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International Journal of Multidisciplinary Research & Innovation
Volume 2. Issue 1, 2024. University of Kabianga, Kenya. ijmri@kabianga.ac.ke

Clinical Officers Council (Coc) Pioneer Experience in Conducting Pre-Internship Licensure E - Examinations

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ABSTRACT

Introduction: *Although University e - examinations started in 2009, Covid-19 pandemic popularized their use thus necessitating their evaluation. COC was among the pioneer institutions in Kenya to use the e - examinations to assess candidates sitting the pre-internship licensure examinations in 2021.*

Objectives of the Study*: The objectives of the study were to: (1) evaluate the adequacy of preparedness for success of remotely administered examinations, (2) determine the strengths and setbacks of information & communications technology (ICT) on e - examination administration, (3) evaluate the challenges experienced by proctors and test takers during the e - examination administration.*

Methodology*: The study design was descriptive qualitative, involving all the 1984 candidates who registered for and sat the e - examination. Separate examinations were offered to the Degree and Diploma candidates, respectively. The 78 proctors and 12 super-proctors were purposively sampled to ensure all examination rooms were catered for and the candidates were adequately invigilated in their respective locations across the country. The proctors and super-proctors were initially contacted through phone calls and emails and those willing to participate were requested to fill the google administered questionnaire that ensured confidentiality and no identification of individual participants occurred. Six ICT technical staff were available to offer technical support. The candidates and the proctors were adequately inducted through three mock examinations prior to the actual examination. Using Google administered questionnaires to ensure confidentiality, proctors, super-proctors, ICT team and the Digiproctor Examinations Management System (EMS) representatives and candidates were requested to give feedback after the mock examinations and teir views were collected and analysed accordingly. The webcam was designed such that super-proctors had full rights to communication and cameras that scanned the candidates' environment but proctors had limited access to the same. Descriptive data analysis was then carried out and the results presented in appropriate tables and figures.*

Results: *Despite various challenges, 77% of candidates succeeded uneventfully while the rest experienced unstable internet connectivity, inadequate computer literacy and anxiety due to e- exam environment non-familiarity. Among these, only 2.07% of the candidature results were cancelled due to gross misconduct with 84% of the problematic candidates having missed pre-exam instructional sessions. All candidates completed the exams in time with 65%, 16% and 5% within1-3 hours, < 1 hour and > 4 hours, respectively with the latter getting extra time for permitted reasons.*

Conclusion*: E- examinations are cost-effective, time-saving and efficient provided appropriate infrastructure, preparation and invigilation are implemented.*

Recommendations*: Although the COC e-examinations were successfully administered, adequate preparation, teamwork and back-up data transmission in case of power failure are mandatory. Computer literacy should be encouraged in training institutions to improve performance by candidates.*

Keywords: *Clinical Officers; Examinations; Licensure; Pre-internship; Proctors*

1.0 INTRODUCTION

Electronically administered examinations (e - examinations) have been defined as all forms of assessment and evaluations that are carried out sing digital technologies (Nguyen et al., 2017; Eltahir et al., 2019; Gorgani & Shabani, 2021). It has also been defined as computer-based and internet-based student assessment that is timed, controlled, summative evaluation that is conducted using each candidate's own device working a unified operating system whilst ensureing that confidentiality is maintained, according to Sindre and Chirumamilla (2015). Although the e - examinations became more commonly used during the COVID-19 pandemic as an urgent measure to overcome the challenges faced by learners and their teachers (Carusi et al., 2020), many institutions have since continued to use e - learning and the associated examinations even after the COVID-19 pandemic (Corbera et al., 2020). The e - examinations were first used as part of the main requirements for the award of a University degree by the University of Tasmania, Australia in 2009 and it was subsequently adopted for University entrance examination in the same country in 2011 (Lane, 2009; Geeve, 2011). The e - examinations system became of national importance in Australian Universities by 2016 and subsequently, elsewhere in the world (Mohammed, 2011; Tella, 2012; Da'asin, 2016). However, even at that early stage, various challenges were encountered and these included increased stress

level due to unfamiliarity with e-examination systems, inadequate functionality and issues of usability (Wibowo et al., 2016). The risk of hacking is also documented (Dawson, 2016; Gruhn & Müller, 2013) although intervention measures were gradually adopted (Sindre et al., 2015).

