necessary in certain situations, especially where research and development is being conducted.

2.3 Agile Software Development

The modules involved in the software is designed following Agile development process. Agile software development process involves incremental and iterative approach shown in the Fig. 1. The proposed system was broken down into five individual models which constitutes the five schools in Federal Polytechnic Kaura Namoda which includes the following.

1. School of Business Management Studies.
2. School of Engineering Technology
3. School of Science Technology
4. School of Environmental Science
5. School of General Studies

These individual models follow the Fig. 1 approach for developing a system with good digital experience.

2.4 Proposed Methodology and System Design

The Academic Network Based Software for Federal polytechnic Kaura Namoda is designed with the following modules: Administrator, Instructor and Learner modules respectively.

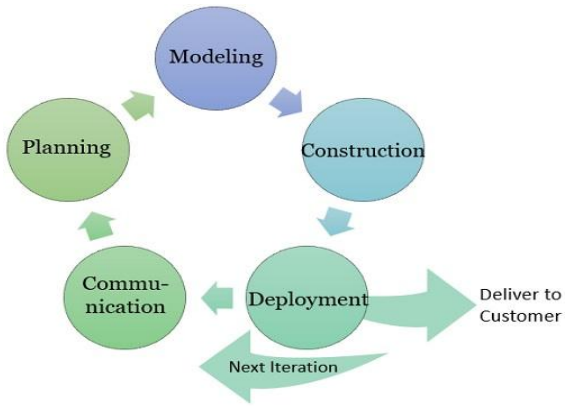


Fig. 1. Agile software development cycle

2.4.1 Administrator module

The element administrator (Admin) is the initiator of this system. His job is to add the following: department, courses, lecturers, student and also view reports from both the student and Lecturers respectively. They work as a supervisory element for all the activities, in fact they are termed to be the Head of various Departments here. Their major work is to coordinate and supervise departmental activities for efficiency and productivity. At the beginning of every semester, he registers the department, flags on the courses available for the semester, and the register those lecturers that will be taking the courses. Furthermore, they register student who are qualify to enroll for the available courses. The report on lecturer and student activities can also be viewed by the Admin. There is a security login interface which always requires them to enter password before being granted access for any changes in the admin portal, this is shown in Fig. 2(a) and Fig. 2(b) depicts the activities of Admin such as such departmental registration into the portal as in Fig. 2(c).

2.4.2 Instructor module

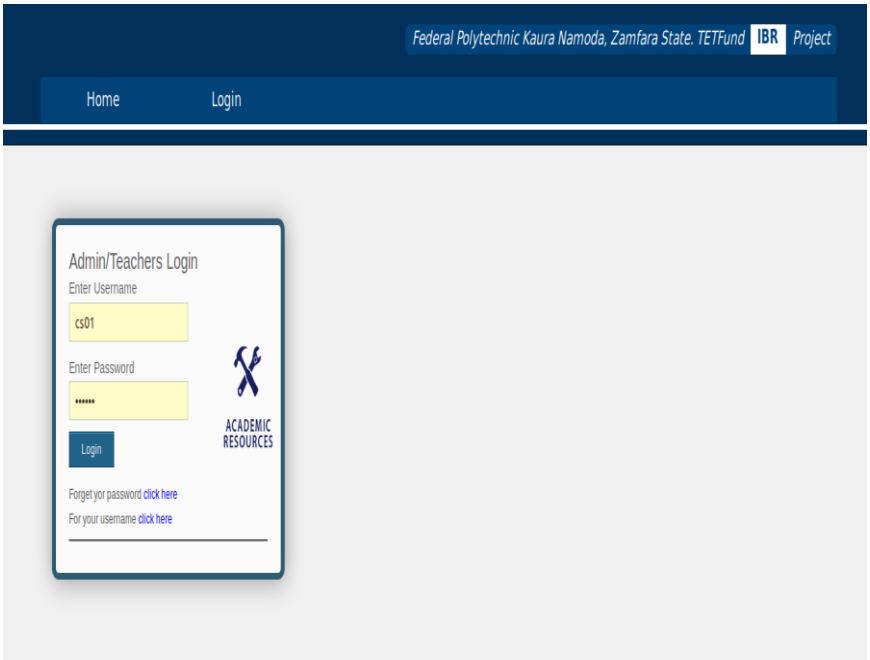
The instructor prepares learning content and uploads same to the enrolled student in his class. He also gives them assignment, test and final examination. Meanwhile, he evaluates all these three and scores the students appropriately and subsequently uploads it. They can send notification to student and views student progress report. See below the activities of instructor and the interface in Fig. 3.

