UNIVERSITY OF CAPE COAST

EXAMINEES' PERCEPTION OF PHYSICAL TESTING ENVIRONMENT OF GHANA TEACHER LICENSURE EXAMINATION

DANIEL KORANKYE ABOAH

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BY

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Thesis submitted to the Department of Education and Psychology, Faculty of Educational Foundations of the College of Education Studies, University of Cape Coast, in partial fulfilment of the requirements for the award of Master of Philosophy degree in Measurement and Evaluation

OCTOBER 2022

DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this University or elsewhere.

Candidate's Signature……. Date……..

Name: …….

Supervisors' Declaration

We hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Principal Supervisor's Signature……...Date……..

Name: …….

Co-Supervisor's Signature…….Date…….

Name: ……

ABSTRACT

This study aimed at investigating examinees' perception of physical testing environment of Ghana teacher licensure examination. Particularly, the study aimed at establishing physical testing environment preferences, physical testing environment perception, differences in perceived physical testing environment in testing centres and differences in perceived physical testing environment of Ghana teacher licensure examination based on gender. The research employed a descriptive survey design with quantitative approach. Multi-stage sampling procedure was employed. Proportionate and simple random sampling were employed to choose fifteen testing centres from five zones of public Colleges of Educations in Ghana. Proportionate, simple random and convenient sampling techniques were used to select 370 examinees from the selected testing centres. Data was collected using a 48-item questionnaire. The questionnaire had 0.947 cumulative reliability coefficient. The study established to a great extent that examinees have positive perception of their physical testing environment and strong preferences for certain physical environment variables. It was also established that male examinees did not differ from female examinees in how they perceived their physical testing environment and the fifteen testing centres were not different in perceived physical testing environment. It was recommended that National Teaching Council (NTC) and Colleges of Education should prepare the testing centres to suit the physical testing environmental preferences of examinees and develop the testing centers to be fit for high-stake examinations.

KEYWORDS

Examinees

Ghana teacher licensure examination (G.T.L.E)

National Teaching Council (N.T.C)

Perception

Physical testing environment

Physical testing environment preferences

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DEDICATION

To my parents Samuel Kissiedu Aboah and Mary Korankye

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CHAPTER ONE

INTRODUCTION

Countries all over the world have attempted to regulate diverse professions by establishing licensing that restricts access into them. The National Teaching Council (NTC) recognises Ghana teacher licensure examination as the only teacher licensing examination in Ghana. There are a lot of factors that affect the validity of examinees' scores of which the physical conditions of the testing environment cannot be left out. It is therefore imperative to identify the conditions of physical testing environment of Ghana teacher licensure examination. Therefore, inquiries into state of physical testing environment of Ghana teacher licensure examination helps direct efforts to reduce bias against certain examinees or groups of examinees and create equal opportunities for all examinees to demonstrate their knowledge and skills.

Background to the Study

According to Adu-Gyamfi, Donkoh and Addo (2016), the history of Ghana's education predates independence, when colonial overlords needed translators and clerical assistants to further facilitate their trading activities of the time. The colonial masters had to teach individuals in order to keep these trading activities going. Arrival of preachers into the country consequently caused a spike in training activities. The reason for this was that the Christian missionaries required educated people to serve as Catechists and guardians in order to help disseminate Christian gospel to the rest of the population (Pinto, 2019). As a result, formal education that required trained teacher was established, which eventually evolved to all of Ghana's communities.

In literature, teacher education continues to attract a huge attention. One key reason for this has been the conviction that teachers have a considerable impact on learning achievement. This learning achievement is dependent on the educational system's efficiency and educational quality (Archibald, 2006; Darling-Hammond & Baratz-Snowden, 2005). In other words, educational product's effectiveness is mostly determined by its quality and delivery (Barber & Mourshed, 2007). As a result, it can be suggested that a nation's educational system is a mirror that reflects the images of its future. The education system therefore emulates the future of every nation because it is the source of the nation's workforce.

Ghana government is still working feverishly to enhance quality of teaching and teachers for its citizens by generally improving the Education system. Part of the Education Bill, 2015 instituted National Inspectorate Council (NIC), National Teaching Council (NTC) and National Council for Curriculum and Assessment (NaCCA) as three new national bodies in the education system. These bodies were tasked basically to oversee the pre-tertiary subsectors (Ministry of Education, 2015). The goal of the pre-tertiary teacher education programme in Ghana aims at preparing teachers to function at the basic and Senior High Secondary Schools (S.H.S), as well as to see to the growth and nurturing student-teachers and teachers into reflective and capable teachers capable of giving quality education to Ghanaian youngsters (Ministry of Education, 2012). Specifically, National Teaching Council has the mandate to oversee the professional development of teachers and therefore has the mandate of issuing professional teaching license.

Before the issuance of Ghana teacher license, Diploma in Basic Education from authorised institutions for training teachers was the minimum qualification for professional teachers at basic school level. Again, Bachelor's degree in Education in appropriate subject areas for a second cycle level of education, or Bachelor of Arts or Bachelor of Science in specific subjects and Post-Graduate Diploma in Education (PGDE) or its equivalent, were the minimum teaching qualification for teachers at the second cycle level. In addition, teachers were in two groups at the first cycle and second cycle educational institutions in Ghana: professional teachers and non-professionals teachers. Non-professional teachers were classified into two categories. Teachers who had West African secondary school certificate examination certificate (WASSCE) and those who had Diploma from recognised polytechnic (now Technical University) or University graduates without a teaching certificate. Those classified as professional instructors are those who have Diploma in Education, Bachelor of Arts or Bachelor of Science in specific subjects and Post-Graduate Diploma in Education (PGDE) and Bachelor of Education degree in an appropriate subject area (Ministry of Education, 2012). It can be inferred that teacher education has undergone numerous reforms in Ghana. These reforms have resulted in a diversity of teachers with various certifications (Anamuah-Mensah, 2006). The reforms, on the other hand, had little effect on students' learning outcomes (Ministry of Education, 2012). To ensure that teachers with various certifications are on the same level of competency, licensing was introduced.

Many governments in the world, through some form of teacher certification, regulates who can enter the teaching profession (Walsh, 2001).

Licensing is a typical technique of regulating a profession by requiring persons who seek to practice the trade to obtain a license. Kleiner (2000) described occupational licensing as a process through which the government grants permission to enter a profession. Both licensing and certification, according to Kleiner (2000), necessitate the demonstration of basic skills and it is perpetuating of illegality if someone without the suitable license execute the regulated job. Consumer protection is frequently the justification for licensing. Policymakers strive to keep away charlatans out of the industry guaranteeing that consumers receive a high quality of goods or services. Moreover, findings establish that occupational licensing improves wages by 15%, a similar effect to unionization (Kleiner & Krueger, 2010).

However, licensing does not only raise earnings and keep crooks out of the field, it also has the potential to keep highly effective people out by erecting hurdles to entrance (Hanushek, Rivkin, Rothstein & Podgursky, 2004). Furthermore, deficient licensure examinations may prevent extremely competent individuals from entering the profession, while allowing incompetent personals to enter. Goldhaber (2007) stressed on significance of licensure screenings, which are strongly linked to the desired goal and teacher performance. Examinations for licensing and certification are high-stakes because of their very nature; consequently, the analysis of scores obtained and the judgments thereafter. The interpretations or judgments that follow licensure test have binding and significant ramifications for individuals, the career path and programs pursued (Association of Test Publishers, 2002). This goes to show that every aspect of the testing should be of keen interest including condition of physical environment in which the test is written because it could be a source of

score invalidity. Differences in the testing environment, such as room temperature, lighting, noise, or even the test administrator, can influence an individual's test performance (Golafshani, 2003).

Physical testing environment refers to our living conditions and surroundings; each feature of the physical environment has a different impact on human behaviour, productivity and perception. The main purpose of an environment is to promote and improve physical aspects of human comprehension, such as visual, auditory, and kinetic features (Kopec, 2006). Physical environment stated differently, refers to the totality and interplay of elements usually present in a structured and inhabited area, such as an examination centre. Furthermore, physical environment, according to Davison and Lawson (2006), is explained as characterisation of the centre parameters. The physical and social elements that determine behaviour are equally swayed by the environment in which the examination is being written (Wall, Higgins & Smith, 2005). As a result, conditions of physical environment and accompanying physical elements can have a substantial impact on examinees' behaviour and attitudes. Nonetheless, this is not exclusive to the Ghanaian setting, as Loreman (2007) states concisely that, the physical environment is frequently overlooked in favour of concerns that are more cognitively appealing to academics. Cheryan, Plaut and Meltzoff (2014), found that student learning and achievement as well as their attitudes are impacted by the physical surroundings.

Physical environment encompasses the classroom and its contents, as well as the edifice of the school and the content, such as physical edifices and infrastructure. It also embraces furniture, the site of testing centre and the

environment which all examinees or learners could come in contact (World Health Organization, 2004). Specifically, in this study, physical testing environment encompasses Furniture i.e., table, chair, space, arrangement of furniture, number of examinees in a room, lighting, indoor air quality i.e., air circulation and temperature. A growing body of evidence suggests that there exist a beneficial relationship existing amid learning outcomes and the environment (Cotterill, 2016). Physical characteristics of the environment influence all activities directly and indirectly and impact on the ability to inspire desirable behaviour. In other words, it might contribute to examinees' and students' misbehaviour (Wannarka & Ruhl, 2008). The physical environment is further described as the subjective and objective aspects of the physical situation where teacher licensure examination is written.

Perception, according to Perea (2011), is our sensory experience of the world around us including both the consciousness of environmental stimuli and the actions we take in response to them. We obtain knowledge about features and elements of the environment that are crucial to our existence through the perceptual process. Perception not only forms our view of the world around us; it permits us to act within our surroundings. Perception covers the five senses; touch, sight, sound, smell and taste. Perception also contains proprioception, a combination of senses that allows you to notice changes in your body's posture and movement. It also includes the cognitive processes that are required to analyse information, such as recognising a familiar face or smelling something familiar. Furthermore, according to Perea (2011), physical environmental perception is the acknowledgement in addition to clarification of sensory stimuli from an individual's physical atmosphere. Examinees perception of their testing

environment may influence their behaviour in testing processes. Consequently, examinees may perceive their physical environment where the licensure test is written differently and in turn may affect behaviour.

Physical environmental preference is defined as choosing among alternatives of environmental variables, and it entails a quick interpretation before choosing (Ebi, 2007). In other words, choices are compared and contrasted in terms of certain characteristics, with the superior option being chosen. Environmental preference can further be explained as the preferential treatment of certain environmental features over others. Any individual working in a given environment will admit to having personal preferences. Many studies have found variances in students' perception of their learning environment based on gender, types of curricula, years of study, entry requirements, ethnicity, and academic results across different courses of study, disciplines, and academic results according to Yusoff, Ja'afar, Arzuman, Arifin and Mat (2013).

Roff (2005) claims that the learning environment has been linked to student achievement, contentment in a test for many years. Consideration of the learning environment in a school, in conjunction with continual quality improvement and innovation, is likely to improve the school's learning outcomes. Children's responses varied depending on the level of noise during the testing, according to (Kim, Baydar & Greek, 2003). The number of occupants, distractions during testing, light and temperature in the testing environment are all found to affect students' standardized test scores in a systematic way. "A quiet, well-lit, and comfortable environment was expected to improve assessment outcomes," according to their findings (p. 570). All of these variables have been proved to have effects on test performance (Kim et al,

2003). A physical learning and testing environment study is one way to improving the quality of an educational programme according to Genn, (2001).

Statement of the Problem

Ghana government is still working tirelessly to enhance the quality of her entire education for its citizenry by improving Education in general. These plans and practices are focused primarily on adjusting and growing the pedagogical system and curriculum, with less emphasis on teaching skills and the learning environment as essential elements influencing student learning and staff productivity (Ali, 2010). The goal of the teacher education programme for pre-tertiary level in Ghana, is to make teachers ready to operate at both basic school level and senior high school. Teacher education programme as well has them aim of growing and nurturing trainees into thoughtful and capable specialists who are capable of delivering quality education to Ghanaians (Ministry of Education, 2012).

According to Philippines (2013) several professions, including teaching, employ licensing systems to remove people from their fields and discourage others from pursuing them. Golafshani (2003) has it that differences in element of the physical testing environment in respect to temperature, lighting, noise and test administrator can influence an individual's score thus a source of score invalidity. Invalid scores would therefore may remove more capable individuals and favour less able individuals. The physical and social elements that determine behaviour are both influenced by the conditions in which the test is written (Higgins, 2005).

Some studies have been conducted on the physical environment of testing centres. Study by Donald (2016) focused on how examinees of national

physical therapist examination perceive their physical testing environment in Florida. It was found that those examinees generally had positive perception of their testing environment. Youssef, Wazir, Ghaly and Khadragy (2013), concentrated on appraisal of the physical learning environment at Suez Canal University at the faculty of medicine. They found that students perceived their physical learning environment to be generally unfit for learning and testing. Makhdoom (2009) assessed or delved into of the quality and the state of physical educational climate of undergraduate clinical teaching years in the college of medicine, Taibah University. Females and male participants perceived their learning environment more positive than negative.

The above-mentioned studies show inconsistencies in terms of the findings on state of physical testing environment. Again, the studies were focused on other professional licensure examinations such as Nursing and Therapist licensure examination in other countries. Consequently, little is known about the state of physical learning and testing environments in Ghana. As a result, it is important that this study assesses the conditions of physical testing environment in Ghana. Specifically, this study assesses examinees' perception of physical testing environment of Ghana teacher licensure examination.

Purpose of the Study

The current study analysed examinees' perception of the physical testing environment of Ghana teacher licensure examination. To gain a better understanding of the nature of the physical testing environment and the relevance of the physical testing environment on the validity of test scores. Specifically, the study objectives sought to:

1. Examine the physical testing environmental preferences for candidates of Ghana teacher licensure examination.
2. Explore how examinees of Ghana teacher licensure examination perceive their physical testing environment.
3. Discover if there exist significant differences between physical testing environment of examinees in the various testing centres.
4. Ascertain if there is a significant difference in how male examinees and female examinees perceive their physical testing environment of Ghana teacher licensure examination.

In way to attain the study's objectives, the following research questions and hypotheses were addressed:

Research Questions

1. What are the physical testing environment preferences of examinees of Ghana teacher licensure examination?
2. How do examinees of Ghana teacher licensure examination perceive their physical testing environment?

Research Hypotheses

1. H_0: There is no statistically significant differences between examinees' perception of physical testing environment in the testing centres.

   H_A: There is statistically significant differences between examinees' perception of physical testing environment in the testing centres.
2. H_0: There is no statistically significant differences between how male and female examinees perceived physical testing environment of Ghana teacher licensure examination.

H_A: There is statistically significant differences between how male and female examinees perceived physical testing environment of Ghana teacher licensure examination.

Significance of the Study

Testing and licensing have over the years been an essential avenue of determining professional capability. The introduction of Ghana teacher licensure examination aims at development and periodic appraisal of teaching practices and ethical standards for teachers and teaching. Importance is placed on all facets of the testing processes and should be scrutinised and appraised. This study would provide awareness into the physical testing environment elements involved Ghana teacher licensure examination. Specifically, findings of the study are significant to:

1. National Teaching Council (NTC) of the kinds of physical testing environment conditions that examinees of Ghana teacher licensure examination prefer when writing Ghana teacher licensure examination. The findings will therefore aid NTC to prepare the physical testing environment in line with examinees' physical testing environment preferences.
2. NTC of variability of physical testing environment in different testing centres where the Ghana teacher licensure examination is written. The variability realised will aid all the testing centres to be standardised.
3. Colleges of Education of the state of their physical testing environment where school-based tests are written. These Colleges of Education would therefore put in efforts to upgrade their testing environment if there is a need.

4. Student-teachers who shall write the teacher licensure examination of the conditions of the physical testing environment. These examinees would prepare appropriately before going to sit for the test.

Delimitation

There are many factors affecting validity of scores of a test, however, the study focused on the physical testing environment conditions such as furniture, space, lighting, indoor air quality and temperature. In addition, the study is restricted by including only candidates who sat for Ghana teacher licensing examination at public Colleges of Education in 2021. This study also could have been carried out in the entire country (Ghana) but the study concentrated on fifteen selected Ghana teacher licensure examination centres.

Limitation

It would have more appropriate to conduct this study across all testing centres of Ghana teacher licensure examination including all examinees but the study was narrowed to fifteen (15) testing centres out of the forty-six (46) testing centres of Ghana teacher licensure examination. The study in addition included 370 examinees out of 24,159 examinees. The study in addition was also limited to quantitative research approach although it could have been more appropriate to use a mixed method research approach. The mixed research approach would have allowed the researcher to use observation to augment the quantitative data obtained.

Definition of Terms

Occupational licensing is a process through which the government grants permission to enter a profession.

Physical environment refers to the totality and interplay of elements usually present in a structured and inhabited area, such as an examination centre.

Physical environmental perception is the acknowledgement in addition to clarification of sensory stimuli from an individual's physical atmosphere.

Environmental preference is defined as choosing among alternatives of environmental variables.