When COVID-19 pandemic occurred, various governments across the world began implementing control measures that included temporary closure of educational institutions as the disease spread rapidly (Giannini, 2020; Chirumamilla & Sindre, 2021). The e - examinations were nevertheless moderately accepted by various teaching institutions as the challenges of COVID-19 were gradually encountered (Eltahir etal., 2022)and the institutions began to adapt to and evaluate the various strategies explorable during the evolving COVID-19 situations (Liguori & Winkler , 2020; Khan et al., 2021). Within a relatively short time, many educational institutions realized that there were many benefits of implementing e - examinations, inspite of the interventions specifically geared towards COVID-19 pandemic. Among the benefits included relatively shorter time between administration and marking of the e - examinations (Bashitialshaaer et al., 2021; Wibowo et al., 2016) readily available tools to evaluate the achievement of e-learning within the developing countries Gorgani & Shabani, 2021), its reliability, greater validity, ease of labelling, minimal expenses incurred Wibowo et al., 2016) and precision (Raman et al., 2021) among other positive features Bashitialshaaer et al., 2021; Liguori & Winkler , 2020; Khan et al., 2021; Al-Darbashi, 2021). The e - examinations are environmentally friendly, easy and quick to administer, saves time and may be taken anywhere and at any time (Way, 2012; Eljinini & Alsamarai, 2012; Alzu'bi,2015) provided the examination time schedule is adhered to. Examination candidates also had more control during the examination, provided they adhere to the proctors' instructions. Some studies reported that some candidates also showed more openness and acceptance of the e - examinations and also preferred electronic computerized tests of multiple-choice type of questions and the provision in some e - examinations that enables them to re-sit the examinations if necessary (Way, 2012; Eljinini & Alsamarai, 2012; Alzu'bi,2015; Shalatska et al., 2020; Elsalem et al., 2021; James, 2016; Hodgson & Pang, 2012; Hameed & Abdullatif, 2017; Spivey & McMillan, 2014; IsauAdewole et al., 2018; Baleni, 2015; Marius et al., Cwil, 2019). Furthermore, e - examinations had a positive impact on the candidates' academic achievement and grades; hence they were accepted as appropriate for use (Wang, 2016; Cwil, 2019). Unlike traditional examinations, e - examinations provide direct feedback to the candidates and therefore improve learning (Spivey & McMillan, 2014; Way, 2012; Eljinini & Alsamarai, 2012).

However, since the introduction of e - examinations, there have been challenges experienced during their implimentation (Chirumamilla & Sindre, 2021; Sindre and Chirumamilla, 2015; Hodgson & Pang, 2012; Alsalhi et al., 2019; James, 2016) according to the Organization for Economic Co-operation and Development (Tella & Bashorun, 2012; Bashitialshaaer, Alhendawi & Avery, 2021; Alzu'bi, 2015). Owing to strict computer technology settings, some candidates were disappointed due to their inability to explain their anwers to certain questions, with some not having prepared adequately according to the relatively new examination instructions. Many candidates expressed the need for time allocated to e - examinations to alleviate the stress experienced due to internet connectivity challenges (Eljinini & Alsamarai, 2012; Crews & Curtis, 2010; Kim, 2020). All these challenges increase the likelihood of examination cheating (Mohammed, 2011) and relatively increased cognitive stress load (Comas-Forgas et al., 2021).

2.0 RESEARCH DESIGN AND METHODOLOGY

The study design was descriptive qualitative, involving all the 1984 candidates who registered for and sat the e - examination. Separate examinations were offered to the Degree and Diploma candidates, respectively. The 78 proctors and 12 super-proctors were purposively sampled to ensure all examination rooms were catered for and the candidates were adequately invigilated in their respective locations across the country. The proctors and super-proctors were initially contacted through phone calls and emails and those willing to participate were requested to fill the google administered questionnaire that ensured confidentiality and no identification of individual participants occurred.

