

Centralized Online Transcript Verification System for Nigeria Tertiary Institutions. A propositional Model.

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ABSTRACT

During postgraduate admission routines, many institutions and students are frustrated because of the present email transcript verification system, as responses to transcript requests take much time. In the same line, many transcript carrying emails are not accounted for especially when it is going outside of the country. The Centralized Online Transcript Verification System (COTVS) is a model that integrates the transcript databases of all Tertiary Institutions, where each graduate is assigned a primary key code (PKC), conspicuously printed on his statement of result or certificate. With this model, a post graduate admission seeker easily submits his or her statement of result or certificate, bearing his PKC to the prospective University. This PKC is keyed into the verifying institution's Transcript Verification Platform (COTVS). As soon as this is done, the transcript of the graduate is displayed for verification and authentication OR denial. Agile Scrum methodology was adopted for this study. Visual Studio++ was the adopted Integrated Development Environment. PHP was the scripting language used for data integration while MySQL covered the backend. The study adopted the Model-View-Controller (MVC) software design pattern. The study recommends that all Universities in Nigeria should key into the centralized online Transcript verification system, for easy transcript authentication and seamless admission processes within Nigerian Postgraduate schools.

Keyword: Transcript, PKC, Verification, Graduate, System.

a proven method or technique. When a graduate of an Institution sees a need to further his education, it is expected that a transcript, which shows his academic performance at a glance be generated by his institution, and be submitted to a prospective institution on request. During this post graduate admission process, one applies for his transcript with the address of a prospective University where he wants to further his education. This school in return sends a verification email to the sender school as to confirm the authenticity of the transcript. Immediately the transcript is confirmed authentic, the admission unit of the prospective institution then goes further to process other admission requirements, but if not authenticated, admission is halted for such prospective postgraduate student.

Verifying certificate can be very tedious, some institutions outsource the process to a third party organization. attempt to use IT technologies has been challenged as universities' will not allow third party organizations access their database for verification processes, as a result the verification process remains partially or completely manual (Moussa et al, 2019) .

Centralized Verification System (CVS) is a system that allows several clients (Tertiary Institutions) to communicate with a central server (Controller) where institutional data are integrated, stored and retrieved from the client side with the help of a third party application (COTVS). The ubiquitous nature of mobile phones will help ease the use of the CVS (Ogonnia & Chiamaka, 2020)

I. INTRODUCTION

Omar et al (2019) defines document verification as the process of proving the correctness or authenticity of a document by using

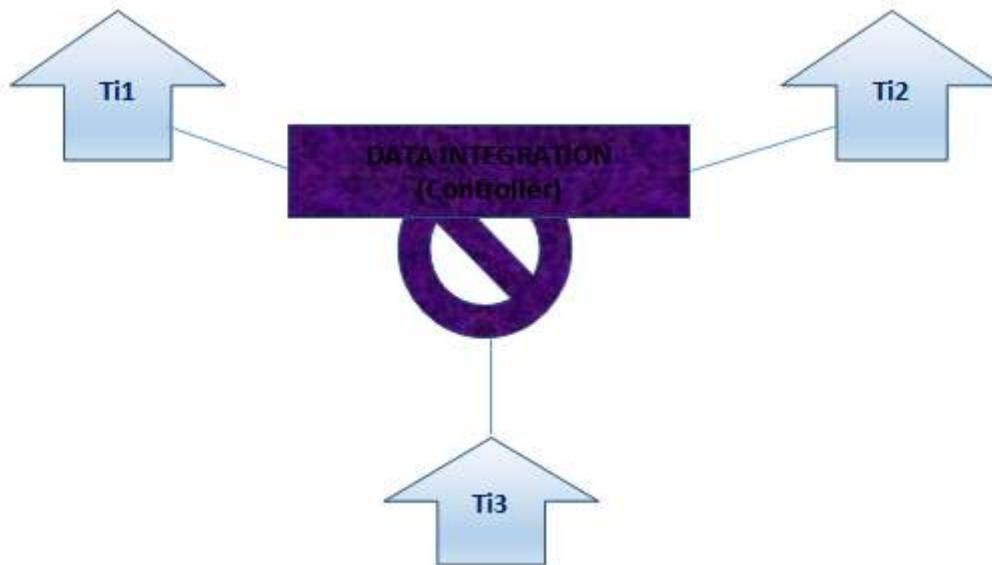


Fig1. CVS

II. PROBLEM STATEMENT

Four major problems were identified in the present Transcript verification processes of tertiary institutions in Nigeria. These are:

- Waste of time and resources by prospective postgraduate students in processing of transcripts.
- Delayed admission decision on the candidates, which could destabilize academic programme plans.
- Feedbacks or responses are not gotten most times from the source institution, and as such admissions can be denied because of lack of transcript verification feedback.
- Verifications and authentications can be easily compromised in the present system as it is done through a decentralized method.