Organization the Study

This study was sub-divided in five chapters, each of which emphasised on a different area of the study. The study's background, statement of the problem, purpose of the study, research questions and hypotheses, delimitation, limitation, significance and definition of terms were all covered in the first chapter. The second chapter evaluated related literature. Literature consists theoretical review, conceptual review and empirical review. The third chapter focused on research method, population, data collection methods, pilot testing, sampling procedures, as well as details of instruments used for data collection and data analysis methodologies. The results were discussed in the fourth chapter and the study's summary, conclusion, and suggestions were discussed in the fifth chapter.

CHAPTER TWO

LITERATURE REVIEW

Introduction

This research focused on examinees' perception of the physical testing environment of Ghana teacher licensure examination. Background of the study, statement of the problem, purpose of the study and the research questions and hypotheses were dealt with in chapter one of this study. In addition, chapter one emphasized the significance of the study and the definitions of key terms in the research. This provided context for the research. This chapter was devoted to reviews of literature associated to or in line with the research topic. Furthermore, the aim was to discover what key writers have written and researchers have found on this research topic. The literature was reviewed under the following subheadings;

1. Theoretical Review
2. Conceptual Review
3. Empirical Review

Theoretical Review

Environmental Load Approach

The study first of all employed the Environmental Load Approach. Environmental psychologists have developed models to describe how people interact with their physical surroundings. The Environmental Load Approach, as stated by Cohen (1978), is grounded on four assumptions:

1. Individuals' ability to integrate stimuli is restricted, and they can only concentrate on a small number of them at a moment.

2. When a person's capacity to pay attention to all external stimuli is surpassed, attention is focused on the most important stimuli. Stimuli that are necessary for an activity are prioritized, while those that are all not ignored.
3. When a stimulus is strong or unexpected, the person might possibly need to pay considerable attention in order to bring out suitable response. Individual attention spans are finite and can be diminished over time.
4. As a result of this exhaustion, a person's attention capacity may extend to an overload, causing outcomes to suffer.

This dynamic process highlights the disparities in people's adaptability to their surroundings, as well as how objectively physical conditions influence how people perceive their surroundings. This perception might lead to either homeostasis or anxiety in the body. If a stressful situation arises, the stress will be resolved depending on a person's capacity to cope. As a result, a time of readjustment or adaptation may be required or it could be a time of amplified anxiety or interference, both of which can lead to a drop in output. Any one of these response to stress can have a compounding impact on a person's capacity to adapt to novel situations.

When this principle is applied to a situation where a cognitive task is being performed, like taking a test, the stimuli in the surroundings are not anticipated to be essential to the task and are thus overlooked. Individuals may redirect their attention to an element in the surroundings if the environmental stimulation is strong enough or unanticipated, according to this idea. An adaptive response would be triggered. Turning attention away from the stimulation could be one response. Overload can happen when a stimulus

interferes too much with a person's attention. Over time, input overload can make a task more frustrating and lead to mental errors (Bell, Fisher & Loomis, 1978).

The most important responsibility for an individual in a testing situation is to pay particular attention to the elements on the test. It is unclear if physical environmental factors could provide a degree of diversion that completely undermines a person's test result, particularly when weariness accumulates over the course of a lengthy testing session. According to Errett, Bowden, Choiniere, and Wang (2006) who investigated whether people get further irritated by background noise as time passes or if they become accustomed to the sound in their environment. They concluded that when individuals are exposed to noise over time, they become accustomed and become less irritated. Bowden and Wang (2005) in their examination of architectural acoustics, they showed no significant links between unpleasant noise and productivity on typing and proofreading jobs.

The lack of significance was attributed to the small subject group, brief exposure time and insignificant fluctuations in performance levels as per the researchers. However, they discovered in individual data that some subjects were better at “tuning out” background noise than others. They wondered if nuisance noise had a bigger impact on jobs that required more cognitive thought than routine duties conducted in an office setting. Longer exposure intervals (60 minutes) were found to have an influence on cognitive task performance, and the effects grew over time according to Leventhall (2004).

Maslow's Hierarchy of Needs Model

Maslow's early writings concentrated on motivation and animal behaviour, indicating an early interest in human motivation. His later research work like focused on topics including social behaviour, self-regard, and domination Maslow's research is focused on how motivation affects a specific experience. While Maslow's ideas were not expressly applied to education, his prior work revealed a deep interest in ways motivational factors influence learning as well as the learning process, particularly from a psychological standpoint (Maslow & Groshong, 1934). Nonexistence of a conclusive motivational theory in the early 1940s made Maslow expressed his dissatisfaction and as a result, he proposed a hierarchy of needs model (McLeod, 2007).

The theory has five goals or needs levels that he suggested should fundamentally alter motivation in the future research, allowing researchers to better understand how needs are addressed. This paradigm laid the path for later motivation and self-fulfillment studies in a variety of situations, including schooling. It has affected and informed several domains of scholarly investigation throughout the years, including psychology and Education. Furthermore, the model continues to inform new and developing research topics. The stages of Maslow's need model are as follows:

1. Physiological requirements, such as food, water, and oxygen, that humans must meet in order to survive.
2. Safety requirements, such as risk prevention and a pleasant, familiar atmosphere devoid of hazards.

3. A sense of belonging, which may involve interactions with one's spouse, partner, children, and/or friends.
4. Self-esteem, which encompasses both the desire to succeed and the need for recognition and distinction.
5. Self-actualization, or doing what one was born to achieve in life, is the pinnacle of self-fulfillment.

Maslow's hierarchy of needs and its application to the physical testing environment

Previous researchers have observed models that can be used as a means to evaluating and investigating a variety of educational contexts, including physical testing environment. This section looks at how Maslow's model of need might be used as a foundation for analysing physical testing environment for Ghana teacher licensure examination.

Physiological needs: Food, water, and air are all basic requirements for human survival. These are called physiological requirements by Maslow (1943). For an individual to fulfil higher order needs, this basic need must be fulfilled. Example, for individual to consider or fulfil security needs, the person would first of all consider physiological need. In order for successful testing to take place in a testing setting, certain essential needs must be identified and provided for examinees. In order to achieve their first-level needs, examinees must have access to a few basic elements and instruments in the testing environment. Many of these needs ought to be provided at the institutional level. The rest on the hierarchy is more dependent on what happens when writing the test. First-level needs are the easiest to serve in a testing environment since they are the least complicated and require the least amount of effort to fulfill.

The prerequisite that students must meet in order to be successful in a testing environment refers to some of the more obvious requirements for taking a test such as proper furniture, lighting, quiet testing room, enough space and suitable temperature. Examinees will not be able to progress farther up Maslow's hierarchy without these essential resources. One way that testing bodies might assist students in meeting basic demands like these is by providing clear, short checklists of important items that should be gathered by an examinee prior to the start of the examination. Another way that testing bodies like NTC can ensure examinees have all their basic needs is by asking examinees to provide their physical testing environment preferences when filling forms of the Ghana teacher licensure examination.

Safety Needs: Maslow's (1943) original model of safety alluded to shelter, as well as a sense of familiarity and comfort. When people are not safe, he adds, they feel restless and worried. Safety as a concept explains questioning what could make examinees anxious or give them a sense of uncertainty. Concept of safety reveals a number of important factors. Examinees unfamiliarity with the examination environment, for example, is one of the most significant stressors while writing in this mode. Both examinees and invigilators may require some time to acclimate to their new surroundings. Concerns include things like learning how to communicate with the surroundings.

Examinees preparation is a major aspect in reducing concerns connected to examinee uncertainty in the testing environment, according to a growing body of evidence (Lorenzi, MacKeogh, & Fox, 2004). Invigilators can play an imperative character in building a welcoming environment for examinees. In addition to pre-testing preparation, one technique for reducing

examinee anxiety when they first arrive at the testing center is to provide an allotted adjustment period during an orientation before to the examination. Examinees should be given enough of time to process information and respond to presentations, temperature, seating arrangements, and other factors, especially in the early parts of the testing.

Additionally, if early access to the testing center can be given, participants may be fully conversant themselves with the surroundings ahead of time (Conrad, 2002). Furthermore, conducting a student introduction session assists students to become more familiar with the technology, exam structure, and communication tools, which increases their chances of having a positive and satisfying examination experience. Maslow's paradigm as the underpinning for analysing adult involvement in education. Insecurity that may lead to an examinee loosing of job or poor grade in the testing setting (or, in general, most formal learning situations) could result in failure to graduate or a delay in licensure attainment.

Finally, determining ways to help students meet Maslow's (1943) second-level needs necessitates determining potential sources of student stress and anxiety. Predicting and responding to these issues before to, during, and after a test can assist to lessen negative student emotions and improve the entire experience.

Relationships/Belongings need: The third level of Maslow's (1943) hierarchy of needs is concerned with a person's need to belong and be accepted by others. Through interaction and collaborative activities, examinees have the opportunity to form relationships with one another and with the invigilators in a testing atmosphere. Palloff and Pratt (2005) describe it this way:

"Collaboration is a cornerstone of the educational experience in the testing environment. Almost anything examinees do in a testing environment can be considered as collaborative, from posting on a discussion board to working in small groups" (p. 334).

A multitude of elements influence how examinees perceive teamwork in the testing environment. Furthermore, an important apparent indicator is the need for establishing a meaningful and collegial relationship with the examinees. There are still unanswered questions about how much and what kinds of communication are required to developing the relationship properly. However, if used correctly, the existing instruments and procedures can elevate invigilators' presence, allowing significant rapport to develop. The instructor responds to each student's initial comments, which is the first step in building the student–invigilator connection (Anderson, 2008). The instructor should always be ready to provide quick, tailored feedback in this and other situations throughout the course that require a reaction.

In addition, examinees' perception of their learning experience is positively influenced by the speed with which instructors respond to inquiries. The relationships between peers and the community of examinees formed among those testing centres are just as important as the student–invigilator interaction. Sense of belonging when lacking among examinees has a negative effect. It also allows some individuals feel disconnected or even alienated from the learning experience (Sadera, Robertson, Song, & Midon, 2009). Examinees must know what they are expected to accomplish to develop a sense of community among their peers in order to meet the third level of Maslow's need hierarchy.

A fundamental aspect of this purpose in a testing centre is achieving a suitable degree of presence, much as it is in a typical classroom, it is critical to attend and participate in class (Danaher, Hickey, Brown & Conway, 2007). The invigilator plays a vital role in motivating examinees to interact by evaluating patterns of engagement (Vonderwell & Zacahriah, 2005) and setting goals and expectations for presence. According to Palloff and Pratt (2005), the instructor should participate in the learning community as an equal member, allowing examinees to become experts in their own testing environment.

Self-Esteem: Maslow's (1943) hierarchy of needs includes self-esteem as the fourth level. The need for humans to be respected and cherished by others might be defined like this. While this requirement exists in the testing environment, as it happens in other jurisdictions of life, the lack of cordial relationship, as previously indicated, is a barrier to accomplishing this goal. A variety of factors influence testing room performance, and examinees may feel undervalued in the testing environment. Self-esteem and a sense of value, in many ways, are impossible to achieve without a firm foundation of testing and cooperation, as seen in Maslow's hierarchy (Curtis & Lawson, 2001).

Examinees who are unfamiliar with a testing environment setting may be fearful, resulting in low self-efficacy/confidence and self-esteem in the testing environment. Additionally, this situation could be worsened by a misinterpretation of positive reinforcement by peers and invigilators (Nicol & Milligan, 2006). Particularly this is troublesome in physical testing environment, as examinees are unlikely to receive much, if any, spoken feedback, instead relying on written communication that is frequently

misconstrued. Orientation, preparation, and positive reinforcement all play a role in assisting examinees in feeling valued, respected, and appreciated.

Conceptual Review

This section contains literature appraisal on the designing and development of licensure examinations, Ghana teacher licensure examination (GTLE), examinees and their physical testing environments and physical testing environment components.

Design and Development of Licensure Examination

Test developers have the aim of creating a test from which accurate conclusions and interpretations can be established. If this aim is established, the test standards are adequately documented and the content domain is extensively analysed. The individual test items that match the specifications are developed, the test developer or developers are probable to create an instrument that produces accurate result. The Standards for Educational and Psychological Testing provide general criteria for test developers and publishers (American Educational Research Association, American Psychological Association & National Council on Measurement in Education, 2014).

These directions will show you how to construct a test that is based on the test's intended goal. The test developer will first of all define objective of the test. Content area that will be measured will also be outlined. Test developers will further move through the development and evaluation procedure by means of a clear focus. The subsequent phase is the test structure, sometimes known as a content blueprint. The framework outlines the domain components that the test will evaluate. For licensure examination, a role isolation study or a task analysis practice is usually used. After the framework

has been designed but sometimes simultaneously, the test requires details of how the attributes of the domain being tested will be quantified.

The type of question, answer format, timeframe, scoring procedures, and ideal psychometric properties of items are all stated in test specification. In addition, test specifications also specify the overall test difficulty, reliability, and administration processes, as well as the target audience for the examination (AERA, APA, & NCME, 2014). The process of generating and evaluating products begins once the test specifications are well specified. From the profession that the test is developed for, a representative group of experts provide external review. Pre-testing is required to see if psychometric standards specified are met as test specifications indicated (AERA, APA, & NCME, 2014).

Construction and evaluation of the item format is the final phase in the test development process. Using internal and external examination of the item form, it obligatory be established if the test specifications have been met throughout this step. Furthermore, when several test forms are prepared, test form equating must be accomplished. Development as well as evaluation of licensure examination are important because conclusions and judgements obtained from a licensing examination necessitates strict attention. Granting that such a rigorous method covers precise test preparation, it has a disadvantage of not curbing a possible source of invalidity of test score during the administration of teacher licensure tests.

The maintenance of test score validity requires consistency among test administration centres for teacher licensure examinations (Parshall, Spray, Kalohn, & Davey, 2002). Exam administration expenses, maximizing test

security, and examinee concerns are all common sources of invalidity in the administration of teacher licensing exams. Differences in examination centres, for example, may result in variations in test administration between testing centres, affecting test score validity. The consistency with which test security measures are implemented is another example. The use of security mechanisms during the administration of an examination can led to irregularities in the testing process, which might call into question the validity of test results. The examinees themselves are example of test score invalidity sources. Examinees who are anxious may react differently than those who are comfortable. As a result, a source of measurement inaccuracy may emerge, as well as the possibility of score invalidity. The extent to which testing environments vary between testing centers, as well as the effect of testing environment on test score validity, are unclear.

Ghana Teacher Licensure Examination (GTLE)

Various occupations require different types of licensure exams. The National Teaching Council (NTC) recognizes Ghana teacher licensure examination as the only teacher licensing examination in Ghana. National Teaching Council develops and administers the licensure examination. The first Ghana teacher licensure examination was held in September, 2018. It comprised key teaching abilities, numeracy and English reading (verbal and essay writing). The NTC is responsible for developing and implementing professional development programs and licensing pre-tertiary teachers (Ministry of Education, 2018). It is also responsible improving teaching practices and periodically reviewing and improvement of teaching practices and ethical standards. Furthermore, advising the minister responsible for education on

matters of professional standing and status of teachers are obligatory for NTC as mandated by the Education Act 2008 (article 778). Individuals that are eligible to sit for the teacher licensure examination according to NTC are as follow:

1. Teachers who are already in the teaching service are eligible to apply for a provisional teaching license that will last for three years after which time they will be required obtain a professional teaching license.
2. Full professional licenses will be awarded only to individuals who complete the final examinations of their teacher education programs as well as the NTC teacher licensure examination.
3. An acquired teaching license is renewable after successful completion of approved professional development courses and teaching evaluation reports every year.
4. Practising teachers are exempt from taking the licensure exam. After completing a certain number of professional development courses, a complete license will be given.
5. All applicants for employment with Ghana Education Services must have a full professional teaching license (GES).

Despite the fact that pass rates have constantly risen, test security has become a significant issue that requires more attention and resources. Each component of the license examination, as well as each examination form, follows a topic structure that represents the knowledge areas that are considered entry-level for teaching in Ghana. Ghana teacher license examination is held mostly at College of Education, a universities and other designated testing centres with some large metropolitan areas having many test centres.

In an ideal situation, variability in testing environments should not affect test scores significantly. Aside from variables like test-taker comfort, noise level, workstation, and illumination, suitable actions should be made to guarantee that test conditions match the stipulated requirements (ATP, 2002). To some extent, testing centres differ in size, brightness, temperature, noise level and space. Little is known about the components of these examination centres across the country.

An attempt has been made aiming at establishing advanced examination centres. An advanced security measures may result in a decrease in the prominence placed on quality control observing of testing centres for overall uniformity. In a similar manner, International Test Commission (2006), states that "human factors challenge in the presentation of content via computer or the Internet" must be addressed (p. 4). The provision of sufficient degrees of control during test administration is also encouraged by these guidelines. The health including the safety of examinees must be expressly addressed by test publishers by alerting them of the testing conditions. These testing conditions include lighting, temperature and break space. In the examination center and on the work surface, test takers must feel at ease through proper sitting posture, sufficient space, comfortable temperature and quality lighting.

Finally, the guidelines addressed the prominence in meeting national health and safety standards for examinees (International Test Commission, 2006).

Examinees and their physical testing Environment

Environmental psychologists are concerned with how people detect their physical surroundings, both voluntarily and involuntarily. The distinction

between voluntary and involuntary observations is that voluntary observations are performed consciously, whilst involuntary observations are done unconsciously. Voluntary observations of the surroundings can frequently be diverted; unintentional observations, on the other hand, might be a huge distraction. If a person recognises that radio sound is distracting (voluntary observation) for instance, the volume of the radio sound can be reduced or turned off totally. The low-level noise by office equipment, on the other hand, may go unseen yet nevertheless causes interruption.