The preparatory phase involved: bench marking with other health-related organizations (mainly the Nursing Council of Kenya that had earlier implemented the e-examinations than other health cadres), development of an online exam policy, procurement of service provider (Digiproctor), sensitization of stakeholders, training of the examination board and other stakeholders, incluing the COC board of directors, technical support team, proctors and test takers on the use of the Digiproctor EMS. The candidates were informed in advance when to login to the system and shortly afterwards, the proctors also logged in. Timely communication of all implementors was then done and the administration of mock examinations followed. During the training and mock sessions, the candidates and proctors were given time to ask questions online (including whatsApp groups that had been formed conveniently for communication purposes. The examiners then continued to discuss on how to resolve some of the matters that arose during the training and benchmarking sessions. The service provider (Digiproctor team) were also available to offer extra support, whener needed. Six ICT technical staff were also available to offer technical support. The candidates and the proctors were adequately inducted through three mock examinations prior to the actual examination. Using Google

administered questionnaires to ensure confidentiality, proctors, super-proctors, ICT team and the Digiproctor Examinations Management System (EMS) representatives and candidates were requested to give feedback after the mock examinations and teir views were collected and analysed accordingly. The webcam was designed such that super-proctors had full rights to communication and cameras that scanned the candidates' environment but proctors had limited access to the same. Descriptive data analysis was then carried out and the results presented in appropriate tables and figures.

3.0 RESULTS

The examination attendance was preceeded by mock examination sessions attended by test takers (candidates)and a supervision team of proctors (Figure 1). Three (3) mock tests were scheduled. A candidate was expected to attend any of the first two (2) and the third (3rd) which was mandatory. Majority of candidates (>2/3) participated in the final and mandatory mock exercise. All proctors, super proctors and support team attended the final compulsory mock exercise (Figure 1).