OBJECTIVE OF THE STUDY

The objective of this study is to solve the four problems mentioned in the problem statement above viz:

- To end the time and resources wasted in transcript verification processes during post graduate admissions.
- To enable a speedy admission decision making as transcripts can be easily accessed from anywhere in the world.
- To create a mind-bridge system where feedbacks and responses are generated by self at request, just by a click.
- To create a centralized system for all tertiary institutions as to easily generate and print

transcript of any Nigerian university just with a Primary Key Code which is very hard to be compromised.

PROPOSED MODEL LIMITATION

The researchers took cognizance of the fact that employees of different organizations also suffer the same fate as postgraduate students during the certificate and transcript verification by their employers. However, this proposed system is designed to solve only the problems encountered during transcript verification systems by institutions, and not for organizations or employers.

III. REVIEW OF RELATED LITERATURE

Below are studies carried out on certificate verification and some research gaps which guided this research work.

Signature Extraction Mechanism: Signature is any drawing or character appended on a document to make it authentic. Madasu, Hafizuddin, Yusof & Hanmandlu (2003) propounded this technique to verify bank cheques for authenticity. Their model had a database of customer's signatures where comparisons are made for authentication. This model only focused on the cheque signature verification only and they only targeted banks and not academic sector. Therefore, their model was not a solution to transcript verification.

OCR Model: Salleh and Yew (2009) proposed an Optical Character Recognition model for document verification. A model where hashed unique

keygenerated from a timestamp, track number and the content of document is embedded into 2D barcode. Their proposed model could scan any document using OCR techniques. The text of the document along with the timestamp and the tracking number is extracted from a 2d barcode. The extracted data is hashed using hashing algorithm. The generated hash value is matched with the hash value stored in a 2D barcode. If the hash values are same, the document is confirmed original, else the document is fake. The proposed model was adopted by some organizations who use it presently. This model has less security as Barcodes can be easily forged, unlike the COTVS where an institution already has their graduate data centralized.

GCV Model: Omar et al (2019) investigated the techniques which can be used for document verification. Their GCV model is a digital verification of paper-based graduation certificates. Their GCV Model opined that information inside paper based documents are subject to threats like forgery, and as such, recommended a digital certificate. However, their model couldn't address the issue of the stress compounded in the verification process. Their model did introduce the barcode technology, but encouraged physical verification of certificates. It was also limited to employers, thereby creating the institutional research gap that backed up this paper.

RFID Model: Mudraganam (2009) developed smart degree system based on RFID. This system utilized the fingerprint of graduates for the purpose of certificate verification. They proposed that graduating institutions should issue certificates with RFID tags; which contain the graduate's biometrics (fingerprint) and bio-data. For certificate verification, an interrogator must be used to read the embedded data in the tag and also the verifier have to log into a website which is usually indicated in the back of the certificate, and download the required software to enable interpreting the tag. Omar (2019) concluded that: "The issue with Mudraganam proposed solution is that the process of authentication is time

consuming, especially that the external entities that might verify the certificate will have to download a software in order to read the encrypted data along with the need to have an RFID reader to read the tag and download its data. Another major problem associated with approach is that the certificates mailed or copies cannot be verified since they will lack the RFID in them. The original certificate has to be present and this is not a feasible solution making RFIDs useless for graduate certificates." Meanwhile, the RFID model was only designed for certificate verification, creating the gap for the COTVS to thrive.

Web-Service-Based Remote Database Access: In their work, (Moussa et al, 2019) proposed a web-service-based remote database access technique for certificate verification. Their model was to reduce the security threats associated with Distributed Database System by avoiding direct access mechanisms. Other advantages of their model was its platform-independency and database centralization, characteristics which received a nod from the proposed COTVS model. However, their Web-service-Based Remote Database Access model was limited to certificate verification, which unveiled a research gap covered by this work.