Usman and Madudili (2019) emphasize the relevance of the physical environment, stating that aspects like lighting, noise and climate management have an impact on student achievement. Students as young as elementary school age are aware of the physical characteristics of their learning environment and have a sense of whether the environment is suitably updated and conducive to learning, according to the authors. Furthermore, association between learning environment and students' performance is substantial to academic achievement. Lyons (2001) outlines the importance of the physical environment to educational attainment by laying out the research literature's current correlations between classroom settings and learning. Higher test scores and more favorable student attitudes have been identified in enhanced learning settings, indicating that the classroom atmosphere has a substantial impact on concentration levels, listening, and writing.

Heschong (2003) discovered that window qualities had as much power in explaining variances in student performance on standardized tests as the quantity of computers or teacher characteristics. Vartabedian (2002) describes the computer technology, audiovisual components, and network structures that

are used in classrooms. Furthermore, administrators of universities care about students' perception of the learning environment, because students may consider the physical learning environment while deciding whether or not to enroll in school. Administrators also decide how much classroom upgrades and expansions will be included in capital improvement requests. Given the amount of money that colleges and universities intend to spend on facility and classroom enhancements, it's critical to understand how important physical classroom environments are to students.

While major study has established that the physical environment has an impact on primary and secondary school pupils, those effects may not be transferred to college students because they are older and spend less time in individual classroom facilities. Testing standards covers the need for test overseers to scrutinised physical test environment. Testing standards realises that the testing process embraces engagement and response to the physical setting in where the test is conducted. Environmental psychology-based theoretical models could help researchers better gain a better understanding of testing environments on adults taking the tests. Environmental psychology, according to De Young (1999), addresses the impact of the physical environment on humans, the followings aspects of the physical testing environment must be considered:

Furniture: A well-designed examination centre can establish an environment that focuses on examinees and supports a variety of activities that prepare them to cope with real-world challenges, such as writing, sketching, demonstrations, role plays, brainstorming, and problem solving (Barrett,

Davies, Zhang and Barrett, 2015). The following factors should be used while selecting furniture such as desks and chairs:

Comfort: Desks and chairs should be comfortable for lengthy periods of time and allow ample space for each examinee to work (Barrett et al., 2015).

Mobility: Examinees should be able to walk about the examination centre easily, allowing them to view their invigilators and break into small work groups if necessary (Harvey & Kenyon, 2013).

Durability: Desks and chairs should be built of lasting materials to ensure that they are stable during use, resistant to repeated use and abuse by examinees, and capable of providing the same level of quality over time (Adewole & Olorunnisola, 2010).

Light: Although everyone's preferences for room lighting are different, some are common qualities that apply to everyone. In well-lit environments, reading ability improves. The benefits and drawbacks of each lighting source are balanced by a combination of natural and artificial light. Although highly lighted spaces might draw people's attention, it's critical that the light is of good quality (Bechtel & Churchman, 2002).

Space: The size of sufficient space per examinee is determined only by the quantity of examinees in a given location (Tanner, 2009). Despite the fact that there are no specific dimensions for constructing examination centres, many testing centres throughout the world adhere to dimensions in relation with establishment of a positive physical learning environment. Yet, class size matters since an overcrowded testing centre reduces the amount of space available per examinee. The examination centre facility should allow for flexibility in order to accommodate the needs of examinees as pedagogy

changes (Barrett et al., 2015b). In addition, Furniture should be arranged in such a way that examinees have flexibility of movement in their testing setting and that action-based activities are supported. Furthermore, examinees need space in order to enhance their creativity in a variety of examination tasks.

Temperature/Climate: Physical and psychological factors play a role in how people perceive ambient temperature. The ability of the body to adjust temperature disparities is one of the physical components. The immediate environments temperature is referred to as the ambient temperature. Individuals' perception and responses to temperature differences are the psychological component of temperature perception. The perception of indoor air quality can also be influenced by temperature. The sense of ambient temperature, and thus air quality, is influenced by humidity and air flow. Room air temperature ranging between 21-23°C is deemed appropriate (CCOHS, 2007). In chilly weather, fidgeting and loss of attention, as well as decreased physical dexterity and quickness, may occur.

Ergonomic Design: Human anatomy and physiology, as well as how people integrate components of their surroundings to complete a task, are all factors in physical space design. Because everybody's size and shape are different, it is critical to make design ergonomically and customised to optimize performance and reduce stress (Smellie, 2003). Different components of the work environment are frequently discussed within a computer lab or area. The test centre itself must be addressed in addition to noise, temperature, humidity, and illumination. Physical testing environment is one aspect of the testing centres that may perhaps affect an examinees productivity and comfort and their ability to move within and outside the testing centre during breaks (Workers

Compensation Fund, 2016). Personal preferences have a big influence on the amount of space needed. A packed room to one individual may not appear crowded to another (Fulton, 1991). Butin, (2000) stated that desks are the working area, so the height should be average since it is difficult to place adjustable desks. He further stated that chairs should be adjustable so that different people with different heights can adjust the height.

Examinees and their physical testing Environment preferences

Individuals have been proven to prefer comfortable room temperature, good lighting, appropriate sound levels and other physical environment. Examinees, thus in general look out for physical environment that boost their competence and self-esteem (De Young, 1999). Majority of exploration on physical environmental impacts have concentrated on offices. Granting that this exploration did not specifically concentrate on testing physical environment, nevertheless can be adapted to it to some extent. Work and measuring performance necessitate people's concentration and are done in offices or within a room. Espey (2008) studied the physical classroom environment of students in college recognised that students prefer desks that are mobile as one of the most important classroom features that positively influences their learning. It was further suggested that seats that are flexible and adjustable and creating a coffeehouse environment have been one of the solutions to modernised classroom needs and preference. According to (Burke and Burke-Samide, 2004), most students prefer a warm but comfortable instructional temperature of classroom in Jamaica.

Price, Dunn, Dunn and Griggs (1981) research established five aspects that define how people learn differently. The learning environment, which

includes elements such as sound, light, temperature, and seating arrangement, was identified as one of the five dimensions. They further discovered that some people prefer warm physical environment to cool ones, and that some people prefer dim lighting to bright illumination. The early research of Price, Dunn and Dunn (1991) developed indicators reflecting desirable aspects of adult working or learning physical environment. They iterated that when workers are put in surroundings that capitalize on their learning and cognitive skills, they are more productive in both learning and work. Adult preferences for work/learning environments have been discovered in twenty domains, nine of these domains are related to the physical aspect of the environment (Price, Dunn, & Dunn, 1991). The areas of preference include level of sound, room colour, light and temperature. Again, ability to adapt with clothing, seating design, opportunity for intake, time of day and need for mobility.

These components, while not particular to the testing environment, address individual needs that individuals executing a task at an examination may require in order to perform to the best. The subject of environmental psychology also provides support for the importance of these environmental factors as well as an awareness of the testing setting. Environmental psychology is an area of study that aims to uncover environmental factors that affect how human behave. It would then apply that information to adjust the physical environment for the people who use it (Sweet, 1989). In furtherance, environmental psychology studies examine the interrelationship between human behaviour and surroundings (De Young, 1999). This encompasses pragmatic investigations into air quality, sound, temperature and lighting in physical environments (Sundstrom et al., 1996).

The latter is an unintended observation of the noise in the environment. Furthermore, people's perceptions of their surroundings and attitudes toward them are tied to their recollections of earlier occurrences. A physical site that resembles a positive educational setting where the individual excelled or one that resembles an environment where the individual failed a course are both examples of this. Third, people prefer to be in situations where they feel most confident and capable, and they tend to seek out these situations. These sections would have varied attributes for each person. Finally, environmental stimuli have been linked to attentional exhaustion and stimulus overload. Environmental factors that cause mental or bodily stress, as well as many other types of stress, that interfere a one's performance (De Young, 1999).

Empirical Review

Physical Testing Environmental Preferences

Individuals have been seen to prefer certain physical environmental variables such as appropriate sound levels, lighting, furniture, room temperature and other physical environment variables. Some examinees prefer warm physical environment to colder environments, while some prefer dim lighting to bright illumination. Physical working environment, physical learning environments and physical testing environment preferences of adult have been discovered in twenty domains, nine of which are related to the setting's physical or temporal characteristics (Price, Dunn & Dunn, 1991). Light, sound, room temperature, room colour, seating design, space, time of day and the need for mobility are among the nine areas of physical environment preference.

Margianti, Fraser and Aldridge (2010) carried out a study on physical testing environment impact on affective and cognitive outcomes of students.

The study involved 250 examinees of Nurses licensure examination in the Philippines. The study aimed at exploring if there were statistically significant relationships between physical testing environment dimensions and student accomplishment at both the individual and class mean levels of analysis. Again, the intended to explore the physical environmental preferences of the examinees. The study concluded that, examinees views are favourable and strongly correlated with testing environment measures, according to the findings. Again, learners exhibited preferences for physical testing environment variables such as, adjustable desk, appropriate lighting, adjustable chairs and ergonomically designed furniture.

Koul and Fisher (2006) conducted another study in Jammu, India, to investigate the characteristics of physical testing environments of National teacher's licensure examination. This study employed a variety of research approaches from various perspectives. The study employed both observation and survey questionnaire in gathering data. Three factors, namely furniture, sound level and temperature were the key variables were studied. Other qualitative methods (interviews and observations) were employed to acquire a more in-depth understanding of the physical testing environments based on the quantitative data. Examinees perceived a positive physical testing environment in terms of lighting, furniture and space and preferred physical testing environment variables such as lighting that illuminates and entire room, furniture, good temperature and space classrooms. They study recommended that for a fair examination to be conducted, there should a uniform physical testing environment.

Students' perceptions of five distinct seating arrangements in typical examination centres in an urban public higher education institution were investigated in a study by Harvey and Kenyon (2013). The study aimed at exploring how students(examinees) perceived their testing environment seating arrangement. Modern mobile chairs, tablet arm chairs, fixed tiered seating with tablet arms, rectangle tables with regular chairs, and trapezoid tables with chairs on caster were among the five seating styles. Students' perceptions of five distinct seating styles in typical classrooms in an urban public higher education institution were investigated in a quantitative, cross-sectional research study. The study found that students prefer modern seating arrangement. The findings suggested that schools should (re)think the objectives and responsibilities of seating arrangements in 21st-century classrooms, including seating.

Aloyo (2015) undertook a study in Kenya on the relationship between physical testing environment and achievement in teacher licensure in Nairobi city, Kenya. The study aimed at exploring if there is a relationship between physical testing environment and achievement in the licensure examination. Again, the study aimed at exploring the physical testing environment preferences of the examinees. The study found that examinees have strong preferences for particular physical environmental variables. Pearson's r, a measure of how much the environment affects test scores, found a favorable relationship between the testing environment and examinees achievement. The impact of the internal atmosphere and amenities on student achievement varied between male and female examinees according to analysis of variance testing. The key predictor variables of achievement identified by the correlation and multiple regressions were the school's acreage, availability of a title deed,

aesthetics, security, school grounds, and type of lighting, interior wall paintwork, graffiti occurrence, classroom furniture condition, and noise from the neighborhood. According to the findings, the physical environment of the school plays a role in student accomplishment. Sound, lighting, classroom or testing room temperature and other physical environment characteristics are among individuals' preferences in general, according to the study, and they seek out preferred situations to boost their confidence and competence.

To better understand end users in this sector, this study examined four broad concepts connected to lighting: knowledge of technical aspects of lighting, perception about the impact of lighting on people, lighting preferences, and lighting importance. The state of these end users' knowledge, beliefs, preferences, and judgments of the importance of lighting, as well as the interrelationships between these variables, were assessed using descriptive statistics and inferential analyses of specific hypotheses. The findings suggest that lighting is essential to laypeople, and that those who value lighting want more control over it. These participants felt they had little control over illumination and wished for more. A significant number of respondents believe that fluorescent lighting is harmful to one's health, and those who agree with these health concerns also say that natural sunshine is preferable than electric light.

In Florida where national physical therapy licensure examination, Donald (2016) investigated how examinees perceive the physical characteristics of the physical testing environment. The objectives were to assess the testing environment as perceived by examinees taking the National Physical Therapy Examination (NPTE), which is a high-stakes licensure examination. A self-

report questionnaire was used to measure perceptions of the physical testing environments. The questionnaire included items that measured individuals' preference and perception of specific characteristics of the environment, along with demographic information and an open-ended item. The Questionnaires were distributed to 216 examinees via emails to a then recent class of physical therapy graduates. A clear preference toward one end of the scale was observed for preferring a quiet room and a desktop area that had a great deal of adjustability. Some participants preferred warm locations, while others preferred a cooler atmosphere, and some preferred more subdued lighting over very bright lighting, according to the study. Illumination, level of sound, room temperature, seating design, opportunity for intake, time of day, room colour and the need for mobility are among the nine areas of consideration.

Examinee's perception of physical testing environment

In Florida where national physical therapy licensure examination, Donald (2016) investigated how examinees perceive the physical characteristics of the physical testing environment. One of the objectives was to assess the testing environment as perceived by examinees taking the National Physical Therapy Examination (NPTE). The finding of the study established that examinees perceived the physical testing environment to be appropriate terms of lighting, temperature, space, air quality, and temperature, she discovered that examinees thought their testing environment was adequate for examination purposes.

In their study investigating factors influencing elective science students' perception of their biology classroom environment in low and high academic achieving senior secondary schools in Ghana's Central Region, Otami, Ampiah

and Anthony-Kruege (2012) used a cross-sectional survey research design. Three hundred and sixty-six third-year optional science students were chosen using a multi-stage sampling process. In the study, it was established four aspects impact elective science students' perception of their biology classroom environment. This includes lighting, arrangement of furniture, teacher's characteristics and cooperation according to the data. The findings suggested that elective science students in both school categories had a negative perception of their biology classroom environment, but that teacher support, cooperation, and equity were significantly different in favor of elective science students in low academic achieving schools.

Ahmad and Amirul (2017) conducted research to determine the suitability of the physical testing environment of examinees of Dentist and Surgeons licensure examination Malaysia. The study involved 400 graduates of Medical and Dentist in Johor, Malaysia took part in this study. The Physical Aspects Classroom Environment Inventory was used to assess students' views on physical aspects and their impact (PACE). The adequacy of the physical classroom setting was assessed using six constructs: furniture, facilities, space, lighting, indoor air quality, and colour. The effects of the physical environment on students were measured using three constructs: health, enjoyment, and learning. The findings found that students thought the physical environment was suitable in terms of furniture, facilities, and lighting, but only moderately in terms of indoor air quality, space, and colour. Students' perception of their physical testing environment had a moderate impact on their health, enjoyment, and learning, according to the findings. The physical environment has a

substantial impact on students' health, enjoyment, and learning, according to further research.

Ahmed, Taha, Alneel and Gaffar (2018) conducted research on Students' perception of the physical learning environment and its relation to their study year and performance in Sudan. A descriptive cross-sectional study was performed of 638 students from the second, sixth and tenth semesters at the Faculty of Medicine at Gezira University, Sudan. This study employed the Arabic-translated Dundee Ready Education Environment Measure. The main predictor variables were the study year and academic performance. Descriptive statistics and one-way analysis of variance with a post hoc Tukey-Kramer multiple comparisons test were used for data analysis. According to the findings, students had a more positive perception of their physical learning environment. The study again found that students their physical environment to positively impact their learning.

Edgerton, McKechnie and McEwen (2011) in their study that aimed at understanding and measuring how secondary school students perceive their physical testing environments of their end of year examination. The study specifically aimed at identifying how the students perceive the physical environment and how these perceptions relate to educational outcomes or achievements. Data was collected through a combination of focus groups and a large-scale survey of three different year groups of students across seven secondary schools in Scotland. The results indicated that students' perception of their physical school testing environment was negative. The study further indicated that physical environment is related to key educational outcomes and the way in which they interact with their environment. However, the findings

also indicate the danger of considering school students as a homogenous group. The study concluded that learners have a negative perception of their physical school environment. The variables considered include furniture, air quality and space.

Differences in perceived physical testing environment in various testing centres

A study by Harvey and Kenyon (2013) on classroom seating considerations for 21st century students and Faculty in Buffalo State, State University of New York. The study explored students' perception of five different seating styles within typical classrooms in an urban public higher education institution. Across all dimensions, students rated significantly highest the modern mobile chairs and trapezoid tables with chairs on casters, while traditional tablet arm chairs and fixed tiered seating with tablet arms scored lowest. In addition, the study found no significant differences in perception of the physical classroom dimensions in the two urban public higher education institutions used in the studies.

Again, Douglas and Gifford (2001) evaluated the physical classroom by students and professors in University of Victoria. A method for linking classroom evaluations physical properties and for comparing the evaluations of different groups. Seven physical properties of the classrooms were reliably assessed by independent observers. Using Brunswik lens model, the relations between the physical properties and the evaluations by two groups were established and compared. The study established that students and professors did not differ in how they evaluated their physical classroom. Again, the study

found that there are no significant differences in how students evaluated their classroom environment in terms of their classrooms.