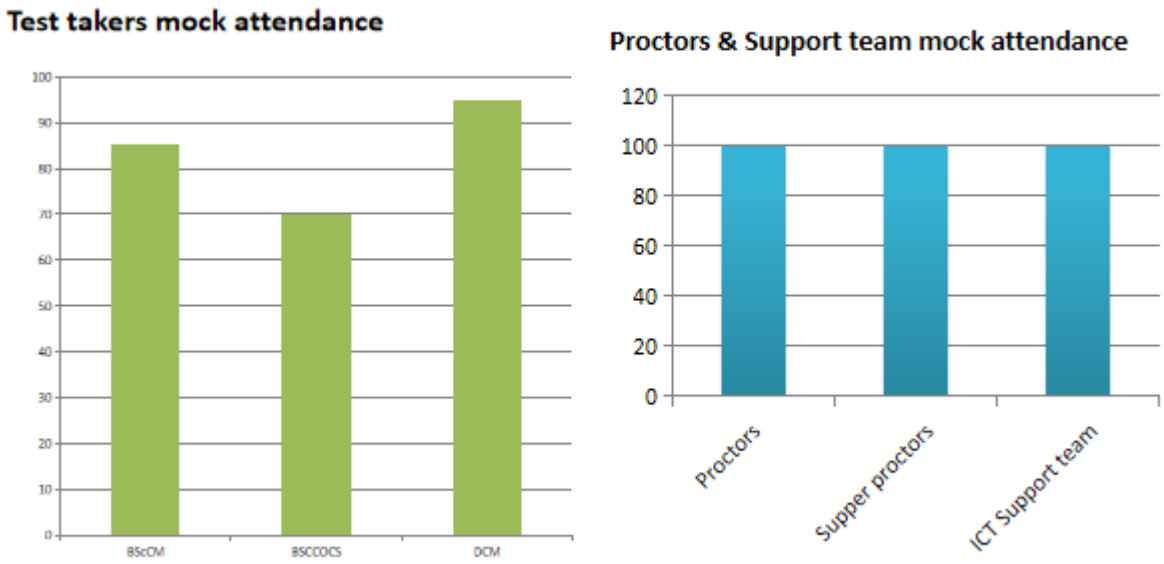
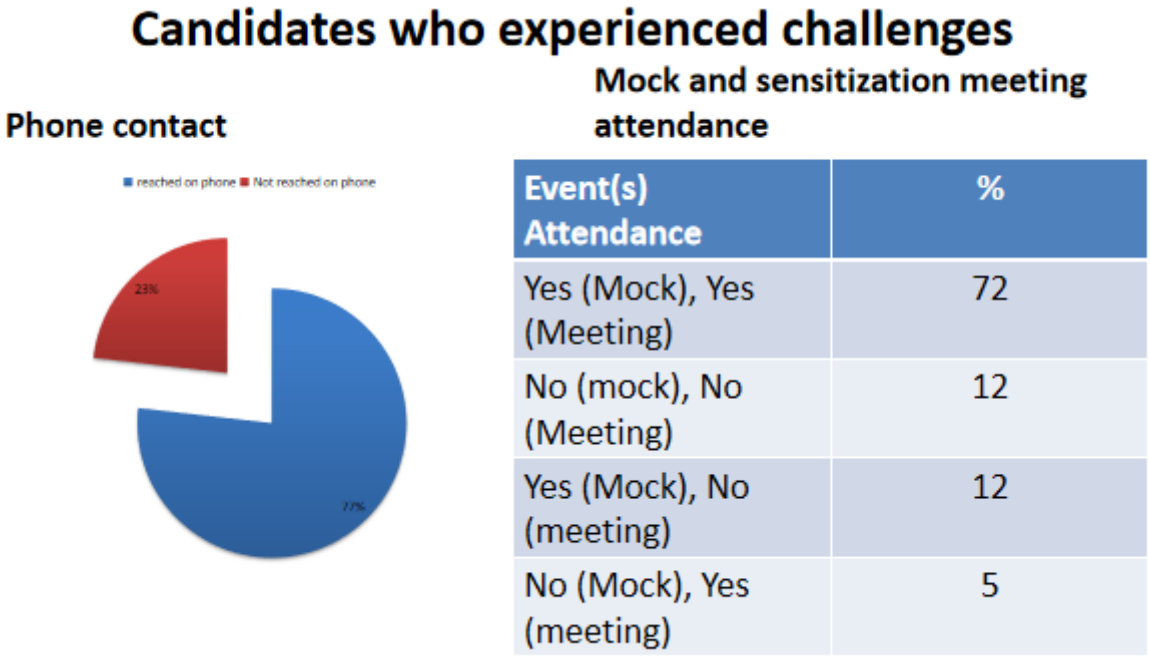


Figure 1: Mock Attendance by Candidates and Proctors.

The candidates with challenges were mainly drawn from among BSc Clinical Medicine candidates. Out of those with challenges, majority (77%) were reached and their respective challenges sorted out successfully, while 23% were not reached due to poor intenet connectivity or whose phones went unanswered.



Event(s) Attendance	%
Yes (Mock), Yes (Meeting)	72
No (mock), No (Meeting)	12
Yes (Mock), No (meeting)	12
No (Mock), Yes (meeting)	5

Figure 2: Proportion of Candidates who attended Mock E - Examination.

Out of those that were reached, 84% of them had not attended the mock exercises, while 65% had not attended the sensitization meeting. However, majority of the candidates (72%) had attended both the sensitization meeting as well as the mock exercises (Figure 3).

