Design and Implementation of an Android-Based Online Clearance System

***Abstract*— Clearance system indicates accessibility and authorization to definite and confidential information and materials of an organization or institution following verification of need and requirements. This final project report has contributed to a research study to address development of a new computer and online based clearance system for graduate students. This research has evaluated research hypothesis based on framed research aim, objectives and research questions to successfully develop of a new computer and online based clearance system for graduate students. This research has evaluated research background assessing relevant research rationale. A relevant thematic literature review has been conducted in this research developing idea and understanding of research topic and research scope on online clearance systems and their application.**

# I. INTRODUCTION

## A. Abbreviations and Acronyms

Clearance is a permission provided by an organization or institution to access materials, information and data that specifically belongs to respective organizations or institutions. Access and providing clearance to individuals or personnel in an organization depends on requirement and accessibility of the individual. Clearance to information and data accessing is done following verification and assessment of the individual’s allowance to classified and specified information. Clearance acquisition is observed in various places and areas of expertise such as government services, defence services, intelligence services, educational services and various other areas. Again, clearance is also provided in business sectors to provide accessibility to confidential and important data on business strategies and other aspects of businesses. Clearances are allowed in order to access intellectual and confidential properties of other owners and therefore various steps in verification and assessment of requirement of definite knowledge is undertaken by respective organizational or institutional authorities.

This final project report will be contributing a research study to address development of a new computer and online based clearance system for graduate students. This project based research will be addressing development of a new and advanced clearance system that will contribute to feasible access to required information and materials for study and education purposes for graduate students. This research will be following a definite research methodology addressing framed research aims, objectives and research questions. Following completion of this research study, development and implementation of an advanced clearance system based on online platforms will be evaluated facilitating ease of access to information and knowledge for graduate students in an educational institution.

## B. Background

Increased growth and development in digital technology has introduced advanced education systems that include educational practises involving technologies such as mobile communication devices, advanced internet distribution and controlling technologies, optimised real-time communication facilities and various other innovative digital technologies. Following involvement of technological innovation in educational practises, institutions and other educational sectors have also introduced online services based on digital technologies to serve and regulate their services [1]. Accessing confidential and specific information for educational purposes required offline or individual based permission and accessibility of clearance. Development and inclusion of technological innovation has transformed acquisition of clearance and permission for respective confidential and specific information. It is identified that introduction and implementation of digital technology in clearance processes has facilitated more advanced and automated services [2].

Online and digital service based clearance systems are observed to be more cost efficient and feasible. It is identified that various entertainment and music industries all over the world have adopted online clearance systems to provide accessibility and publish patent and copyright licenses [3]. This implies that online and technology based clearance services are more efficient and adaptable with respective businesses and organizational activities. Online clearance services allow access to e-governance and online based control of services and clearance to individuals accessing clearance to specific data or information [1]. In context to this it is identified that Food and Drug Administration (FDA) of the United States of America and Conformite Europeene (CE) has approved online clearance system mobile software named ***One Drop.*** This particular software monitors blood pressure and blood glucose providing clearance to diagnosis and treatment of issues regarding mentioned ailments [4]. Market based publicities and consumer acquisition approaches significantly depend on development and accessibility of data and information on businesses and business strategies adopted. Therefore it is essential to provide accessibility to specific business related data and knowledge to responsible entities or individuals to contribute to better organizational or business processes [3].

## C. Rationale

Developed innovation and inclusion of the same in the educational system has induced different constraints for both teachers and students to adapt and new educational practises. Technological and internet based issues have been identified to be prime barriers and perceived challenges. According to accessed data and information it is identified that, the maximum number of reported constraints in online educational practises are due to improper internet network availability (31%), electrical issues (17%) and inadequate responses from students. It is also identified that cost management related to online educational approaches also contribute to a considerable percentage of issues, 16% [5]. This implies that students are devoid of accessible knowledge and information for their education and therefore introduction of online accessible clearance systems are necessary for educational materials necessary for students.