2.4.3 Learner module

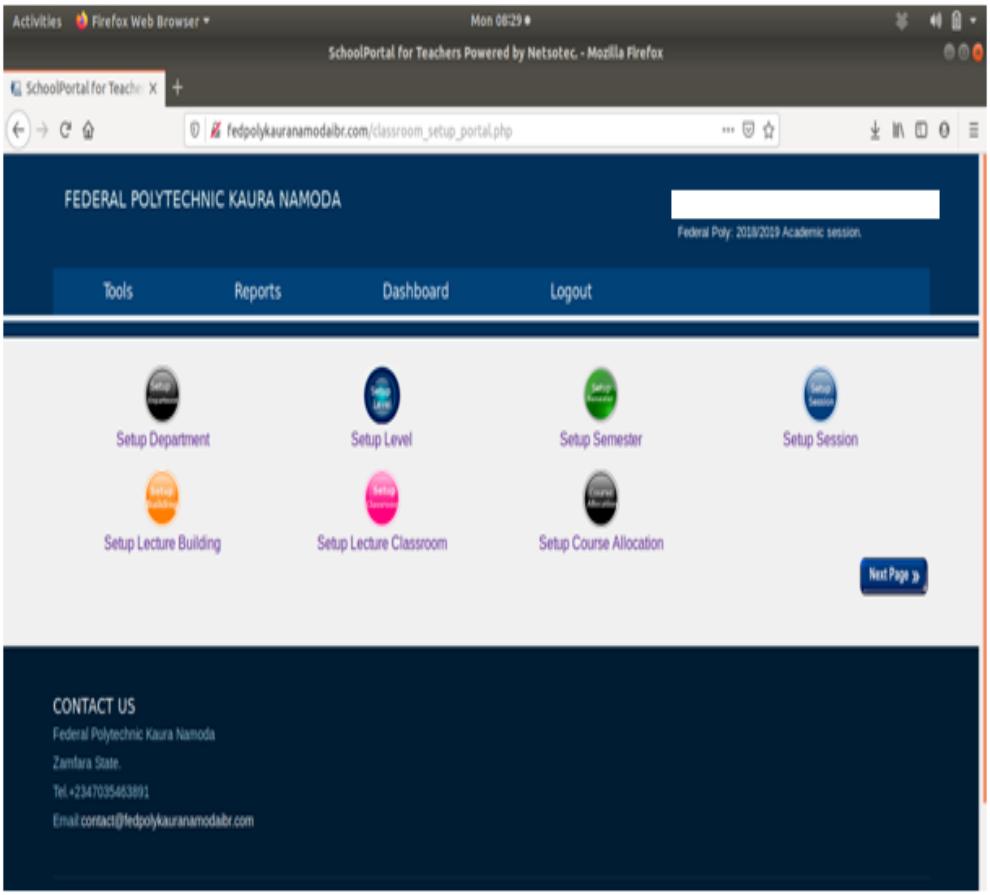
This module is the student view where he accesses the learning contents, do assignments and upload it, take test and final examination. On this view, the learner is equipped with the facility to view all his course work and final scores examination scores for the registered courses. This scenario is clearly captured in the diagram in Fig. 4.

Meanwhile, for an effective learning experience with this proposed system, the three key users work hand-in-hand. We have adopted the flow of traffic [11] as shown in Fig. 5.

This is done by including additional user which is the administrator who oversees the smooth running of this system and updates when need be. Meanwhile, institutions A and B in Fig. 5 are replaced with various schools in the Federal Polytechnic Kaura Namoda.



(a)



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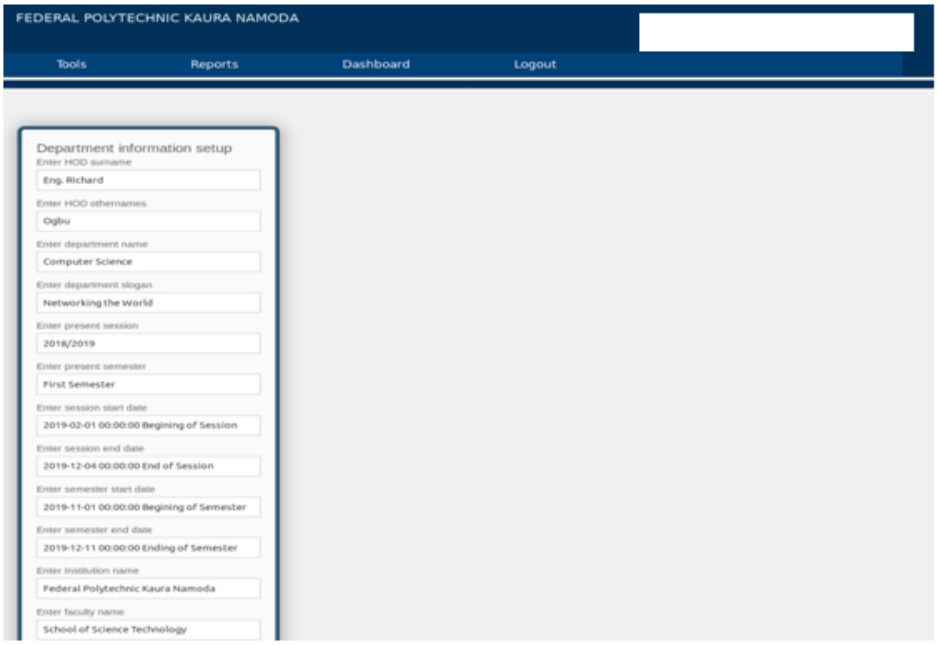