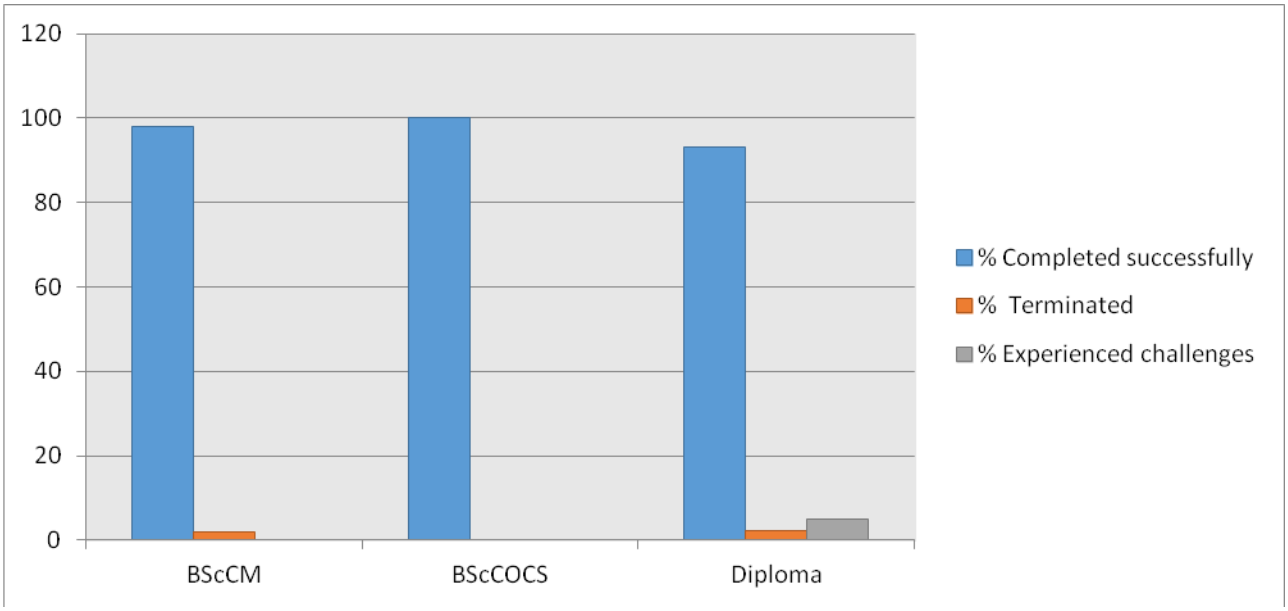


Figure 3: Actual E - Examination Percentage Attendance

All (100%) of BSc Ophthalmology and Cataract Surgery (BScCOCS) candidates completed their examinations successfully without any hitches (Figure 3). Among the Diploma candidates, 93% completed successfully, 2% got terminated due to aberrant behaviours and 5% experienced various challenges.

Majority (65%) of the candidates spent between 1-3 Hrs in the examination while 16% spent <1 hour while 5% spent slightly more than 4 hours during the entire examination (the latter due to the extra time added following the system down-time).