A study by Majumde, Kumar, Krishnamurthy, Ojeh and Adams (2019) on the physical testing environment perception of teacher licensure examination in Pakistan. The study involved 450 examinees in four (4) different examination centres. The study used survey and observation. It was reported that examinees had negative perception of their testing environment and in addition, reported that examinees perception were significantly different in terms of physical testing environment. In addition, Andrew and Orodho (2014) carried out research in Kenya that studied the physical classroom environments in rural high schools and urban schools. The study involved five (5) urban and five (5) five rural schools. The study involved variables such as lighting, location, desk, tables and temperature. It was reported that the classroom environment in urban centres were different from the classroom environment in the rural areas.

Differences in Male and Female examines perception of physical testing environment

Margianti, Fraser and Aldridge (2010) carried out a study on physical testing environment impact on affective and cognitive outcomes of students. The study also sought to find out if there is a statistically significant differences in physical testing environment according to gender. The study found that there were statistically significant relationships between physical testing environment dimensions and student accomplishment at both the individual and class mean levels of analysis, according to the findings of the simple and multiple correlation analysis. Student views are favourable and strongly correlated with learning environment measures, according to the findings. Again, Male and

female students have similar sentiments toward their lectures, according to the findings.

Study by Kim, Dear, Candido, Zhang and Arens (2013) on "Gender differences in office occupant perception of indoor environmental quality (IEQ)" investigates the gender differences in the occupants' perception on various aspects of indoor environmental quality (IEQ) by two lines of inquiry; Firstly, a comprehensive literature survey spanning the research areas of indoor air quality (IAQ), sick building syndrome (SBS), thermal comfort, lighting, and acoustics was conducted. Statistical analyses indicated that female occupants' satisfaction levels were consistently lower than male occupants for all fifteen IEQ factors (including thermal comfort, air quality, lighting, acoustics, office layout & furnishings, and cleanliness & maintenance). Cherenfant (2013**)** conducted research in Robert Morris University campus where students were asked to complete a survey to analyze aesthetics in classrooms to determine what each gender found the most important in his or her learning environment, and whether female students were or were not the most aware of their aesthetic environment. The results demonstrated an insignificant difference between males and females' preferences, but showed that male students were slightly more aware of aesthetics in their classrooms and Interactivity were assessed. Across all dimensions, students rated significant.

A study by Burgess and Kaya (2007) studied whether gender influenced college student's attitude concerning classroom seating layout in Alabama. The research involved 912 college students. The results revealed that females have greater feeling at ease in rows of tablets-arm chairs and in clusters while males felt more at ease in u-shaped and rows of tables with individual chairs. Arpaci,

Hazar, Bayansalduz and Tingaz (2013) carried out a study included 183 volunteer students studying at School of Physical Education and Sports at Gazi University to explore learners' perception of whether the classrooms are ergonomically suitable. Out of the total sample, 43.2% of them were females, while 56.8% of them were male students. The mean score of the female students was higher than that of the male students. There was a statistically significant difference between the genders for the item asking whether the learners think there is enough space for the legs between the chair and the desk. Muchemi (2018) studied the importance indoor air quality. A cross sectional survey was conducted to characterize the indoor air quality (IAQ) in schools and its relationship with gender of the occupants. Concentrations of total volatile organic compounds (TVOCs), carbon dioxide and temperature were assessed in four girls' and three boys' secondary schools in Nakuru, Kenya. The results indicate that the perception of concentrations of carbon dioxide were significantly higher in girls' classrooms than in the boys' classrooms.

Summary

Notwithstanding what is discovered about the impact of the physical environment on an individual's enjoyment, productivity, focus, and job endurance, little is known about the state of physical testing/examination environment. Regardless of the fact that environmental psychologist, ergonomist and public health practitioners have delved into physical environment on a micro and macro scale, it appears to be little literature on the effects of environmental characteristics on test takers. Lighting, air quality/temperature, space, and ergonomic design are all components that are regularly evaluated across disciplines. Many researches have looked into these

physical characteristics, as well as their individual and combined impact on physical stress, satisfaction, psychological and productivity.

CHAPTER THREE

RESEARCH METHODS

Introduction

This study assessed examinees' perception of the physical testing environment of Ghana teacher licensure examination. Research methodologies employed in this study were discussed in this section including research design, study area, population, sampling and sampling procedure, data collection instruments, pilot testing, data collection procedure and data processing and analysis.

Research Design

Gay and Airasian (2000) defined research design as follows: "a general strategy for conducting a research study" (p. 107), which describes the basic structure of the study. They go further to say that, the hypotheses, variables, and real-world limitations are all part of the study design, which instructs the researcher which strategy to use. Furthermore, a research design can be understood as an operating model or blueprint for a research project which thus takes into consideration both internal and external reasoning (causality and generalizability respectively). Research design, according to Mouton (2001), is a blueprint or draft for how a researcher wishes to carry out research. Research design further lays emphasis on the procedures to take when conducting an enquiry. As a result, it reflects the strategy for gathering and analysing data related to a specific topic. For the purpose of this study, descriptive survey design with quantitative approach was employed.

Kulbir (2009), has it that descriptive survey design is a research design that looks out for reasons that are linked to specific events, outcomes,

conditions, or types of behaviour. Also, according to Osula (2001), descriptive surveys are varied and practical, mainly for researchers because they indicate specific needs. Osula went further to say that descriptive survey design is necessary for all sorts of study that aims at appraising a situation and draw conclusions and generalisation. The key aspect of this kind of design, thus according to Best and Kahn (2007), is that it reflects the current situation of a phenomenon, feelings, and continuous patterns. Another goal of this type of research design for observation, description and documentation of characteristics of an event as it naturally occurs.

Pilot testing, questionnaires, observation, interviews, and document review are some of the data collection approaches used in this design (Amedahe & Asamoah-Gyimah, 2003). It is a scientific technique for determining associations between variables, asking follow-up questions and explaining topics that are not really apparent. This research design is characterised by huge population size so it allows the researcher to make broad generalisations based on the representative sample chosen. Randomisation is used in the descriptive survey design so that errors as a result of using sample observation for generalisation of population characteristics (Wallen, 2000). The chosen research design was deemed suitable because:

1. The topic necessitated the collection of data via research instrument that is self-reporting because of its nature, and
2. Huge volumes of information were gathered within the shortest possible time.

By asking respondents questions concerning the construct under inquiry, this strategy aided in data collection.

On the other hand, in a case where researcher refuses to follow strict procedures, collected data in this research may be distorted as a result of bias incorporated into the research according to Amedahe & Asamoah-Gyimah, (2003). Further shortcoming is that, while data can be collected by direct observation, it must be organised and delivered in an appropriate manner before reliable conclusions can be established. If caution is not maintained, the findings of the study may not be reliable (Jacobs, 2011). Another fundamental weakness is demand characteristics, which encourage respondents to strive to produce responses that reflect respondents' perception of a situation or what the investigator needs from them. Notwithstanding its drawbacks, it was determined to be the best design for this study.

Study Area

The research was conducted in Ghana. Ghana is bounded on the West by the Ivory Coast, on the North by Burkina Faso, on the East by Togo, on the south by the Gulf of Guinea, and on the West by the Atlantic Ocean. In Ghana, teaching licensing test is written in all sixteen regions. There are 48 Colleges of Education scattered across the entire country that are in five zones (Northern Zone, Ashanti/Brong Ahafo Zone, Volta Zone, Eastern/Greater Accra Zone and Central / Western Zone).

Ghana is one of the educational hubs in Africa that has a lot of educational institutions. Again, Ghana has implemented licensing for all teachers at basic school level and second cycle institutions so to improve the competence of teachers. The first Ghana teacher licensure examination was written in 2018 across Colleges of Education and other selected testing centers.

Figure 1: Graphical Map of Ghana showing location of Colleges of Education.

KEY

Source: Google Map, 2021.

AN: Berekum College of Education, Berekum

AK: Mampong Techincal College of Education

AQ:Ambrose College of Education, Dormaa Akwamu

AF:Joseph's College of Education, Bechem

AJ:Louis College of Education, Kumasi

AI:Monica's College of Education, Mampong

AL:Wesley College of Education, Kumasi

V: Agona SDA College of Education
AH:Offinso College of Education, Offinso
AP:Al-Faruq College of Education
AI:Atebubu College of Education, Atebubu
T: Wiawso College of Education
TT:Bia Lamplighter College of Education
AC:Enchi College of Education, Enchi
X: Foso College of Education
AB:Holy Child College of Education, Sekondi-Takoradi
Z: Komenda College of Education
Y: Our Lady of Apostles (OLA) College of Education, Cape Coast
AE:Abetifi Presbyterian College of Education
Q: Accra College of Education, Greater Accra
O: Ada College of Education, Ada
AD:Akrokerri College of Education, Akrokerri
W: Kibi Presbyterian College of Education
AW:Methodist College of Education (Ghana), Akim Oda
S: Mount Mary College of Education, Somanya
R: Presbyterian Women's College of Education, Aburi
G: Presbyterian College of Education, Akropong–Akuapem
V: Seventh-Day Adventist (SDA) College of Education, Asokore
I: Bagabaga College of Education, Tamale
AX:Vincent College of Education, Yendi
H: Dambai College of Education, Dambai
E: Nusrat Jahan Ahmadiyya College of Education, Wa
C: Gambaga College of Education
A: Gbewaa College of Education
AY: McCoy College of Education
AH:Offinso College of Education, Tamale
D: Tumu College of Education, Tumu
M: Evangelical Presbyterian College of Education
AF: John Bosco's College of Education
N: Akatsi College of Education, Akatsi
J: Jasikan College of Education, Jasikan
BA: Evangelical Presbyterian College of Education
P: Peki College of Education, Peki
L: Teresa's College of Education, Hohoe
K: Francis College of Education, Hohoe

Population

According to Nitko (2004), population is defined as the entire collection of cases that meet a designated set of criteria. He went further to say that population has some characteristic that sets it apart from other groups. Bryman (2001) defined a population as a group of people or things who possess at least one trait. In this study, the population consisted of candidates (examinees) who sat for Ghana teacher licensure examination at public Colleges of Education in 2021.

From appendix E, there are 46 Colleges of Education that are in five zones of Colleges of Education in Ghana. The zones are as follow; Northern zone, Ashanti/ Brong Ahafo zone, Volta zone, Eastern/Greater Accra zone and Central/ Western Zone. Ashanti/Brong Ahafo zone had 6,466 examinees, Central /Western zone had 3,521 examinees, Eastern/Greater Accra zone had 5,337, Northern zone had 5,753 and Volta zone had 3,104 examinees. There were specifically 24,159 candidates of teacher licensure examination across all 5 zones of public Colleges of Education. Therefore, they consist the study's population.

Accessible population

Accessible population according to Kothari (2004) is the part of the population in research on which the conclusions from the research can applied. This type of population is specifically known as the study population. It can be further said that, accessible population is a part of the target population. It is from the accessible population that researchers draw their samples. In this study, 15 testing centres were sampled as the accessible population. Therefore, 15

testing centres were proportionately sampled according to number of centres in each zone as the accessible population.

Table 1: Distributions of Colleges of Education according to zones

Zone	Number of testing centres	Sample
Northern Zone	10	3
Ashanti/ Brong Ahafo Zone	14	5
Eastern/Greater Accra Zone	8	3
Central/ Western Zone	7	2
Volta Zone	7	2
Total	46	15

Source: Zonal Colleges of Education report (2021)

From Table 1, there are 46 public Colleges of Education where Ghana teacher licensure examination was written. These 46 centres are into 5 zones. To ensure that each of the five zone is represented equally, proportionate sampling was used to sample 15 centres from the 46 testing centres. The proportionated testing centres from each zone was arrived at by dividing the number testing centres in that zone by the total number testing centres (46). The product is then multiplied by 15 (accessible testing centres).

In each of the 5 zones, simple random sampling was then employed to selecting the proportionated testing centres. All the names of testing centres in a zone were written on a folded piece of papers. All the names on papers were put in a container and shook. After shaken, the proportionated number were thus selected and then recorded.

Table 2: Accessible population

Examination Centre	Examinee(N)	Zone
Ola College of Education	525	Central/Western
Fosu College of Education	702	Central/Western
Accra College of Education	504	Eastern/G.Accra
SDA College of Education	620	Eastern/G.Accra
Kibu College of Education	701	Eastern/G.Accra
Atebubu College of Education	511	Ashanti/B.Ahafo
St. Louis College of Education	504	Ashanti/B.Ahafo
Berekum College of Education	602	Ashanti/B.Ahafo
Offinso College of Education	621	Ashanti/B.Ahafo
St. Francis College of Education, Hohoe	314	Volta
Peki College of Education	402	Volta
Akatsi College of Education	733	Volta
Bimbilla College of Education	302	Northern
St. John Bosco's College of Education	401	Northern
Tumu College of Education	421	Northern
Total	7,863	15

Source: Field survey (2021)

From table 2, there are 7,863 examinees from the fifteen testing centres consisting the study's accessible population.

Sample and Sampling Procedures

Sarantakos (2013) defined sample as a subject that have been selected carefully from the overall entities making up a population. Again, Sarantakos

has it that sample is a subgroup of a population that the researcher intends to generalize the findings to. The methods used to choose a sample from the population are referred to as sampling and sampling procedures.

In this study, multi-stage sampling technique was employed. Firstly, proportionate sampling was employed in selecting 15 testing centres from the 46 Colleges of Education. In Ghana, there are 46 Colleges of Education which are in 5 zones. Proportionate sampling was used in sampling 15 testing centres from the 46 Colleges. As a results, 3 centres were selected from Northern zone that had 10 centres. Ashanti/Brong Ahafo zone had 14 testing centres and 5 centres were sampled. This was done across the five zones. This can be seen in Table 3.

Secondly, simple random sampling was used in selecting the proportionated number of testing centres from each zone. As a results, Our Lady of Apostles (OLA) College of Education and Fosu College of Education were randomly sampled from Western/Central zone. Accra College of Education, Seventh Day Adventists (S.D.A) College of Education and Kibi College of Education were randomly sampled from Eastern/Accra zone. In addition, Atebubu College of Education, St. Louis College of Education, Berekum College of Education and Offinso College of Education were randomly sampled from Ashanti/Brong Ahafo zone. St. Francis College of Education, Hohoe, Peki College of Education and Akatsi College of Education were also sampled form Volta zone and Bimbilla College of Education, St. John Bosco's College of Education and Tumu College of Education were randomly sampled from Northern zone.

Table 3: Distribution of examinees according to testing centres

Examination Centre	Examinee(N)
OLA College of Education	525
Fosu College of Education	702
Accra College of Education	504
SDA College of Education	620
St. Louis College of Education	504
Berekum College of Education	602
St. Francis College of Education, Hohoe	314
Peki College of Education	402
Bimbilla College of Education	302
Offinso College of Education	621
St. John Bosco's College of Education, Navrongo	401
Tumu College of Education	421
Kibu College of Education	701
Akatsi College of Education	733
Atebubu College of Education	511
Total	7,863

Source: Field survey (2021)

Table 3 shows the distribution of the selected testing centres and their respective number of examinees. There were 7,863 candidates who sat for the Ghana teacher licensure examination at the 15 centres.

Thirdly, proportionate sampling was then used to select 370 examinees from the selected testing centres. This because, according to Adam (2020), for quantitative studies, an accessible population of 7,863 require sample size of

367 for generalisation. In order to make room for adjustment, a sample size of 370 for a population of 7,863 was used.

Table 4: Distribution of study participants according to testing centres

Examination Centre	Examinee(N)	Sample
Ola College of Education	525	25
Fosu College of Education	702	33
Accra College of Education	504	24
SDA College of Education	620	29
St. Louis College of Education	504	24
Berekum College of Education	602	28
St. Francis College of Education, Hohoe	314	15
Peki College of Education	402	19
Bimbilla College of Education	302	14
Offinso College of Education	621	29
St. John Bosco's College of Education, Navrongo	401	19
Tumu College of Education	421	20
Kibu College of Education	701	33
Akatsi College of Education	733	35
Atebubu College of Education	511	24
Total	7863	370

From Table 4, using a proportionate sampling, the number of examinees from each testing centre was arrived at by dividing the number of examinees at that centre by the total accessible population (7,863). The results were then

multiplied by 370 to arrive at the proportioned sample. This was done across for all the testing centres. Lastly; convenient sampling was employed to select the proportionate number of examinees from selected centres.

Data Collection Instruments

The development of instruments for collecting data in the field is referred to as instrumentation. Questionnaires and an interview schedule are two examples. Whereas variety of research instruments may have been employed, a questionnaire was found to be the most suited for this study. One main advantage of questionnaires is that, it is simple in administration, easy to complete and researchers are able to score much more easily.

In addition, it requires researchers and respondents to devote less time to them (Knowles, 1980). Notwithstanding the benefits of questionnaires, there remains a risk of falsification. As a result, respondents' answers may not be completely candid. This can occur for a variety of reasons, including social desirability bias and the desire to preserve private information. Dishonesty, on the other hand, can be avoided by assuring responders that their privacy is respected and that the process does not allow for personal identification. Examinees will not be required to disclose their names or any other kinds of identification in order to ensure this. It also has the flaw of responders missing difficult questions, which might skew the results of the survey.

This study adapted questionnaire instrument called Physical Aspects of Classroom Environment Instrument (PACE) by Ahmad, Yahaya, Abdullah, Noh and Adnan (2015). The development of this instrument involved three stages; the first stage was to identify the main constructs of the physical environment, followed by constructing the items in each construct, and the final

stage was field testing of items, data analysis and validation process (Ahmad, Yahaya, Abdullah, Noh, & Adnan, 2015). The original PACE instrument had an internal consistency reliability (alpha coefficient) of between 0.881 and 0.951 for all scales.