(c)

Fig. 2. Administrator activities interface. (a) Login Admin (b) General Activities (c) Registering Department

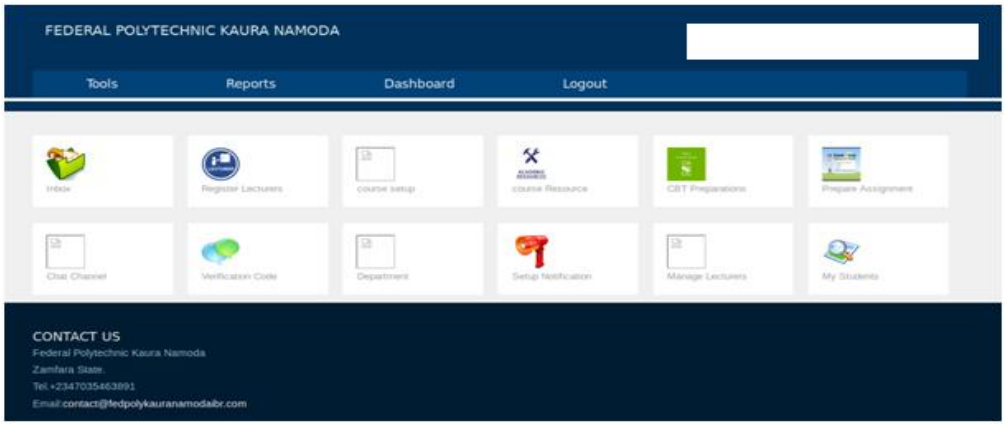
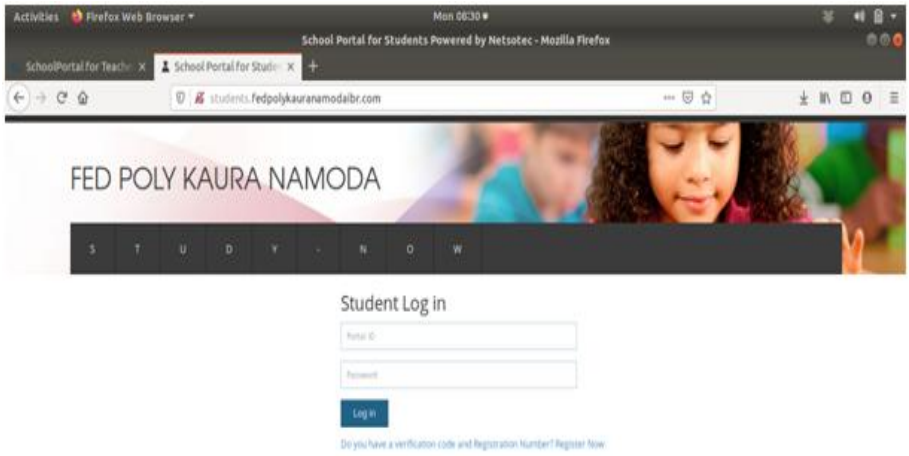
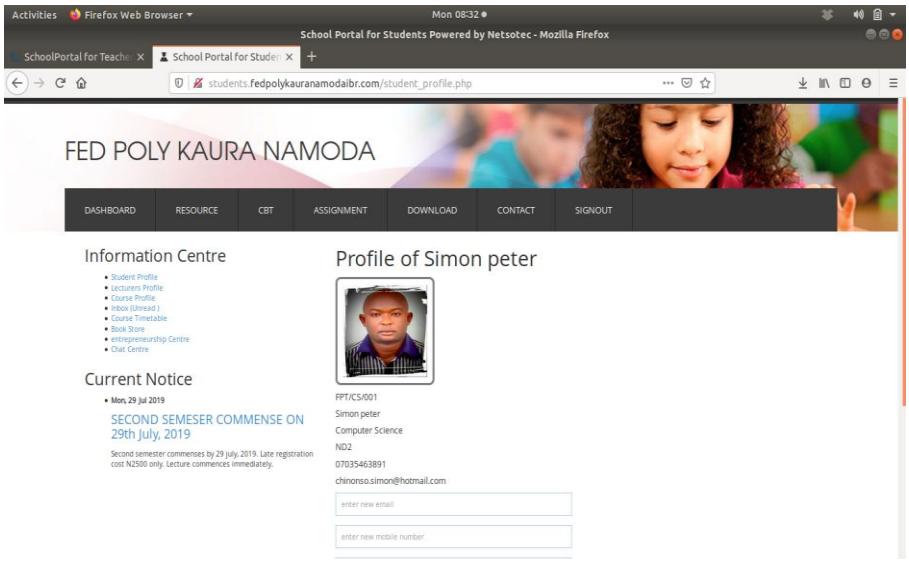