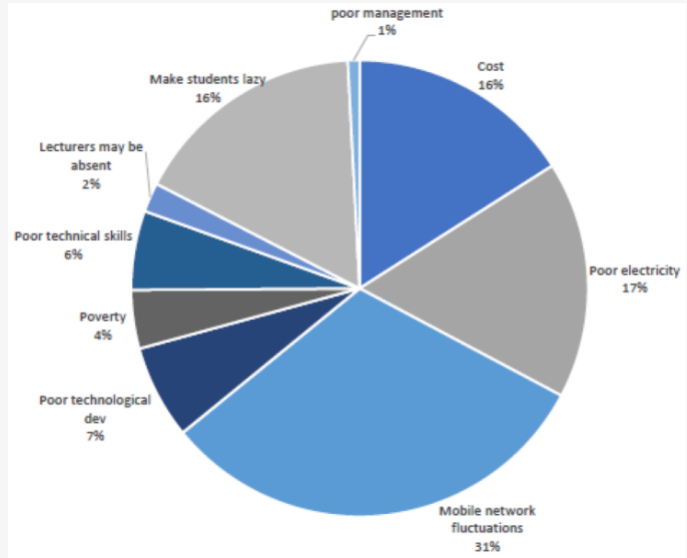


Fig. 1. Perceived barriers in accessing study sources

(Source: Okai-Ugbaje, Ardzejewska and Imran, 2020) [5]

Accessed results from a research study has evaluated that students have significant issues with their health and other psychological states. Following prolonged exposure to screens of communication devices has been identified to affect the eyes of students. Posture body positioning is also identified to be one of prime constraints of attending lectures through digital technology. Based on a research on 533 respondents it is observed that, almost 303 of them have stated that their eyes are affected from prolonged lectures. 225 of respondents have stated that they have developed anxiety, 288 of respondents have stated that they are facing issues with their body posture and 209 of the respondents have reported that they have experienced severe headaches [6]. Following this evaluation of present issues it is therefore required by educational institutions to implement online clearance services to provide feasible and easy access to educational materials for their education without affecting their health and psychological states.

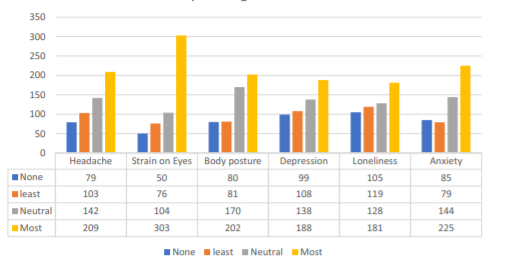


Fig. 2. Factors affecting online lectures

(Source: Shrivastava *et al.* 2021) [6]

In recent years it is observed that students are more adaptive and are accepting mobile and online educational treatises. Following which it is required to provide access and facilities with clearance systems based on digital technology and the internet. In this context, it is observed from a research data that, more than 25% students have strongly agreed that mobile learning (m-learning) is more engaging towards learning and more than 50% has stated that m-learning based education and supports learning opportunities from anywhere [6], Therefore institutions and educational sectors can efficiently adapt these opportunities and introduce clearance via online technologies.

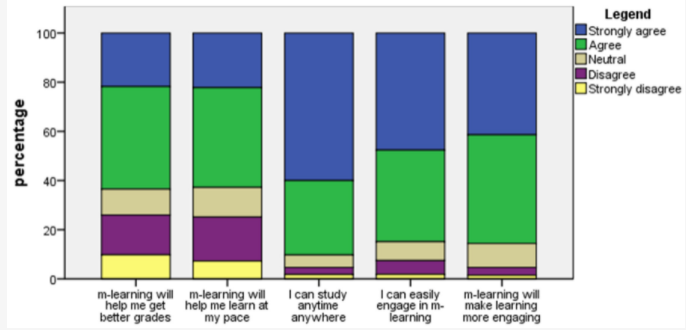
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Fig. 3. Students' Perceptions

(Source: Okai-Ugbaje, Ardzejewska and Imran, 2020) [1]

This research will contribute towards development of an automated and online based clearance service that will provide more support towards education and accessibility towards learning approaches. This research will shed light on a more innovative and automated online clearance service system.