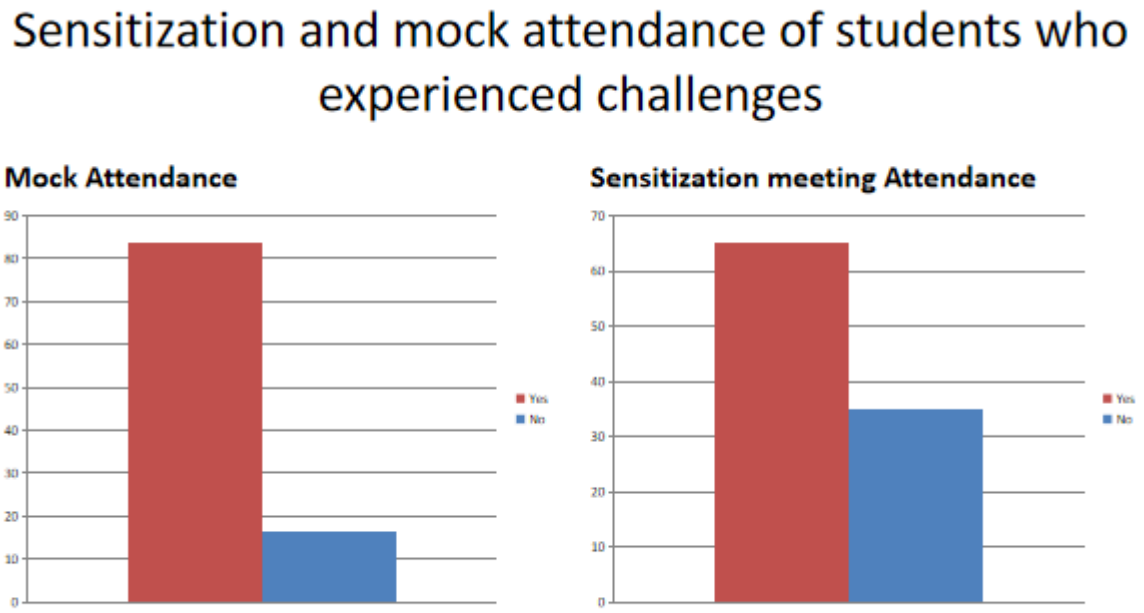


Figure 4: Percentage Proportion of Candidates who experienced E - Examination Challenges.

Overall, the challenges encountered during the examination included: unstable internet connectivity, inadequate computer literacy (especially observed among the Diploma candidates), system navigation challenges (observed among candidates who had not participated during the mock exercises), panic and anxiety following occasional data transmission error, unfamiliarity with the e - examination procedure and system dropouts, failure to follow examination instructions and support team guidance and inability to get through to the support team (call centre) by some candidates in need of help (Figure 4).

4.0 DISCUSSION

In our study, all candidates were properly identified, unlike identity challenge among others found in a study by Shalatska et al (2020). Unreliable internet connectivity is one of the major reasons why some candidates were not able to participate and/or complete the e - examinations. The internet connectivity also adversely affected the effective participation of candidates and even proctors, during the training sessions prior to the actual participation in the examinations.

A recent study by Pokhrel and Chhetri (2021) has demonstrated the importance of analyzing the challenges of COVID-19 as a valuable means to learn from the experience to enhance our academic measures and improve online education capabilities. These challenges were also noted in previous research studies performed in other regions of the world. According to Ahmed et al (2021), a study that analyzed the challenges encountered during administration of e - examinations in higher learning institutions during the time that COVID-19 was ravaging the world, five items should adequately addressed prior to effective participation in e - examinations. These items include: adequate and strategic preparation, invigilation, internet connectivity, visibility of gadgets used and computer literacy of candidates and supervisors, evaluation and feedback. Our study revealed system navigation challenge that occassioned stress-related panic, anxiety thus necessitating permitted extension of time for some candidates; Exam cheating is problematic according to many recent studies (Kim, 2020.,Comas-Forgas et al., 2021., Mohammed, 2011.,Agu et al., 2021., AlsaadyI et al., 2020., Afacan Adanır G et al, 2020., Bilen & Matros, 2020; Abdelrahim, 2021).

The candidates should be available for the preparation stage of the e - examination. Participants should be housed in a facility that is fully equipped with gadgets for reliable internet connectivity, be conversant with the content (topics) to be covered and be armed with electronic soft ware packages to be used for appropriate display of the examination materials. A separate study by Shalatska et al (2020) also emphasized on the importance of determining the accurate identity of the intended recipients of the examination, the purpose of the e - examination, clarification of the tasks to be undertaken and the need to specify forms of feedback after the e - examinations. The latter was indeed the purpose of the current research study. An earlier study by Isaias et al (2019) that analyzed the framework and comparison of e - assessment systems pointed out that eight criteria for the development of and implementation of electronic tests should include ensuring adequate security, cost, accessibility,

scalability, usability, feedback, development and implementation design options and feedback mechanisms. Earlier research conducted by Fontanillas et al, 2016) to determine the requirements for candidates to successfully undertake e - examinations are strategic preparation, including acquisition of integral competencies, consideration of all internal and external factors that can affect the learning environment, coherence of the learners, examination implementation and invigilation.