IV. METHODOLOGY

The Agile scrum methodology was adopted for the purpose of this work. The Agile method is flexible and customer-focused. The agile scrum was created by seventeen software developers who joined together to come up with the Manifesto for Agile Software Development, also known as the Agile Manifesto. This methodology was adopted because of the below reasons:

- Simplicity and customer focused software delivery
- Software development life cycle is completed without a phase halting another.
- Timeliness and seamless repetition

FLOWCHART OF THE PROPOSED MODEL

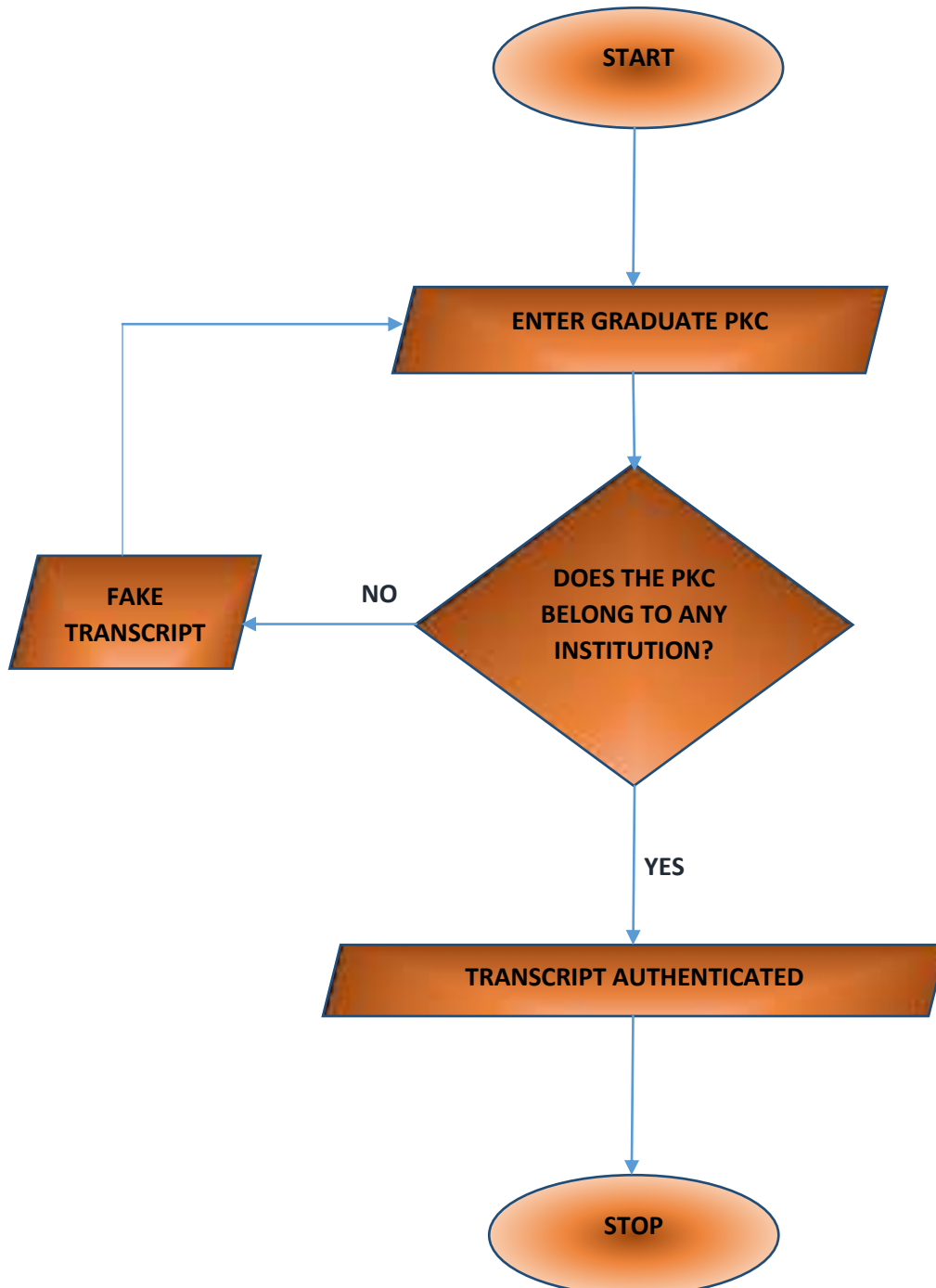


Fig2. Flowchart of the proposed System

SOFTWARE DESIGN THEORY OF THE PROPOSED SYSTEM

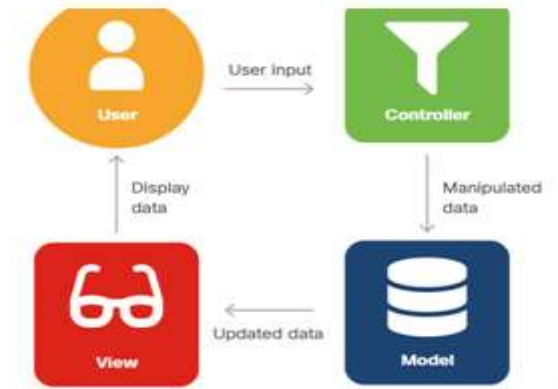


Fig3: Model View Controller.Source: Netacad.com

The Model-View-Controller (MVC) was propounded in 1970 by TrygveReenskaug. This is a design pattern which its goal is to simplify development of applications that depend on graphic user interfaces. Each component communicates with each other in one direction. This design pattern is commonly used in web applications, hence its choice for this model.

The execution of the Model-View-Controller of the proposed system:

- As shown in fig2, the user provides input.
- The controller accepts the input and manipulates the data.
- The controller sends the manipulated data to the model.
- The model accepts the manipulated data, processes it, and sends the selected data (in the strictest forms of MVC, via the controller) to the view.

- The view accepts the selected data and displays it to the user.
- The user sees the updated data as a result of their input.

MODULE ACTIVITIES

The website was designed and hosted in a demo Uniform resource locator (URL)program-[www.program-demo.online/transcriptverification](https://program-demo.online/transcriptverification) where the modules were tested.

Login Module activities