## D. Project Aim and Objectives

### 1) Aim

Primarily this research aims to develop and automated clearance software that will replace manual participation, introducing automated and online based clearance software for graduate students. In addition to this, the aim of this research is to implement and introduce a more bias-free and accurate clearance system. This research will also address hassle free clearance acquisition maintaining a more secure and transparent process. This research will also contribute in accomplishing development of an android base clearance service system for graduate students.

### 2) Objectives

* To develop and implement a hassle free, quick and effective clearance system for graduating students
* To address students clearance, related queries and requests more effectively and timely
* To introduce a biased free and transparent clearance system for graduating students
* To provide unrestricted accessibility of specific materials and information
* To develop clearance services through online
* To implement and develop an innovative android-based online clearance system

## E. Research Questions

* How to develop a quick and hassle free clearance system for graduating students?
* How to address the student queries and requests more effectively and timely?
* How to develop a bias-free and transparent clearance system for graduating students?
* What can be done to provide unrestricted access to specific materials and information?
* How can clearance services can be facilitated through online based software?
* How to develop and implement an android based online clearance system for graduating students?

## F. Project Hypotheses

A well documented, effective, and well developed online clearance system has been decided to be implemented. This is aimed to provide graduating students with unrestricted access to clearance of necessary materials and information. Development and introduction of a new online clearance system will require effective participation and distribution of knowledge and perceived feasibility of the system. Absence of a correlation between internet and education will positively support in fulfilment of research aim and research objectives. Processing of student data and credentials will be effectively managed followed by an improved data security. Providing the name and respective credentials of students it will be possible that organizations or respective educational institutions will be able to identify and effectively verify student identity before providing unrestricted clearance. Errors and biased clearance issues would be permanently mitigated reducing human involvement.

* Online clearance system would allow development of an adaptable education system positively developing correlation between internet and learning
* Data processing and security will be positively increased to develop a more effective and accurate clearance system for graduating students
* Providing unrestricted access to graduating students would positively support in their learning process and education
* Online clearance system for graduating students will positively mitigate biased involvement in clearance system by replacing human based clearance system with automated clearance system.

## G. Significance

This research has considered development of new software for online clearance system for graduating students. This research outcome will provide understanding and idea development on clearance system based on online and android service platforms. In addition to this, this research will further address development of aided software for an online clearance system with unrestricted accessibility for graduating students. Following this research the importance and advantages of online clearance systems will be effectively justified. Research results will elaborately discuss and frame software development and online tolerance systems. In addition this research will also contribute in knowledge and further research studies to mitigate and reduce possible existence of literature gaps under this research topic. This research will significantly increase and contribute to acceptance and adaption of online learning and education.

## H. Structure

Fig. 4. Research Structure

(Source: Created by Researcher)

# II. LITERATURE REVIEW

## A. Introduction

Online clearance systems are essential with increasing human interactions with technologies and the internet. It is an essential service that has a significant impact on various areas of expertise. Clearance systems can be found in governmental services, business sectors, health organizations and educational sectors. However online, automated and technology based clearance systems are not necessarily adopted. This section of this research will be evaluating several literatures and articles to evaluate impact on respective areas of automated and online clearance systems.

## B. Constraints and Issues with Access to Clearance

Access to clearance is a very essential aspect in an organization where it is identified that an organization provides access to an individual to confidential and specific information or knowledge reviewing and verifying needs [8]. Therefore access to clearance must be monitored and managed to provide a feasible clearance access. Automated and online based clearance systems have been introduced and implemented to provide fast and effective clearance systems. However, introduction and implementation of online and automated clearance systems have not completely mitigated issues and challenges related to access to specific and confidential information or data. Reinforcement of trust and increased biased control and participation of clearance service providers have developed issues such as piracy and unjustified use of confidential information and materials. Further, accessibility provided by an organization to use and integrate specific or confidential information is manipulated to gain access and disclose organizational confidential data. Control and access to specific information and materials confidential to businesses or organizations must be regulated following a well organised legal knowledge and legislation [9]. Therefore, issues and constraints related to access to clearance require effective legislative control and regulations.