It was used to gather self-reported information about examinees' background characteristics, examinees' physical environmental preferences, and examinees' perception of physical testing environment where the teacher licensure test was taken. The examinees' questionnaire was divided into three sections. Section A was designed to elicit demographic information from the examinees and comprised of three questions. Section B, consisted of 30 questions, and was designed to elicit data about the examinees' perception of the physical testing environment of teacher licensure examination. Section B consists of 15 questions that aimed to study examinees' preferences for physical testing environment. Instruments were put through pilot testing before being used.

Pilot testing

As per Donald (1990), pilot testing assists the researcher in determining whether the study is viable and worthwhile to proceed. Pilot testing assess the suitability and practicality of instruments that will be used for data collection in research. The instrument was pilot tested to ensure better understanding and to correct any misunderstandings that may have arisen as a result of the items framing and construction. Pilot testing was carried out at Komenda College of Education. Komenda College of Education were selected because it is one of the centres where Ghana teacher licensure examination was written. The pilot testing questionnaires were given to 30 examinees and they responded. From

the pilot testing, Cronbach alpha for sections B and C of the questionnaire were 0.946 and 0.861 respectively. Cumulative reliability statistic for the questionnaire was 0.947. This reliability coefficient falls within the range of reliability coefficient of the original instrument.

Validity is defined by Mugenda and Mugenda (1999) as the accuracy and significance of conclusions drawn from study findings. Content-related validity aids in determining whether the instrument's content encompasses an appropriate domain's sample it is meant to represent. Content-related validity of the instrument and face-validity of the same instrument were also confirmed. This was accomplished by submitting the questionnaire to an educational research expert. As part of the content validation process, measurement and evaluation specialists were requested to assess the drafted survey. The item quality, relevance, and completeness were all evaluated by experts. The survey instrument was reviewed by all participants in the pilot testing for accuracy, grammar, linguistic bias, readability, clarity and ease. This extensive assessment of the drafted questionnaire is way of establishing content validation of the instrument. The study instrument was revised based on the findings of the pilot testing.

Data Collection Procedures

Survey participants included persons who had graduated from Colleges of Education and Universities who read Education courses and have written Teacher licensure examination in 2021. Data were gathered from sampled examinees. Respondents were encouraged to be candid because the research was for academic purposes and the findings would be beneficial to the other

examinees who are yet to sit for same examination, Colleges of education where the examination was written and also the National Teaching Council.

To fulfill all institutional requirements, an introductory letter from Department of Education and Psychology at University of Cape Coast was acquired. The letter was meant to requesting the help of Heads of Schools and other institutions to ensure the study's success. In addition to the letter of introduction, an ethical clearance was obtained from the institutional review board at University of Cape Coast. This was to ensure that institutional review board's utmost permission was acquired in carrying out this study.

Permission and data of examinees (including names, e-mails and phone numbers) were taken from NTC. Each respondent was tasked to respond to one questionnaire. The online questionnaires were sent to these examinees to respond. Before the questionnaires were sent, respondents were called and informed consent was sought from them. In all, about 1,200 online questionnaires were sent examinees. A responds rate of 30% was anticipated but about 25% responds rate was realised. In addition to the online questionnaires, hardcopies were personally taken to institutions where some of these examinees were and undertaken their national service at the time. Permission was sought and phone calls were placed to these institutions a week before the data were collected to plan convenient days in addition to times for the administration of the questionnaire.

The researcher went to the first school, OLA Presbyterian Junior High School, on July 1, 2021 where some examinees from Ola College Education were doing National Service. On the same day, some examinees completed the administered questionnaire. Some examinees requested that theirs should be

obtained the next day. other schools and institutions were attended to administered more of the questionnaire.

Research assistances were trained to gather the data in other selected regions. These research assistances were trained via phone calls and others were trained on zoom. This was done because of the distance involved. One month was used in gathering the data from the 15 testing centres. The number of hardcopy questionnaires administered were 150 and response rate of 70% was realised.

Data Processing and Analysis

Processing and analysis of collected data provided facts and figures. These facts and figures enabled an interpretation of results about the findings and hence affirmations can be made from the study. The answered questionnaires were gathered and edited to address questions that were partially or not at all responded. The printed questionnaires that were administered in person were serially numbered to facilitate easy identification and statistical presentation and analysis. This precaution was followed to ensure prompt detection of slight inaccuracies in data processing. The questionnaire that was administered electronically were also thoroughly read and inspected to address questions that were partially or not responded.

The responses to the numerous questionnaire items will also be added, collated, and statistically analyzed. The questionnaires' items were all coded. The items were all on a four-point Likert scale were graded from 4 to 1, with 4 indicating strong agreement with the statement, 3 indicating agreement with the statement, 2 indicating disagreement with the statement, and 1 indicating strong disagreement with the statement. Descriptive statistics were produced to

provide a description of participants in the study. Age, sex, and testing centre were used to categorize the participants. The background information of the individuals was analysed using percentages and frequencies.

Research Question One (What are the physical environmental preferences of examinees of teacher licensure examination?) was answered using section C of the questionnaire. The participants' physical environmental preferences for each of the seven elements of the testing environment being examined were the variables of interest for question one. These seven environmental dimensions were measured by fifteen (15) individuals' questions, which were looked into separately. Percentages and Frequencies were used to analyse data on examinees' physical testing environmental preferences. Scale adjectives are neutral and interpretations describe examinees' physical testing environment preferences rather than a judgment of what is 'better' or 'higher' on the scale.

Research Question Two (How do examinees of teacher licensure examination perceive their physical testing environment?) was answered using section B of the questionnaire. For this question, the variables of interest were how examinees perceived their physical testing environment. Perception of physical testing environment was measured using 30 different items. To answer this question, one sample t-test was used to analyse data on examinees physical testing environment perception.

Hypothesis 1(there is no significant differences between examinees' perception of physical testing environment in various testing centres and alternative hypothesis that states that there is significant differences between examinees' perception of physical testing environment in various testing

centres) was answered with section A and B. For this question, the interest was how different are examinees' perception of physical testing environment with respect to testing centres. Data on this hypothesis was analysed using One-way analysis of variances (ANOVA) between groups.

Hypothesis 2 (There is no significant differences between male examinees and female examinees perception of physical testing environment of teacher licensure examination and alternative hypothesis that states that there are significant differences between how male examinees and female examinees perceived physical testing environment of Ghana teacher licensure examination) was answered by section A and B of the questionnaire. For this question, the interest was how different were males and female examinees in respect of how they perceived physical testing environment. Data on this hypothesis was analysed with independent samples t-test.

Ethical Consideration

The acceptable principles of conduct required when conducting research are referred to as research ethics. Seidman (2006), has it that ethical consideration describes how important it is for individuals to be aware of the objectives and potential adverse consequences of their engagement. It also specifies and informs participants on their right to withdraw their participation at any time. Informed consent originates the participant's right to personal liberty according to Mertens (2010). Researchers have an ethical right to guarantee subjects safety. The researcher assumes direct duty for doing ethically cleared research. Researchers must make every effort to ensure that the psychological, social and physical welfare of participants. This to ensure that

the study does not harm any participants. Mutual respect and trust should characterize research collaborations whenever possible.

Researchers should be aware of ethical standards, according to Punch (2008). In addition, social research requires stricter ethical standards because of the involvement of data about individuals. In social research, moral considerations and respect for respondents are critical. As a result, various ethical considerations were considered in this study. All ethical considerations, such as informed consent, anonymity, and confidentiality, were fulfilled in the study.

Before starting the data collection, examinees gave their verbal consent. The participants were informed that participation in the study is entirely voluntary. Participants were also informed that and that they are not under any bondage, free to withdraw, accept otherwise decline to partake. This study factored privacy of respondents. According to Oliver (2010), anonymity is an important concern in research ethics since it allows participants to keep their identities undisclosed. For the objectives of this study, coded names were adopted for identification that could not be linked back to the respondents. Labels were used as appropriate to ensure that information was kept confidential. To avoid invading participants' privacy needlessly, prior information was sent to participants to obtain their approval before data collecting began.

As a measure of guaranteeing the ethical concept of anonymity, no names or identifiable information from responders was used. This was done to avoid respondents being victimized if their comments were deemed undesirable by other stakeholders. On the aspect of confidentiality, every precaution was

taken to keep the responses of the participants confidential. Those involve in the study were reassured that their responses to the items on the questionnaire would be private. Again, no person or persons would have access to any of the information they provided, and that no one's name would be recorded in the study. Most crucially, in terms of the study's ethical concerns, information mentioned from preceding studies to support the review of related literature would be properly acknowledged through both citation and referencing to avoid academic dishonesty, often known as plagiarism.

Chapter Summary

The research design, population, sampling and sampling procedure, data collection instrument and procedures and data processing and analyses were all highlighted in this chapter. The descriptive research design was chosen for this study. The population for this study included examinees of teacher licensing examination in Ghana in 2021. The study sampled participants using multi-stage sampling approaches. The research questions were analyzed using percentages and frequencies and one sample t-test. Research hypotheses were also tested using one way analysis of variances (ANNOVA) between groups and independent sample t test.

CHAPTER FOUR

RESULTS AND DISCUSSION

The purpose of the study was to investigate examinees' perception of the physical testing environment of Ghana teacher licensure examination**.** In **t**his chapter, analysis in addition to presentation of collected data from the participants were offered. The collected data for the research were analysed and discussed in accordance to the study's research questions and hypotheses. Examinees of 2021 Ghana teacher licensure examination were the respondents of this study. Data were analysed using frequency distributions and percentages, one sample t-test, independent samples t-test and One-way analysis of variances (ANOVA) between groups. This chapter firstly described demographic characteristics of respondents. In the second part of this chapter, the findings of the study were presented in four sections according to the research questions and hypotheses. The analyses were done based on the following research questions and hypotheses:

Research questions

1. What are the physical environmental preferences of examinees of Ghana teacher licensure examination?
2. How do examinees of Ghana teacher licensure examination perceive their physical testing environment?

Research Hypotheses

1. H_o: There is no significant differences between perceived physical testing environments of examinees in the various testing centres.

H_A: There is significant differences between perceived physical testing environments of examinees in the various testing centres.

2. H_o: There is no significant differences between males and females perception of physical testing environment of Ghana teacher licensure examination.

H_A: There is significant differences between how males and females perceive physical testing environment of Ghana teacher licensure examination.

Background Characteristics of Respondents

The study sought for the demographic characteristics of the respondents. In this section of this chapter, analysis of the background data of the respondents were presented. These included the distribution of respondent's according gender, ages and testing centres.

Table 5: Gender Distribution of Examinees

Gender	Frequency	Percent
Male	204	55.1
Female	166	44.9
Total	370	100.0

Source: Field survey, (2021)

From Table 5, it is observed that there were greater number of Male respondents 204 (55.1 0%) than Female respondents 166 (44.9%).

Table 6: Age Distribution of examinees

Age	Frequency	Percentage
20-25	173	46.8
26-30	150	40.5
31-35	27	7.3
36+	20	5.4
Total	370	100.0

Source: Field survey, (2021)

From Table 6, most of respondents 173 (46.8%) for this study were between the ages of 20-25, followed by ages of 26-30, 150(40.5%). Respondents between the ages 31-35 were the third majority, 27 (7.3%). Respondents who were 36+ years were least 20(5.4%).

From Table 7, 15 testing centres were used for the study, Akatsi College of Education had the highest number of respondents (9.5%), followed by Fosu College of Education (8.9%). The third highest respondents were at Kibi College of Education (8.6%), followed by SDA College of Education and Offinso College of Education (7.8%). The fifth highest respondents were from Berekum College of Education (7.6%), followed by Ola College of Education (12.4%). Next highest were at St Louis College of Education and Accra College of Education. Next is Tumu College of Education (5.4%), Peki College of Education St. John Bosco College of Education (5.1%). Least of the respondents were from Bimbilla College of Education (3.8%).

Table 7: Distribution examinees according to testing centres

Testing Centre	Frequency	Percentage
Ola College of Education	25	6.8
St. Francis College of Education, Hohoe	15	4.1
St. Louis College	24	6.5
St. John Bosco College of Education, Navrongo	19	5.1
Accra College of Education	24	6.5
Bimbilla College of Education	14	3.8
Fosu College of Education	33	8.9
SDA College of Education	29	7.8
Berekum College of Education	28	7.6
Peki College of Education	19	5.1
Offinso College of Education	29	7.8
Tumu College of Education	20	5.4
Kibi College of Education	32	8.6
Akatsi College of Education	35	9.5
Atebubu College of Education	24	6.5
Total	370	100.0

Source: Field survey, (2021)

Research Question One

What are the physical testing environment preferences of examinees of Ghana teacher licensure examination?

This research question pursued after the physical testing environmental preferences of Ghana teacher licensure examination. Fifteen (15) items were

used in measuring this construct which were on a four-point Likert type scale (Strongly Agree =4, Agree=3, Disagree=2 and Strongly Disagree=1). Where "Strongly Agree" means that the respondents see that variable in question to be more than enough in the testing environment, "Agree" means the variable in question is enough in testing environment, "Disagree" means the variable in question is not enough in the testing environment and "Strongly Disagree" indicates that variable under investigation is not available in the physical testing environment. For easy interpretation 'Strongly Agree' and 'Agree', were put together as Agree. 'Disagree' and 'Strongly Disagree' were put together as 'Disagree'. This mean, when a physical environment variable had an average score of 50% and above, then it can be concluded that examinees prefer that physical testing environment variable. On the other hand, when a variable had an average score below 50%, then examinees do not prefer such variable. Descriptive statistics of frequencies and percentages were used to analysed the responses of the respondents and the results were shown in Table 8 in page 71.

Table 8: Examinees' Physical Environmental Preferences

Statement		Agree		Disagree	
	N	Freq	%	Freq	%
I prefer……..					
chairs that are comfortable to be used for a long period of time	370	285	77	85	23
chairs that is able to accommodate various body sizes	370	309	83.5	61	16.5
tables that can perform all testing tasks (i.e., drawing, writing)	366	320	86.5	46	12.5
testing room arrangement that allows interaction among examinees	370	281	76	89	24.1
testing room that are spacious (i.e., not overcrowded)	370	319	86.2	51	13.8
testing room that allows invigilators to monitor examinees effectively	370	333	90	37	9.8
light that is able to illuminate the entire testing room	370	332	89.7	38	10.2
lighting system that I can control	370	319	86.6	51	13.8
a quiet testing room	370	321	86.7	49	13.2
fresh indoor air in my examination room	370	340	91.9	30	8.1
temperature that makes me comfortable	370	333	90	37	10
furniture arrangement that eases required movements	369	329	88.9	40	10.8
an examinee to a seat (one examinee, one seat)	370	304	82.2	66	17.9
a small number of examinees in a testing room	370	312	84.4	58	15.7
fans that I can control	369	301	81.3	68	18.4

Source: Field survey, (2021)

From Table 8, the findings from the study showed that examinees have preferences for certain physical testing environment conditions. The results indicated that 285(77%) of 370 respondents indicated that they prefer chairs that are comfortable and can be used for a long period of time. Again 309 (83.5%) respondents prefer chairs that accommodate able to various body sizes. Interestingly, 320(86.5%) of respondents reported that they prefer tables that can perform all testing tasks. Again, it was found that most respondents 281 (76%) specified that they prefer testing room arrangement that allows interaction among examinees, 319 (86.2%) also pointed that they prefer testing room that are spacious (i.e., not overcrowded).

The results of the study further bared those 332(89.7%) respondents prefer light that is able to illuminate an entire testing room. With reference to lighting system, most of the respondents, 319(86.6%) indicated that they prefer lighting system that they can control. The study results revealed utmost respondents 321(86.7%) favour quiet testing room and 340, (91.1%) respondents exhibited strong preference for fresh indoor air in their testing room. Temperature that makes examinees comfortable is also preferred by most respondents 333(90%). It was found that 329 (88.9 %) respondents specified that they prefer furniture arrangement that eases required movements. In addition, 304(82.2%) respondents said that they prefer an examinee to a seat (one examinee, one seat). Moreover respondents 312(84.4%) prefer a small number of examinees in a testing room. Lastly, 369 (81.3%) confirmed that they prefer fans that they can control.

Research Question Two

How do examinees of Ghana teacher licensure examination perceive their physical testing environment?

Respondents' responses on physical testing environment perception of examinees of Ghana teacher licensure examination are presented in Table 9 on pages 74 and 75.