Our study revealed additional challenges that included system navigation challenges by candidates who had not adequately attended the preparation (mock) stage of the examinations. Consequently, some of the candidates therefore panicked during the actual examination. The associated anxiety also necessitated extension of examination time for some candidates. These encounters were in-keeping with findings from other researches that were being carried out around the same time that our own study was being done. In some of the studies done elsewhere, many candidates expressed the need for time allocated to e - examinations to alleviate the stress experienced due to internet connectivity challenges (Eljinini & Alsamarai, 2012; Crews & Curtis, 2010; Kim, 2020). However, some candidates were caught up in cheating attempts although the affected candidates were captured by the system cameras; hence necessitating cancellation of their examination results due to their aberrant behaviour. However, cheating was also found to be a problem during the COVID-19 pandemic among students in Spain (Comas-Forgas et al, 2021). Research done elsewhere was found to increase the likelihood of examination cheating (Mohammed, 2011) and relatively increased cognitive stress load (Comas-Forgas et al., 2021). Other disadvantages of online examinations that have been noted in other research studies include challenges in access to stable internet connectivity (Agu et al., 2021){9}, high level of anxiety (AlsaadyI et al., 2020), inexperience with using computers or other online access gadgets for assessment purposes Afacan Adanır G et al (2020){10} and high cheating chances (Bilen & Matros, 2020; Abdelrahim, 2021).

To overcome such challenges, it is imperative that proctors should be adequately trained to scan the environment of each e - examination candidate. The webcam system used during the conduct of the Clinical Officers Council (COC) examinations fortunately provided an enabling environment for examination cheating to be controlled and in time. However, other researches have since found and published results identical to our findings from the current study. Advantages of online examinations include ease of implementation (Ilgaz & Adanır, 2020), immediate feedback capability, time saving (Way, 2012; Eljinini & Alsamarai, 2012; Alzu'bi,2015) and enhanced adaptability(Raman et al, 2021).

Without adequate implementation strategies for proctors to invigilate the candidates, the e - examinations have the potential of becoming a total failure. However, with improvement strategies in place, the future is bright for e - examination administration, especially in the light of the rather unpredictable challenges paused by COVID-19 and other emerging and/or re-emerging disease conditions necessitating the need to avoid the risk of transmission of dangerous diseases through physical human contact.

COVID-19 is not the only disease to focus on as far as the need to incorporate for e - examinations into the examination systems in the academic arena. There are numerous other infectious diseases with a potential to cause as much havoc or worse situations than COVID-19. The emergence of marbug virus transmission in parts of Tanzania during march, 2023 is one such disease outbreak, among others currently being watched by health care personnel across the world. This therefore calls for more preparedness by academic and other institutions that offer various examinations to their candidates, to handle many such unpredictable situations.

5.0 CONCLUSION

Poor internet connectivity adversely affected a minority of the candidates although all of them successfully accessed data.e - examinations were found to be cost - effective but adequate preparation is required. The e - examinations enabled computerized automated marking of the examinations, immediate release of results and analysis of performance in terms of their thematic areas, competencies, cognitive and affective domain.

6.0 RECCOMENDATIONS

Based on the successful outcome of the pioneer COC experience, e - examinations by the COC is the way to go in future. However, remotely administered e - examinations require adequate preparedness in terms of alternative data transmission routes in the event of failure of the same. Proctors and examination candidates should be adequately trained prior to the examinations. Computer literacy should be encouraged in all training institutions to improve performance by candidates.

7.0 ACKNOWLEDGEMENT

I wish to acknowledge the following for contributing immensely to the research: The entire membership of the Clinical Officers Board for funding and creating an enabling environment for the research; members of the Clinical Officers Council Secretariat for participating in data processing and analysis and the co-opted members that perticipated in the research team. Particularly, I wish to thank the following for great sacrifice to collate and analyze the data: Mrs. Eunice Kuria, Mr. Maina Nduru, Dr. Marcella Otieno, Ms. Violet Aswa and Mrs. Angeline Munavu.

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