Enhanced access to clearances also adds into issues and challenges with access to clearance. Enhanced access and control over confidential data, induces possible issues with **Anonymity, Disclosure, Data Sharing** and **Privacy** [10]. Impact of these issues often contributes to inefficient identification of preferences or information or data lost or pirated [9]. Issues with access to clearance are often identified to involve technologies and innovations such as Machine Learning (ML) and Internet of Things (IoT). Accessibility and communication clearances based on embedded IoT and ML must be maintained and coordinated with integrity, authenticity and confidentiality [11]. Therefore, it is evident that issues and constraints of access to clearance must be monitored and controlled effectively to successfully reduce chances of data piracy and other privacy issues.

## C. Online Clearance System

Clearance system as discussed earlier in this research indicates accessibility and authorization to definite and confidential information and materials of an organization or institution following verification of need and requirements. Clearance systems were developed to ensure maintenance of protection of organizational data, information and materials. Primarily clearance systems were manually implemented based on participation and service of human workforces, but with development of technology and internet modern clearance systems are automated and controlled under singular authority replacing involvement of human workforces [12].

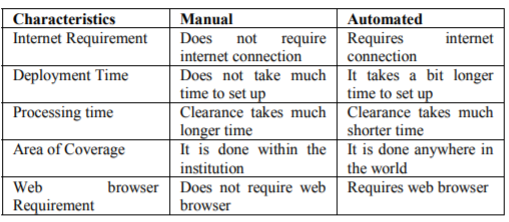


Fig. 4. Differences between Manual and Automated Clearance Systems

(Source: Nneji *et al.* 2018) [12]

Online clearance systems are controlled and regulated under on system design which has significantly reduced time consumption and location issues for clearance accessibility processes. Modern day educational institutions have improved their clearance systems for students with online clearance systems, allowing a feasible access and acquisition of educational data and knowledge [12]. Remote access to clearances for graduating students is an essential initiative introduced and implemented by educational organizations. It is observed that online clearance systems have served with a more advanced enrolment and verification process that allow educational institutions to provide clearances more effectively and timely [13]. Most online automated clearance systems are developed and designed based on ***“Input-Process-Output (IPO) Model”*** where it is observed that requests and accessibility are processed based on an electronic and automated system providing required permit or access to clearances [13].

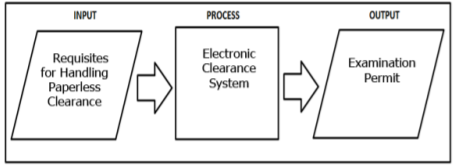


Fig. 5. IPO Model

(Source: Cadiz III, Bondoc and Estroga, 2017) [13]

## D. Theories

*1) The Diffusion of Innovation Theory*

The Diffusion of Innovation Theory was developed in order to identify and investigate acceptance and diffusion of innovations in technology based on a concerned group or population within a definite time period. This theory allows and emphasises how and what type of technological innovation would be diffused within a concerned population over time [14]. This theory considers five important factors that address innovation diffusion, **Knowledge, Persuasion, Decision, Implementation** and **Confirmation.** Following increased online and digital means of learning and education, this theory can be applied and evaluated following acceptance and consideration of e-learning and online accessibility of learning among students [14]. Acceptance of innovation in e-learning and technological considerations among students can be effectively investigated by application of this theory.

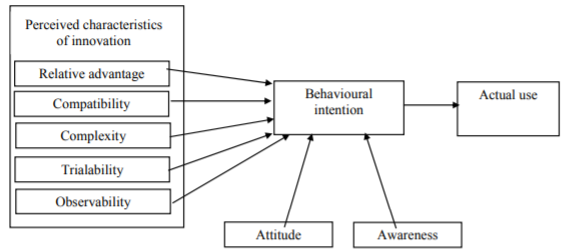


Fig. 6. The Diffusion of Innovation Theory

(Source: Qazi, Raza and Shah, 2018) [14]

*2) Theory of Reasoned Action (TRA)*

# The theory of reasoned action addresses actions and intended behaviours, importance and attitude over consequences of subjective norms. This theory was developed to evaluate behavioural determinants and intentions towards beliefs and implemented norms [15]. Perception of acceptance and denial of beliefs of implemented subjective norms are determined and evaluated through this theory. TRA determines behaviour of individuals and respective consequences supported by performing beliefs of individuals [15]. This theory can be implemented and evaluated to effectively relate behaviours and extent of perceived beliefs of students following implemented online education and learning practises. Attitude and determinants of belief perceived against technology and online services in education can be explained through this theory.