The proposed Centralized Online Transcript Verification system has a secured web address “<https://program-demo.online/transcriptverification>” through which every institution can sign-in for verification purposes.

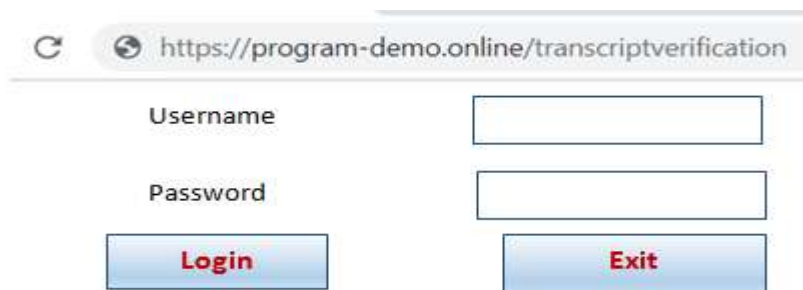


Fig 4: Login form

Registration Module activities

Five independent systems were used to simulate five institutions’ data centers. These data centers registered 10 graduates into the centralized server using the demo URL, assigning PKC to each

graduate. Hence, 50 graduates currently resides in the centralized server.

Transcript Verification Activities

Each of the five systems were logged into the system independently and simultaneously from different locations to verify transcripts from each simulated institution.

Primary Key Code (PKC) of a simulated graduate from Federal Polytechnic Oko with the Code “FPOCSH09009” who registered for a PGD programme in Nnamdi Azikiwe University, Awka was checked using Nnamdi Azikiwe University’s platform, and the transcript was verified authentic. This was possible because, the data of the simulated Federal Polytechnic Oko graduate was already registered into the proposed model, Centralized Online Transcript Verification System (COTVS), just like other graduates from Nnamdi Azikiwe University, Ebonyi State University, Enugu State University of Science and Technology,

Akanulbiam Federal Polytechnic UnwanaAfikpo were registered, hence, these four institutions including Federal Polytechnic Oko, Anambra State, have been successfully integrated.

V. RESULT

Transcript Verification Form

This form is an input form that is seen when one signs into the Transcript platform. It has a simplified user interface through which the users of the platform selects or enters the details of a prospective postgraduate student, for verification and authentication. It has a “Verify” Command button that contains a PHP code which searches and queries the centralized server for the PKC. If the PKC is correct, then the transcript is shown.