Fig. 3. Lecturer activities interface



(a)



(b)

Fig. 4. Learners Modul

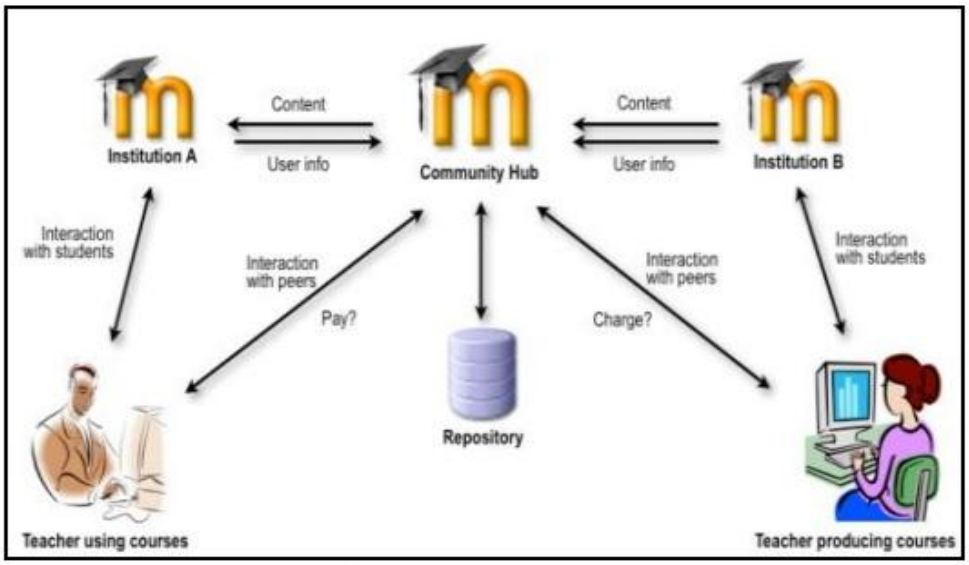


Fig. 5. Moodle course management system [11]

2.5 System Requirement

This is the proposed system configuration and it is in two folds, the software and hardware requirement. They ensure the smooth and efficient running of the proposed system. The hardware requirements are those requirements which avails the hardware necessary component for the software to work effectively. Meanwhile, the software requirements are that software that should be resides inside the computer system for efficient functionality of the proposed algorithm.

2.6 Hardware Requirement

The following is the hardware requirements of the proposed new system.

a. Flat screen monitor
b. Printer
c. Uninterrupted Power Supply (UPS)
d. 1.5gb RAM or more
e. 100 Hard Disk Drive (HDD) or more
f. Basic/ Extended Keyboard

2.7 Software Requirement

They are all the necessary programs required by computer system to effectively executive the proposed system. They are as below:

a. WINDOWS 2007/2018
b. Wireless Network Infrastructure
c. Internet domain server
d. Internet service provider
e. Oracle database server
f. Desktop Server
g. Computer System
h. Linux Red Hat Server
i. Apache web Server
j. MySql Server

3. CONCLUSION

The rate at which students and lecturers have embrace ICT has necessitated the conception of this research. Student and lecturers alike are on the internet for average of ten hours, thus this time can be used on the proposed learning portal for effective learning experience. Meanwhile, the kind of lecture delivery in Federal Polytechnic Kaura Namoda Nigeria as mentioned earlier can be improved with the new proposed Academic Network Based Software which is Learning Content Management System (LCMS) that would ensure student studying on their pace and lecturers preparing appropriate learning course materials for effectively lecture delivery. We propose that this system should be used by the institution but should able to provide a strong and reliable Information Communication technology (ICT) that will drive the portal to different schools and departments.

4. RECOMMENDATION

One of the positive effects of COVID-19 in the educational system is the adoption of on-line platform for teaching and learning. And since the federal Polytechnic Kaura Namoda have not joined other institution yet in using this system, we recommend the implementation of (ANBS). This will go a long away in keeping the teaching

and learning active even the face of insecurity which is ravaging the area.

ACKNOWLEDGEMENTS

We appreciate the TeTFund Nigeria for availing us the fund through Institutional Based Research (IBR) to undergo the research of this kind, we say thank you for all your effort towards making this study a success. To the Management of Federal Polytechnic Kaura Namoda, we are much grateful for the opportunity and the push, it really worth it.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
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