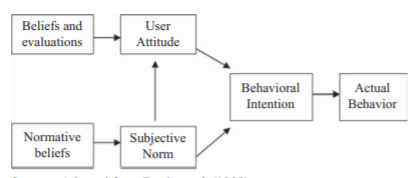


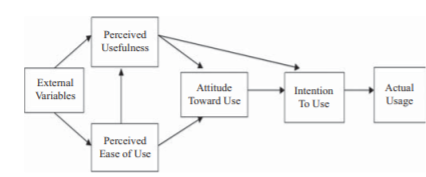
Fig. 7. Theory of Reasoned Action (TRA)

(Source: Buabeng-Andoh, 2018) [15]

## E. Models

*1) The Technology Acceptance Model (TAM)*

The Technology Acceptance Model (TAM) has been developed to address and evaluate acceptance of technology and perceived usefulness of the same. This model also addresses the extent of ease of use of introduced technology or innovation considering impacts and influence of external variables [15]. TAM evaluates impotence and positive influence of technology and innovation contributing to increased acceptance and consideration of use of technology. TAM is efficiently effective in evaluation and determination of acceptance of technology and innovations among students introduced with new technology and innovation based learning systems. Acceptance, perceived attitude and behavioural intentions of students on technology based e-education and learning can also be effectively addressed following TAM [16].



# Fig. 8. The Technology Acceptance Model (TAM)

# (Source: Buabeng-Andoh, 2018) [15]

*2) The Online Learning Community Model*

This model is developed for evaluation of development of sense of community and digital competencies of online education and learning systems. This model integrates social and cognitive presence to influence and develop a collaborative learning and educational approach [17]. Hybrid or technology based digital learning is influenced by this model and resizing and repositioning of digital learning opportunities are considered based on relations with cognitive presence and social presence. The importance of this model is that it allows development and intersection of collaborative learning and development of a sense of community among students or the considered population [17].

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Fig. 9. The Online Learning Community Model

(Source: Blayone *et al.* 2017) [17]

## F. Summary

This section of this research has evaluated the importance and use of clearance systems identifying several issues and benefits. Thematic assessment of literature accessed based on research related topics has contributed to an integrated understanding and idea development of research scope and research problem. Relevant literatures have been reviewed containing data and information on online clearance systems or graduating students. Two relevant theories, **The Diffusion of Innovation Theory** and **Theory of Reasoned Action (TRA)** have been discussed referring to research related issues and understanding. **The Technology Acceptance Model (TAM)** and **The Online Learning Community Model** have also been evaluated following an in-depth reviewing of related literature.

# III. METHODOLOGY

## A. Introduction

Developing a research study requires effective control and regulation of research relevant data and thereby requires following a definite research methodology. A research methodology addresses research related and research development approaches and measures that supports achievement or research objectives and aims. Research methodology provides support and alignment of research development with research scope and research problem. Following a definite research methodology allows research development based on either primary or secondary research methods. This section of this research will be evaluating considered research methodology to address development of android based online clearance system software for graduating students. Research philosophy, research approach, research design, data collection and data analysis methods are evaluated in this section of this research.

## B. Research Philosophy (Realism Philosophy)

## C. Research Approach (Deductive Research Approach)

## D. Research Design (Conclusive Research Design)

## E. Research Strategy (Experimental Research Strategy)

## F. Data Collection Method (Secondary)

## G. Tools and Techniques (Python Language, Jupiter Notebook Platform, Chatterbox Module)

## H. Ethical Consideration

## I. Summary

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