Table 9: Analysis of result of one sample t-test of examinees' perception of physical testing environment

Statement	N	M	SD	T	df	*P*
Tables in my examination room can be used to perform all task (writing, drawing)	370	2.68	.79	-11.37	369	.000
Tables in my examination room can be used to hold equipment (mathematics set, papers)	370	2.38	.76	7.46	369	.000
Tables in my examination room match existing chairs	370	2.29	.82	-11.68	369	.000
Tables in my examination room are safe to use (sturdy, not easily broken)	370	2.44	.78	9.24	369	.000
Chairs in my examination room able to accommodate various body sizes	370	2.52	.78	-5.57	369	.000
Chairs in my examination room comfortable to be used for long period of time	370	2.58	.76	-1.37	369	.171
Chairs in my examination room safe to use (sturdy, not easily broken)	370	2.69	.74	8.78	369	.000
Arrangement of furniture in my examination room makes movement possible to suit all activities (i.e., testing)	370	2.19	.71	9.19	369	.000
Arrangement of furniture in my examination room allows independent work	370	2.82	.75	8.07	369	.000
Arrangement of furniture in my examination room encourages interaction between invigilators and examinees	370	2.68	.79	7.59	369	.000
Arrangement of furniture in my examination room adaptable according to the needs of the examination	370	2.38	.76	2.40	369	.017
Space in my examination room is of appropriate size in accordance with the number of examinees	370	2.29	.82	-4.80	369	.000
Space in my examination room facilitates invigilators movements when monitoring examinees test activities	370	2.44	.78	6.74	369	.000
Space in my examination room allows independent activities	370	2.52	.78	3.05	369	.002
The number of examinees in my examination room does not make the examination room crowded	370	2.58	.76	-2.27	369	.024
The number of examinees in my examination room makes it easy for invigilators to effectively monitor examinees	370	2.69	.74	4.75	369	.000
The number of examinees in my examination room allow all activities can be carried out comfortably	370	2.19	.71	-7.35	369	.000
The lighting in my examination room makes use of white bright light	369	2.73	.72	6.11	368	.000

The lighting in my examination room is appropriate due to an adequate number of lights	370	2.68	.79	-4.77	369	.000
The lighting in my examination room is appropriate due to well-functioning lights	370	2.38	.76	4.79	369	.000
The lighting in my examination room illuminates the entire room evenly	370	2.29	.82	-4.18	369	.000
The lighting in my examination room meets the needs of all testing activities	370	2.44	.78	-4.50	369	.000
Air circulation in my examination room appropriate due to the number of fans corresponds with the size of the examination room	370	2.52	.78	4.41	369	.000
Air circulation in my examination room appropriate due to well-functioning fans	370	2.58	.76	-3.16	369	.002
Air circulation in my examination room appropriate due to good ventilation	370	2.69	.74	-4.88	369	.000
The temperature in the examination room is comfortable for the examination process	370	2.19	.71	-1.53	369	.127
The temperature in the examination room is can be controlled by examinees	370	2.52	.78	.60	369	.551
The temperature in the examination room is adjustable according to examination activities	370	2.68	.79	1.93	369	.055
The temperature in the examination room is enables me to concentrate on examination	370	2.38	.76	5.00	369	.000
The temperature in the examination room is enables me to remain active	370	2.29	.82	-8.31	369	.000

Field survey, (2021)

From Table 9, results from the one sample t-test indicated that, examinees have positive perception about certain physical testing environment variables and negative perception towards some variables of physical testing environment of teacher licensure examination. This is evident by some scores being above the cut-off point (2.5), and others below the cut-off. The cut-off was arrived at by adding the value of the responds (strongly agree=4, agree=3, disagree=2 and strongly disagree=1), that is 4+3+2+1=10/4.

Respondents indicated that tables in testing room could perform all task (M=2.7 SD=.79), tables in testing room could not hold equipment (M=2.4, SD=.76). Additionally, tables in testing room did not match existing chairs (M=2.3, SD=.82). Most examinees indicated that tables in testing room were not safe to use (M=2.4 SD=.78). Chairs in testing room were able to accommodate various body sizes (M=2.5 SD=.78) and were comfortable to be used for long period of time (M=2.6 SD=.76). Examinees also indicated that chairs in testing room were safe to use (M=2.7 SD=.74).

Furniture arrangement in testing room did not make movement possible to suit all activities (M=2.2 SD=.71), arrangement of furniture in testing room allowed independent work (M=2.8 SD=.75). Again, arrangement of furniture encouraged interaction between invigilators and examinees (M=2.7 SD=.79). Furthermore, arrangement of furniture in testing room was not adaptable according to the needs of testing (M=2.4 SD=.76). Respondents perceived space in testing room to of inappropriate size in accordance with the number of examinees (M=2.3 SD=.82). In furtherance, space in testing room did not facilitates invigilators movements when monitoring examinees test activities (M=2.4 SD=.78) and space allowed independent activities (M=2.5 SD=.78).

Respondents also perceived that the number of examinees in testing room did not make the examination room crowded (M=2.6 SD=.76) and made it easy for invigilators to effectively monitor examinees (M=2.7 SD=.74). Again, number of examinees in testing room did allow all activities can be carried out comfortably (M=2.2 SD= .71).

Lighting in testing room made use of white bright light (M=2.7 SD=.72) and was appropriate due to an adequate number of lights (M=2.7 SD=.79). Lighting was also appropriate due to well-functioning lights (M=2.4 SD=.76) but did not illuminate the entire room evenly (M=2.3 SD=.82). The lighting in testing room could not meets the needs of all testing activities (M=2.4 SD= .78). Respondents showed that air circulation was appropriate due to the number of fans corresponds with the size of the examination room (M=2.5 SD=.78) and appropriate due to well-functioning fans (M= 2.6 SD= .76).

Respondents perceived air circulation to be appropriate due to good ventilation (M=2.7 SD= .74) and but for temperature, it was not comfortable for the examination process (M= 2.1 SD=.71). Examinees indicated that temperature in testing room could be controlled by examinees (M= 2.5 SD=.78). In addition, temperature in testing room was adjustable according to testing activities (M=2.7 SD=.79) but temperature did not enable examinees to concentrate on examination (M=2.4 SD=.76). Lastly, temperature in the examination room did not enable examinees to remain active (M=2.3 SD=.82).

Table 10: One Sample t-test for Total Perception of physical testing environment

	Test value =75					
Total Perception	N	M	SD	t	Df	P
	369	75.6016	3.78299	3.055	368	.002

Field survey, (2021)

With regard to respondents' perception of physical testing environment of the teacher licensure examination, the overall perception mean score was 75.6. A test value of 75 was obtained by multiplying the 30 items by the cut-off point (2.5). The test value which is 75 was then compared with the overall mean score (75.6) overall perception of physical testing environment. The overall mean score (75.6) for respondents' respondents' perception of physical testing environment is greater than the test value which of 75. This implies that respondents' total perception of physical testing environment was above average (high) indicating that examinees had positive perception of their physical testing environment.

Research Hypothesis One

Ho: There is no significant difference between perceived physical testing environments of teachers' licensure examination in various testing centres.

To test this hypothesis, One-way analysis of variances between groups (ANOVA) was used to analyse the collected data. This hypothesis has the purpose of finding out whether significant differences exist among the perceived physical testing environment of Ghana teacher licensure examination

in the fifteen testing centres. Prior to the analysis, assumptions underlying the use of ANOVA were checked. Firstly, test of normality was conducted to determine if it has not been violated so further analysis could be conducted. Results from the normal Q-Q plot (section B of appendix B) revealed that the data did not violate the normality assumption. Result for "Ola College of Education", "Fosu College of Education", "S.D.A College of Education", "Peki College of Education" , "Berekum College of Education", "John Bosco's College, Navrongo", "Offinso College of Education", "Accra College of Education", "St Francis College of Education ","Tumu College of Education", "Akrokeri College of Education", "Atebubu College of Education", "Kibi College of Education" and "Akatsi College of Education" of the dependent variable "Total Perception", was also normally distributed except "St. Louis College of Education". ANOVA was used because it is a robust test and effective even when normality is violated.

The equal variance assumption was also tested to find out whether the variances between the groups are the same. Results from the Levene's test for equality of variances (section D of APPENDIX C) revealed that the equality of variance assumption was not violated. From the table, the sig. value of the Levene statistic is greater than 0.05 (.733> 0.05) therefore, variances are assumed equal.

Table 11: ANOVA of categories of testing centres in terms of total physical testing environment perception

Group	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	187.810	14	13.415	.935	.521
Within Groups	5078.630	354	14.346		
Total	5266.439	368			

Source: Field survey, (2021)

From the one-way ANOVA, F (14, 354) = .935, p =.521. The result shows that there is no significant difference between the fifteen categories of testing centres in terms of physical testing environment perception. In other words, the null hypothesis (there is no significant differences between perception of the physical testing environments of examinees in various testing centres) was accepted and the alternative hypothesis (there is significant differences between the physical testing environments perception of examinees in the testing centres) was rejected.

Research Hypothesis Two

H_O: There is no significant differences between how males and females perceived physical testing environment of teacher licensure examination.

This hypothesis sought to test whether a statistically significant difference existed in how examinees perceived their physical testing environment in terms of gender. An independent samples t-test was used to analyse data on this research hypothesis.

The dependent variable for the respondents was the Total perception score of males and females. Prior to the analysis, assumptions underlying the

use of independent samples t-test were checked. Results from the normal Q-Q plot (Section A of APPENDIX B) revealed that the data did not violate the normality assumption. From Section D of APPENDIX B, the sig. value from the Levene's test of equality of variances is greater than 0.05, therefore, equal variances are assumed. Therefore, independent sample T-test was be used.

Table 12: T-test of Categories of Gender (Males and Females) in terms of Physical Testing Environmental Perception

Gender	N	Mean	SD	Df	t-value	p-value
Male	204	75. 250	3.59546	367	-1.993	.196
Female	165	76.0364	3.97076			

Source: Field survey, (2021)

Result from the analysis found no significant difference in Male examinees and Female examinees in terms of physical testing environment perception, t (367) = 1.993, p = .196. This specifies that male and female examinees did not differ in terms of physical testing environment perception. In other words, both male and female examinees in the testing centers were similar in terms how they perceived physical testing environmental. Therefore, the first null hypothesis, there is no significant differences between how male and female examinees perceive physical testing environment of Ghana teacher licensure examination was accepted and the alternative hypothesis that stated that there is significant differences between how male and female examinees perceive physical testing environment of Ghana teacher licensure examination was rejected.

Discussion of Research Findings

In this section, the findings were discussed in relation to:

1. Examinees' physical testing environmental preferences.
2. Examinees' perception of the physical testing environment.
3. Differences in perceived physical testing environment in various testing centres.
4. Differences in how male and female examinees perceive their physical testing environment.

Examinees' physical testing environment preferences

This research question sought to discover physical testing environmental preferences of examinees of teacher licensure examination in Ghana. The outcomes of the study specified that examinees prefer certain physical environmental attributes. Among the physical testing environmental preferences are: chairs that are comfortable to be used for long periods of time, chairs that are able to accommodate various body sizes, tables that can perform all testing tasks (i.e., drawing, writing), testing rooms arrangement that allow interactions among examinees, testing room that are spacious (i.e., not overcrowded) and testing room arrangement that allows invigilators to monitor examinees effectively. In support of the findings above is a study Margianti, Fraser and Aldridge (2010) who found that examinees of Nurses licensure examination in the Philippines exhibited strong preferences for physical testing environment variables such as, adjustable desk, appropriate lighting, adjustable chairs and ergonomically designed furniture.

The findings in addition established that learners prefer chairs that are adjustable, comfortable and able to accommodate various body sizes. The

findings are further buttressed by the work of study by Koul and Fisher (2006) in Jammu, India that investigated the characteristics of physical testing environments of National teacher's licensure examination. Examinees preferred physical testing environment variables such as lighting that illuminates and entire room, furniture, good temperature and space classrooms. They further found that learners showed strong fondness for furniture arrangement that eases movements, an examinee to a seat and small number of examinees in a testing room. This finding is further supported by the findings of Harvey and Kenyon (2013) found that students prefer modern seating arrangement.

Furthermore, examinees desire light that is able to illuminate an entire testing room, lighting system that examinees can control, a quiet testing room, fresh indoor air in a testing room, temperature that makes examinees comfortable, furniture arrangement that eases required movements, an examinee to a seat (one examinee, one seat), a small number of examinees in a testing room and fans that examinees can control. In addition, Donald (2016) revealed that part of examinees prefer warm physical environment and others prefer a cooler environment. Donald further iterated that level of sound, light (illumination, type of lighting), room temperature, room colour, seating design, and opportunity for intake, time of day and the need for movement are among the nine areas of preference for examinees of National Physical Therapy Examination (NPTE) in Florida. In furtherance, the verdicts of Aloyo (2015) who undertook a study in Kenya on the relationship between physical testing environment and achievement in teacher licensure in Nairobi city, Kenya. Sound, lighting, classroom or testing room temperature and other physical environment characteristics are among individuals' preferences in general,

according to the study, and they seek out preferred situations to boost their confidence and competence.

The findings of this study were however inconsistent with the findings of an aspect of the findings of Donald (2016) who found that some examinees prefer more subdued lighting over very bright lighting. This can be attributed to examinees of the national therapy examination in Florida preferring physical testing environment where they can practice examination malpractices. Burke and Burke-Samide (2004), on the element of temperature reveals that most students prefer a warm yet comfortable instructional climate. The differences in the findings of this study and that of Burke and Burke-Samide (2004) could be attributed to the geographical area differences. Jamaica generally has warm weather and those examinees are used to warm weather. Once more, the findings of Burke and Burke-Samide (2004) stated that students prefer crowded classroom and space that allow interaction among them. Furthermore, it was found that students in their testing rooms prefer flexible invigilation and light that is not able to illuminate an entire classroom.

Examinees' perception of physical testing environment

This research question seeks to establish physical testing environment perception of examinees of teacher licensure examination in Ghana. The outcomes of the study related to examinees' perception of physical testing environment, in general, indicated that examinees had positive perception of their physical testing environment of Ghana teacher licensure examination.

Specifically, the findings of this study established that examinees generally had positive perception towards some attributes of the physical testing environment and negative perception towards some attributes of the physical

testing environment. Examinees perceived that tables in their testing room could hold equipment and tables were safe to use (sturdy, not easily broken). Examinees perceived arrangement of furniture in examination room made movement possible to suit all activities, arrangement of furniture allowed independent work and encouraged interaction between invigilators and examinees. Similarly, furniture was adaptable according to the needs of the examination, facilitated invigilators movements when monitoring examinees test activities, allowed independent activities and did not make the examination room crowded.

Parallel to these findings are findings of Donald (2016) who found that examinees of National Physical Therapy Licensure examination in Florida perceived the physical testing environment to be appropriate terms of lighting, temperature, space, air quality, and temperature, she discovered that examinees thought their testing environment was adequate for examination purposes. Again, Ahmad and Amirul (2017) conducted research to determine the suitability of the physical testing environment of examinees of Dentist and Surgeons licensure examination Malaysia. They found that their physical testing environment had a moderate positive impact on their health, enjoyment, and learning, according to the findings.

Additionally, space facilitated invigilators movements when monitoring examinees test activities and allowed independent activities. The number of examinees make it easy for invigilators to effectively monitor examinees. In terms of lighting, white bright light was used, well-functioning lights and lighting that met all the needs of all testing activities. For temperature, temperature was appropriate due to the number of fans corresponding with the

size of the examination room and could be controlled by examinees, temperature was adjustable according to examination activities and temperature enables examinees to concentrate on examination activities.

In line with the findings above are the study by Ahmed, Taha, Alneel and Gaffar (2018) that asserted that students perceived their physical learning environment to be positive and fit for all learning activities. The variables that were studied included furniture, facilities and lighting. The findings further agree with Donald (2016) who found that examinees perceived their physical testing environment to be suitable for examination purposes in terms of lighting, temperature, space, air quality and but moderately for temperature.

Despite examinees perceiving some aspects of their physical testing environment as positive, they perceived the following aspects of their negative physical testing environment as negative: tables in the testing room could not be used to perform all tasks, tables mismatched existing chairs, chairs in the examination rooms were not able to accommodate various body sizes and uncomfortable to be used for long period of time. Likewise, arrangement of furniture was not adaptable according to the needs of the examination, space in testing rooms was not of appropriate size in accordance with the number of examinees, and the number of examinees in the testing room did not allow all activities to be carried out comfortably. Similarly, lighting in the testing room was not appropriate due to an inadequate number of lights and could not illuminates the entire room evenly. Air circulation was inappropriate due to improper ventilation. Examines also established that, temperature in the testing room was not comfortable for the examination processes and did not keep examines active. Supporting the findings of this study is study by Donald

(2016), who candidly stated that the utilization of natural and artificial light should be flexible enough to meet a variety of work requirements. Again, Edgerton, McKechnie and McEwen (2011) in their study that aimed at understanding and measuring how secondary school students perceive their physical testing environments of their end of year examination. The study concluded that learners have a negative perception of their physical school environment. The variables considered include furniture, air quality and space.

Differences in perceived physical testing environment in various testing centres

This hypothesis sought to find out whether there was significant difference in perceived physical testing environment in the fifteen categories of testing centres. The findings of the study revealed a non-significant difference in perceived physical testing environment in the fifteen categories of testing centres. By implication, Ola College of Education, Fosu College of Education, S.D.A College of Education, St. Louis College of Education, Peki College of Education, Berekum College of Education, John Bosco's College, Navrongo, Offinso College of Education, Accra College of Education, St Francis College of Education in Hohoe, Tumu College of Education, Akrokeri College of Education, Atebubu College of Education, Kibi College of Education and Akatsi College of Education did not differ in terms of perceived physical testing environment.