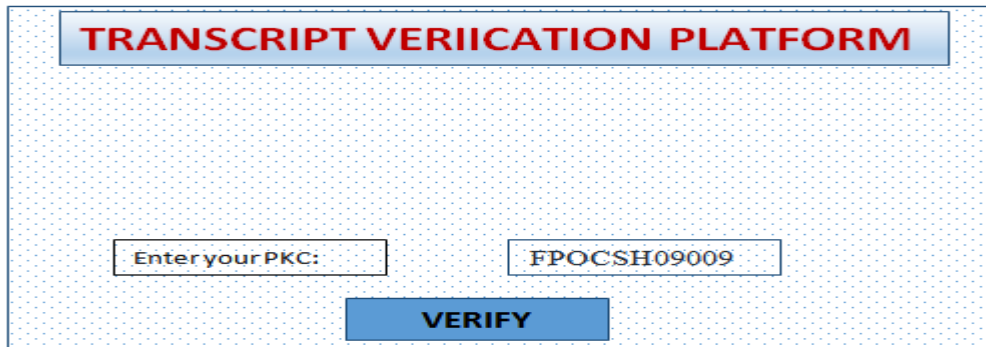


Fig5: Transcript Verification form

Output Specification

Verification Confirmation and Authentication form

Verification Authentication form

Below is the form that will display when the Primary Key Code is correct. That is a sample transcript of one of the 5 students that was registered in the Registration Module activities.

TRANSCRIPT VERIFIED AUTHENTIC				
FEDERAL POLYTECHNIC OKO TRANSCRIPT				
FIRST YEAR				
CODE	TITLE	GRADE	UNIT	
COM111	INTRO TO COMPUTER	78-A	4	
COM113	DIGITAL ELECTRONICS	47-D	3	
GNS121	USE OF ENGLISH	87-A	4	
GNS127	CITIZENSHIP EDUCATION	55-C	2	
MTH111	LINEAR ALGEBRA	77-A	4	CGPA-3.89
SECOND YEAR				
COM221	INTRO TO COMPUTER	72-AB	4	
COM213	DIGITAL ELECTRONICS	47-D	3	
GNS201	USE OF ENGLISH	70-AB	4	
EED216	CITIZENSHIP EDUCATION	55-C	2	CGPA-3.55
Name: ODOGWU IKEMBA.		Department: COMPUTER SCIENCE		
Regnum: FPOCSH09009		CGPA: 3.72 (DISTINCTION)		
PRINT				

Fig6: Transcript Authenticated Output

Verification Denial form

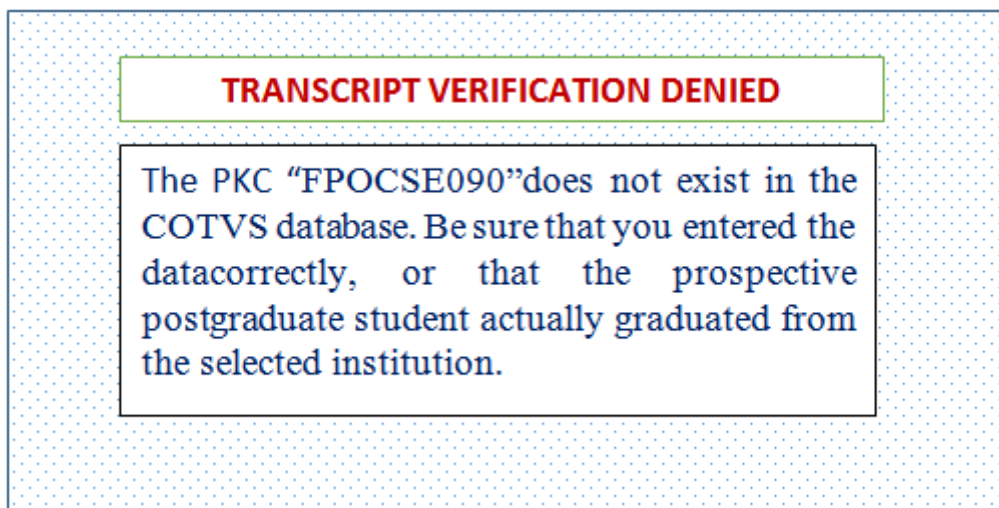


Fig7: Transcript Denied Output

VI. CONCLUSION

This paper proposed a model that was able to solve the raised issues in the problem statement. Primary Key Code was used as a search algorithm to make sure that transcripts registered by institutions are displayed when queried, while those not registered returns a denial response. The issue of security threats was also taken care of by the use of Secure Socket Layer which helped to create "https" formation in the demo Uniform resource locator (URL). The transcript verification test case also shows that with minimal cost and high speed, transcripts can be verified, and postgraduate admission processed without waiting for seaming correspondences between graduated and admitting institutions. Hence, our proposed solution is highly scalable and efficient for any country.

RECOMMENDATION

This study recommends the following:

- The Ministry of Education should enact a policy that will enable all the Institutions to key into this Centralized Online Transcript Verification System (COTVS).
- This model should be tested with real institutions as to expose some issues which may have not been noticed in the simulated model.

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