One way-analysis of variances (ANOVA) between groups test showed that there is no statistically significant difference in perception of the physical testing environment in the fifteen testing centres. In view of this finding, the null hypothesis (H_o) of hypothesis 1 which states that there is no significant

difference between perceived physical testing environments of teacher licensure examination in various testing centres was retained. The findings of this study match a study by Harvey and Kenyon (2013) on classroom seating considerations for 21st century students. The study found no significant differences in perception of the physical classroom dimensions in the two urban public higher education institutions used in the studies. Harvey and Kenyon further concluded that physical aspects of the classroom were not perceived to be different and therefore could not contribute to any difference in performance of learners. Again, Darren & Robert (2001) evaluated the physical classroom by students and professors in University of Victoria, the study established that there are no significant differences in how students evaluated their physical classroom environment in terms of their class or stage. Specifically, students perceived the makeups of their physical classrooms to be similar, therefore learners had no problems moving to new classroom.

Contrary to the findings of this study is the findings of Majumde, Kumar, Krishnamurthy, Ojeh and Adams (2019) who studied the physical testing environment perception of teacher licensure examination in Pakistan. It was reported that examinees perception was significantly different in terms of physical testing environment in terms the testing centres. More so, some examinees of teacher licensure examination in some centers perceived their physical testing environment to more appropriate whilst others perceived testing environment to be unfit for such a high-stake test. Examinees in addition perceived that the testing environment had a negative impact on their test results. In addition, the findings contradict their finding of Owens (2005), who carried out a study in Kenya that studied the physical classroom environments

in rural high schools and urban schools. He reported that perception of physical classroom environment in urban centres were different from the classroom environment in the rural areas.

Differences in male and female examinees perception of physical testing environment

This hypothesis sought to find out whether there were any significant differences in how male and female examinees perceived their physical testing environment of Ghana teacher licensure examination. The findings of the study revealed a non-significant difference in the perceived physical testing environment in terms of the categories of gender (Male and Female). By extension, Male and female examinees did not differ in terms of how they perceived their physical testing environment of Ghana teacher licensure examination. The results of an independent sample t-test showed that there is no statistically significant difference in perception of the physical testing environment in terms of gender. In view of this finding, the null hypothesis (H_o) of Hypothesis 2, which states that there is no significant differences between how male and female examinees perceived physical testing environment of Ghana teacher licensure examination was accepted and the alternative hypothesis (H_A) which states that there is significant differences between how male and female examinees perceived physical testing environment of Ghana teacher licensure examination was rejected.

The findings of this study concurred with the discoveries of Jungsoo, Richard, Christhina, Hui and Edward (2013) who found no statistical differences in the gender differences in the occupants' perception on various aspects of indoor environmental quality including lighting, temperature, space

and furniture. They iterated that, statistical analyses indicated that female occupants did not differ from males in terms of satisfaction levels in terms of thermal comfort, air quality, lighting, acoustics, office layout and furnishings. In the same way, Sybile (2013) in his research where students were asked to answer a questionnaire to analyze aesthetics in classrooms to determine how each gender found the most important in his or her learning environment, and whether female students were or were not the most aware of their aesthetic environment. The results demonstrated an insignificant difference between males and females' perception, but showed that male students were slightly more aware of aesthetics in their classrooms.

The findings of this study were however not in line with the findings of Adams and Ferguson (2001), who established that female College students have more positive perception towards the lighting than males. Fatma, Muhsin, Mehmet and Emre (2013) established a significant difference between gender for the item asking whether the learners think there is enough space for the legs between the chair and the desk. Muchemi (2018) studied the importance of indoor air quality. The results indicated that the perception of concentrations of carbon dioxide were significantly higher in girls' classrooms than in the boys' classrooms.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Overview of the Study

The purpose of this study was to assess examinees' perception of physical testing environment of Ghana teacher licensure examination. Specifically, the study examined the physical environmental preferences for candidates of Ghana teacher licensure examination, explored how examinees perceived their physical testing environment, find out if there existed any significant difference between physical testing environment of examinees in the various testing centres and discover if there was a significant difference between males and female examinees as to how they perceived their physical testing environment of Ghana teacher licensure examination.

The study was conducted in Ghana, specifically, particular testing centres for teacher licensure examination were selected for the study. The methodology used in this study was the descriptive design. The study included surveys of 370 examinees who sat for 2021 teacher licensure examination. Questionnaire was used in gathering for the data for the study. The statistical tools used for the analysis of collected data included frequency and percentages, one sample t-test, one way analysis of variances (ANOVA) between groups and independent samples t-test analysis. The tests were conducted for significant differences at a significance level of 0.05.

This chapter in addition offered a summary of the study, key findings, the conclusions drawn as well as the recommendations, the contribution of the study to knowledge, relevance for national teaching council (NTC) and Colleges

of Education, examinees of teacher licensure examination and suggestions for further study. Specifically, the study sought to attain the following objectives:

1. The physical environmental preferences of examinees of teachers' licensure examination in Ghana.
2. How examinees perceived their physical testing environment of teachers' licensure examination in Ghana.
3. Differences in perceived physical testing environments of examinees in various testing centres.
4. Differences in perceived physical testing environment of the teacher licensure examination based on gender

Research Questions

1. What are the physical environmental preferences of examinees of teacher licensure examination?
2. How do examinees of teacher licensure examination perceive their physical testing environment?

Research Hypotheses

1. H_O: There is no significant differences between perceived physical testing environments of examinees in the various testing centres.
   H_A: There is significant differences between perceived physical testing environments of examinees various testing centres.
2. H_O: There is no significant differences in perceived physical testing environment of the teacher licensure examination based on gender.

H_A: There is significant differences in perceived physical testing environment of the teacher licensure examination based on gender.

A descriptive survey design was used for the study. A sample size of three hundred and seventy (370) respondents were selected using multi-stage sampling. Fifteen teacher licensure testing centres were selected for the study. The sample consisted of 25 respondents from OLA College of Education, 33 from Fosu College of Education, 24 from Accra College of Education, 29 from SDA College of Education, 24 from St. Louis College of Education, 28 from Berekum College of Education, 15 from St. Francis College of Education, Hohoe, 19 from Peki College of Education, 14 from Bimbilla College of Education, 29 from Offinso College of Education, 19 from St. John Bosco's College of Education, Navrongo, 20 from Tumu College of Education, 33 from Kibi College of Education, 35 from Akatsi College of Education and 24 from Atebubu College of Education.

A 48-item questionnaire for assessing the physical testing environment was used to gather data from the respondents. In order to ensure that the validity and reliability of items on the questionnaires, the questionnaire was pilot tested using thirty (30) teacher licensure examination candidates from Komenda College of Education. The responses given by respondents were used to improve the questionnaire. The pilot testing was indispensable for the reason that it enhanced the content validity and reliability of the instrument. Also, it better-quality the questions format and scales after cautious analysis of the items based on the remarks handed by respondents regarding the weaknesses, clarity and ambiguity on all aspects of the questionnaire.

The demographic variables of the respondents in the study as well as data on research question one was analysed with frequencies and percentages. Data on research question two was also analysed with one sample t-test. Data on hypotheses one and two were also analysed using one-way analysis variance (ANOVA) between groups and independent sample t-test respectively.

Summary of Key Findings

The following key findings were made:

Teacher licensure examination examinees prefer particular physical testing environmental conditions. It was found that examinees prefer comfortable chairs. Examinees also prefer tables that can perform all testing tasks and testing rooms' arrangement that allow interactions among examinees. The study also found that examines prefer testing room that are spacious. In the situation of lighting, findings are that, examinees prefer light that is able to illuminate. Examinees preferred quiet testing room. Examinees also prefer fresh indoor air in a testing room and comfortable temperature.

Generally, teachers' licensure examination examinees have positive perception of their physical testing environment. Examinees had the following positive perception of their physical testing environment of teacher licensure examination. Tables in the testing room could hold equipment, arrangement of furniture in testing room allowed possible movements, room encouraged interaction between invigilators examinees and adaptable according to the needs of the examination. Lighting in examination room was appropriate and well-functioning and lastly, temperature could be controlled by examinees and adjust in accordance with needs of testing.

Examinees had the following negative perception of their physical testing environment; Tables in the testing rooms are unable to perform all tasks and mismatched existing chairs. Chairs could not accommodate various body sizes, were not comfortable to be used for long period of time. Testing rooms were also crowded. Lighting was also not inappropriate due to an inadequate number of lights. Lastly, temperature was not comfortable for testing processes.

The study found no significant difference in perceived physical testing environment in the various testing centres. The study also found no significant difference between how males and females perceived their physical testing environment.

Conclusions

The study examined how examinees of teacher licensure perceived their physical testing environment in Ghana. Examinees were found to prefer certain physical testing environmental characteristics. This is to say that for a successful testing, without the physical testing environment having a tore on examinees test score, physical environmental preferences such as chairs that are comfortable chairs and tables that can perform all testing tasks, testing room arrangement that allows interactions among examinees should be considered.

It was also evident that, generally examinees perceived their testing environment positively. Specifically, examinees perceived some aspects of their testing room to be generally fit for testing such as tables that could hold equipment. It was also found that some aspects of physical testing environment of Ghana teacher licensure examination were perceived to be negative. They include tables that unable to perform all tasks, mismatched existing chairs.

In furtherance, the study that the fifteen centres of Ghana teacher licensure examination were similar in terms of how examinees perceived them. Based on this, it could be concluded that physical testing environment conditions of the centres where teacher licensure examination was written were same with respect to physical testing environment features. Furthermore, the study found no significant difference between how males and females perceived their physical testing environment. Centered on this, it could be clinched that examinees had similar perception of their testing centres where teacher licensure examination was written irrespective of gender.

Recommendations for Policy and Practice

Based on the findings of the study and the conclusions drawn, the following recommendations were made for policy and practice:

1. National Teaching Council (NTC), the body responsible for conducting teachers' licensure examination should prepare the testing centres to fit the physical testing environmental preferences of examinees. This is because the study found specific attributes of physical testing environment that examinees prefer. These physical testing environment preferences could be incorporated as an aspect of the licensure examination form. This will make examinees comfortable and the physical testing environment would not be a source of score invalidity.
2. It is also recommended that physical testing environment of the testing centres (Colleges of Education) should be upgraded especially those aspects that examinees perceived to be unfit for the high-stake test. Again, an additional time should be allocated so that examinees can make up for time lost due to the conditions of the physical environment.

3. The study found no significant difference between perceived physical testing environments of examinees testing centres. Since some aspects of the testing environment was negatively perceived, it is suggested that effort should then be made by NTC and Colleges of Education to develop the testing centers to be fit for a high-stake test such as teacher licensure examination since some aspects of the testing environment were found inappropriate.
4. Again, since the study found no significant difference in perceived physical testing environment across the testing centres, National teaching council should provide a visit or allow examinees to visit their testing centres before the actual testing so examinees will be familiar and become comfortable in the examination centres.

Suggestions for Further Research

This research serves starting point and fact-finding study to commence the identification of the characteristics of the examinees who take part in teacher licensure examination in Ghana. The preferences that individuals have for physical testing environment, the state of the physical testing environment and a starting point to explore the differences that exist between physical testing environments. For future studies;

1. Researchers should make an attempt to access testing centres directly for observation making sure that direct access do not affect test administration security.
2. Researchers should also explore the perception of effects of physical testing environment on examinees performance.

3. This study could be replicated in other high-stake examination such as Nursing and Midwifery licensure examination, Basic Education Certificate Examination (B.E.C.E) and the West African Senior Secondary School Certificated Examinations (WASSCE).

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APPENDICES

APPENDIX A

UNIVERSITY OF CAPE COAST

COLLEGE OF EDUCATION STUDIES

DEPARTMENT OF EDUCATION AND PSYCHOLOGY

EXAMINEES' QUESTIONAIRE

The purpose of this questionnaire is to obtain evidence of Examinees' Perception of the Physical Testing Environment of Ghana Teacher Licensure Examination. I therefore, solicit your cooperation and consent. No attempt will be made to associate your name or institution with the completed questionnaire. This work is purely for academic purpose and all your responses would be kept confidential.

This questionnaire is divided into three sections. The first section is for eliciting information about the background characteristics of respondents. The other two sections are about examinees' perception of physical testing of Ghana teacher licensure and Ghana teacher licensure examination examinees' physical testing environment preferences respectively.

Instruction: You are kindly requested to tick (√) or write where appropriate for each item on this questionnaire.

SECTION A

Background Information

1. Examination center ……..
2. Gender Male [ ] Female [ ]
3. Age 20-25 [ ] 26-30 [ ]

   31-35 [ ] 36+ [ ]

SECTION B

Perception of Physical Testing Environment

This section contains various aspects of the physical testing environment in which you took Ghana teacher Licensure Examination. Please provide your best estimate of your experience of physical testing environment of your examination centre.

Please tick (√) the appropriate columns to indicate your level of agreement with the following statements. ***Strongly Agree (SA) =4, Agree (A) =3, Disagree (D) =2, Strongly Disagree (SD) =1.***

FURNITURE

S/N	Tables in my examination room…	SA	A	D	SD
4	can be used to perform all tasks (writing, drawing)				
5	can be used to hold equipment (mathematics sets, papers)				
6	match existing chairs				
7	safe to use (sturdy, not easily broken)				

	Chairs in my examination room…	SA	A	D	SD
8	able to accommodate various body sizes				
9	comfortable to be used for long period of time				
10	safe to use (sturdy, not easily broken)				

	Arrangement of furniture in my examination room....	**SA**	**A**	**D**	**SD**
11	makes movement possible to suit all activities (i.e., testing)				
12	allows independent work				
13	encourages interaction between invigilators and examinees				
14	adaptable according to the needs of the examination				

SPACE

	Space in my examination room…	**SA**	**A**	**D**	**SD**
15	is of appropriate size in accordance with the number of examinees				
16	facilitates invigilators movements when monitoring examinees test activities				
17	allows independent activities				

CONGESTION

	The number of examinees in my examination room...	**SA**	**A**	**D**	**SD**
18	does not make the examination room crowded				
19	makes it easy for invigilators to effectively monitor examinees				

20	allow all activities can be carried out comfortably				

LIGHTING

	The lighting in my examination room…	**SA**	**A**	**D**	**SD**
21	makes use of white bright light				
22	is appropriate due to an adequate number of lights				
23	is appropriate due to well-functioning lights				
24	illuminates the entire room evenly				
25	meets the needs of all testing activities				

INDOOR AIR QUALITY

	Air circulation in my examination room appropriate due to…	**SA**	**A**	**D**	**SD**
26	the number of fans corresponds with the size of the examination room				
27	well-functioning fans				
28	good ventilation				

TEMPERATURE

	The temperature in the examination room is…	**SA**	**A**	**D**	**SD**
29	comfortable for the examination process				
30	can be controlled by examinees				
31	adjustable according to examination activities				
32	enables me to concentrate on examination				
33	enables me to remain active				

SECTION C

Examinees' Physical Testing Environment Preferences

The following section contains various preferences of physical testing environment of examinees of Ghana teacher licensure examination. Read each line and tick the options that best describes your preference of physical testing environment when taking an examination.

Strongly Agree (SA) =4, Agree (A) =3, Disagree (D) =2 and Strongly Disagree (SD) =1.

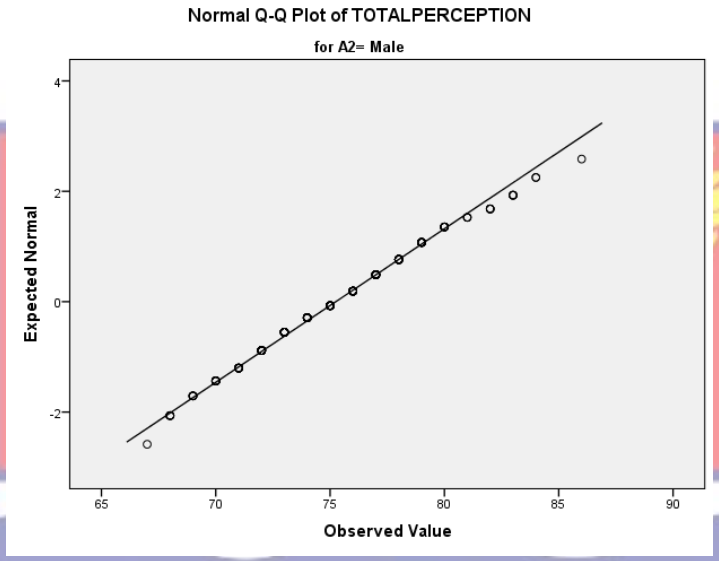
Statements					
S/N	**I prefer…**	**SA**	**A**	**D**	**SD**
34	chairs that are comfortable to be used for long periods of time				
35	chairs that is able to accommodate various body sizes				
36	tables that can perform all testing tasks (i.e., drawing, writing)				
37	testing room arrangement that allows interactions among examinees				
38	testing room that are spacious (i.e., not overcrowded)				
39	testing room that allows invigilators to monitor examinees effectively				
40	light that is able to illuminate my entire testing room				

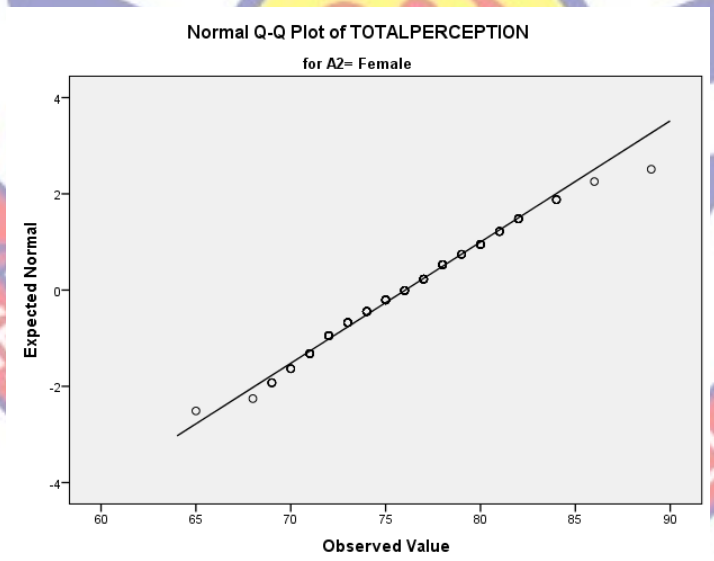
41	lighting system that I can control				
42	a quiet testing room				
43	fresh indoor air in my examination room				
44	temperature that makes me comfortable				
45	furniture arrangement that eases required movements				
46	an examinee to a seat (one examinee, one seat)				
47	a small number of examinees in a testing room				
48	fans that I can control				

APPENDIX B

NORMALITY PLOT AND TEST OF HOMOEINITY OF VARIANCES

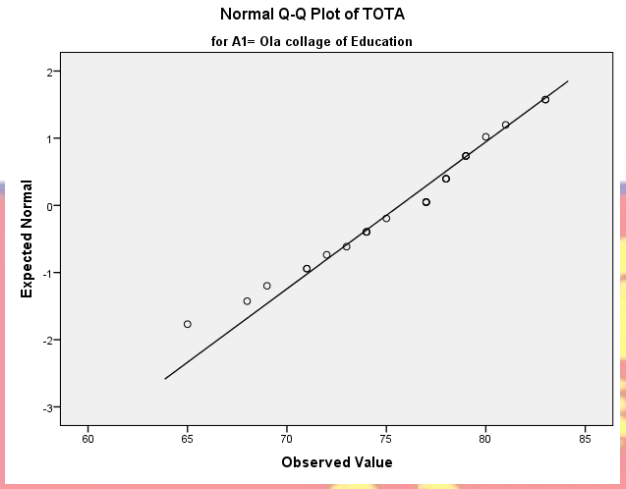
Section A: Normality plot of total perception according to gender

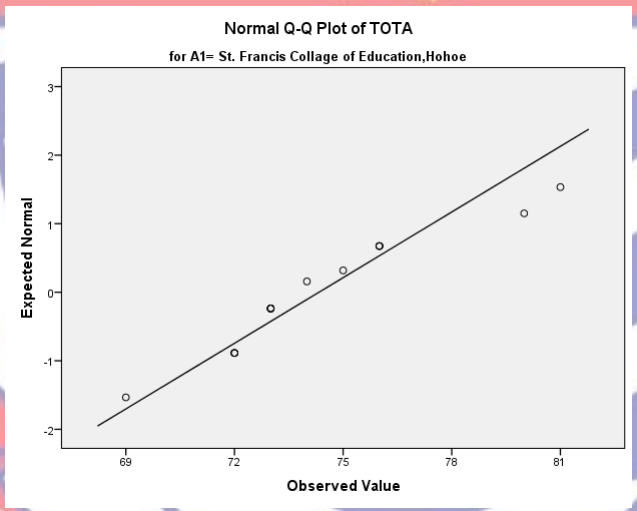


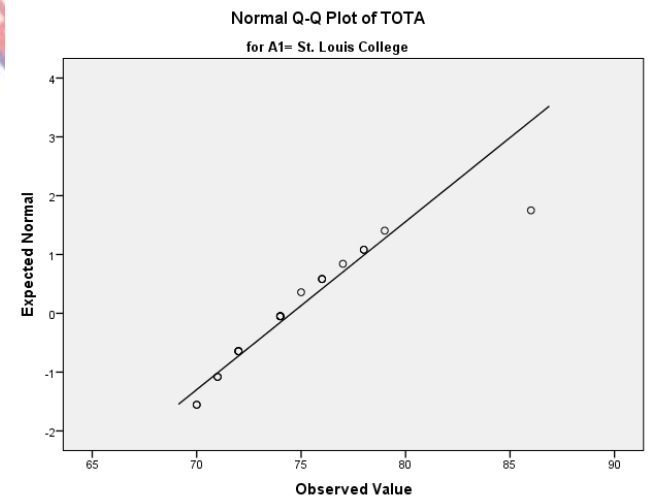


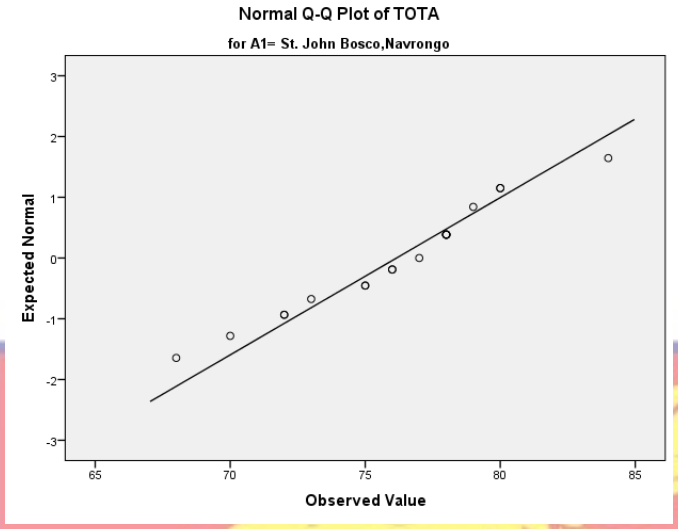
SECTION B:

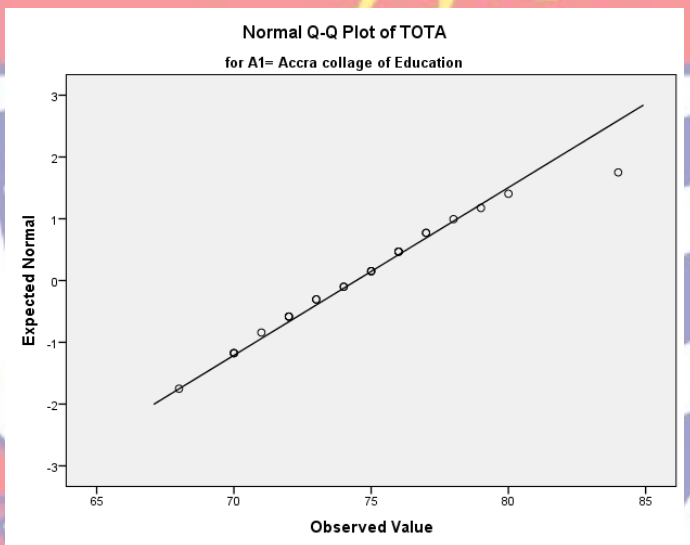
NORMALITY PLOT OF TOTAL PERCEPTION ACCORDING TO TESTING CENTRES

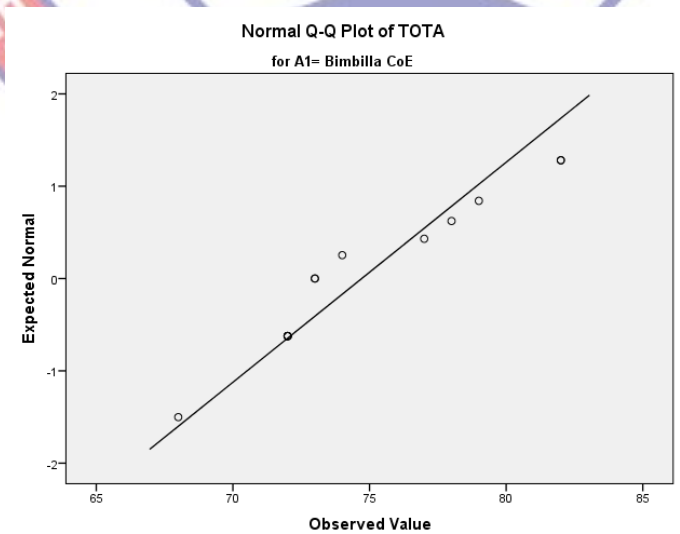


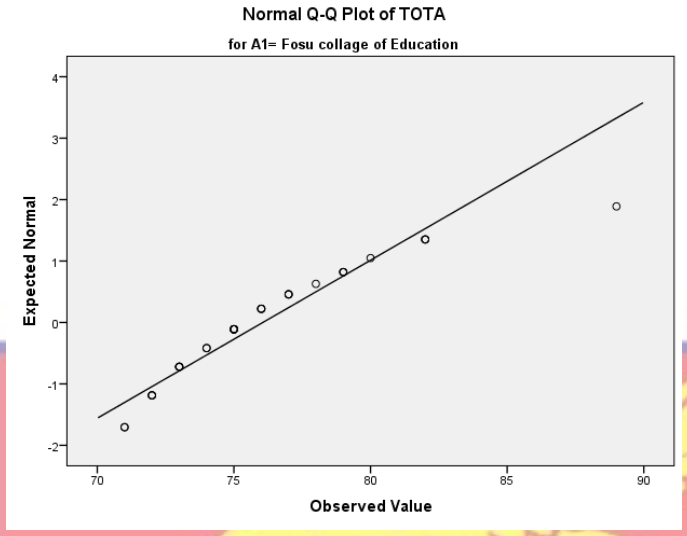


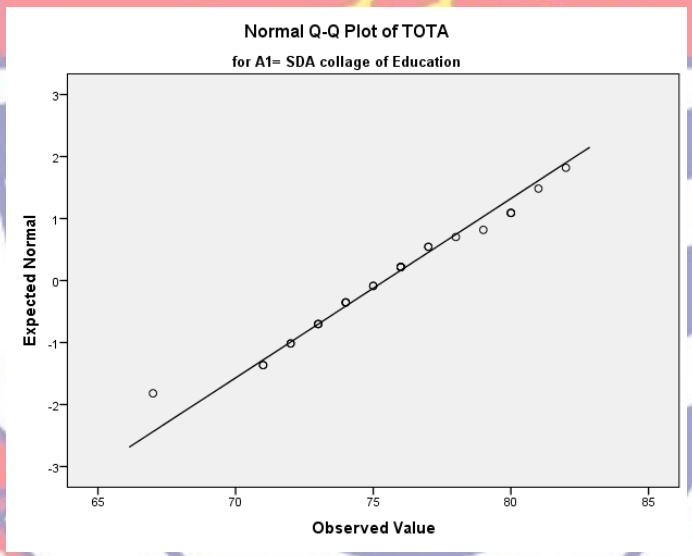


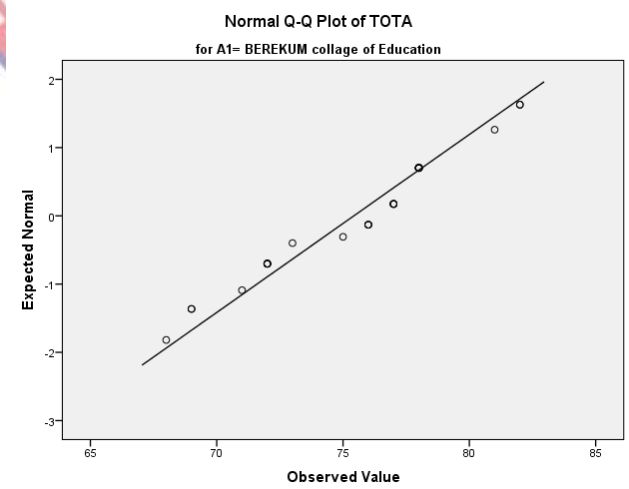


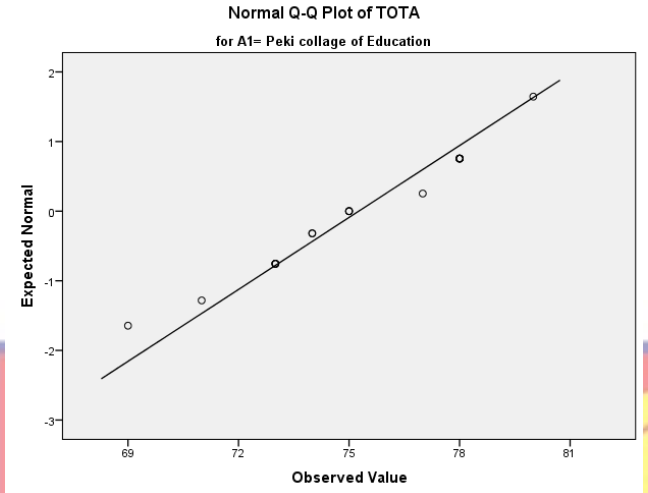


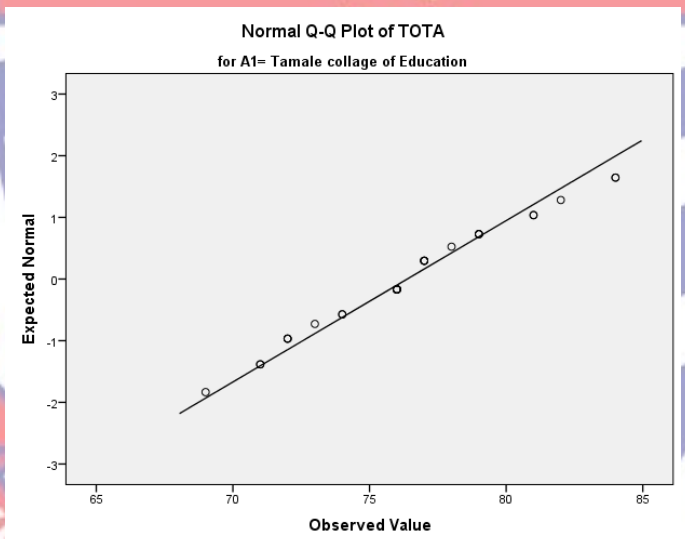


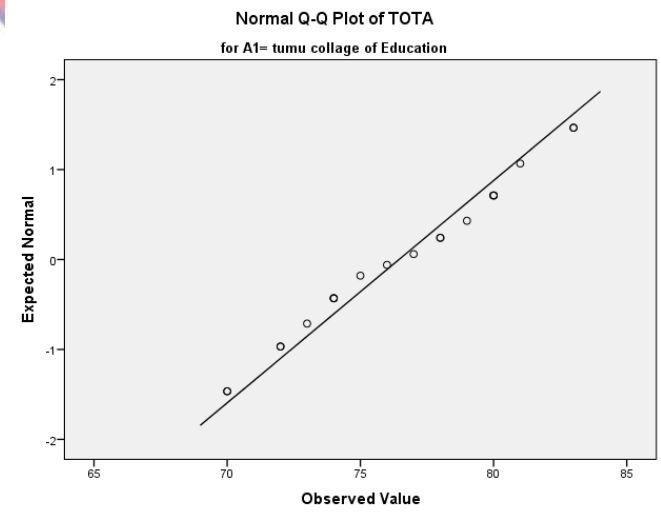


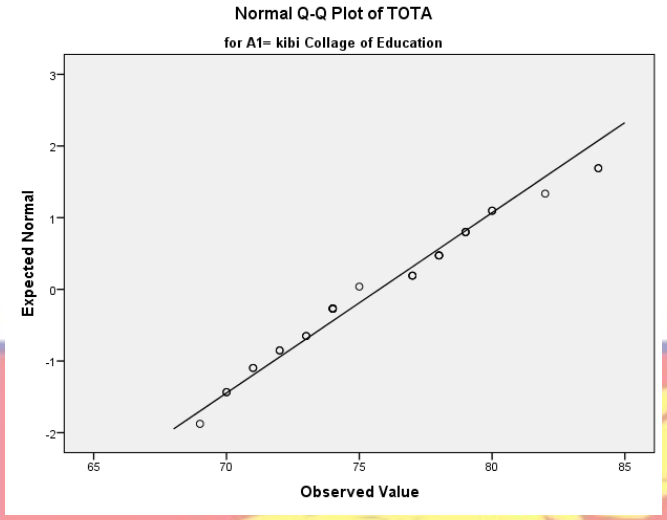


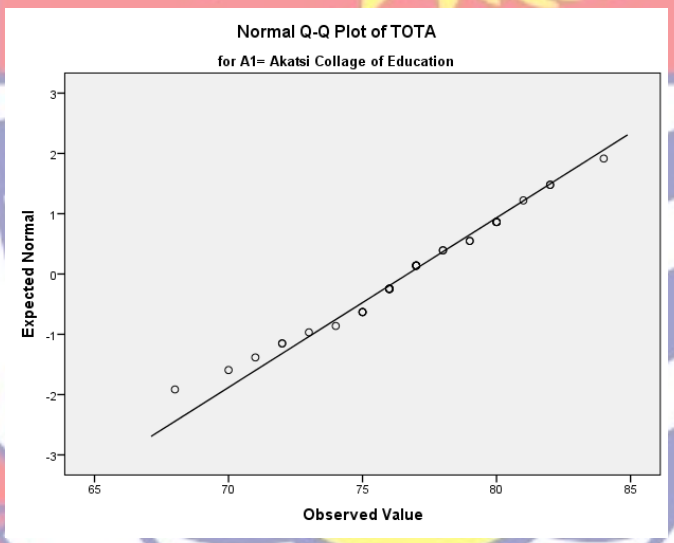


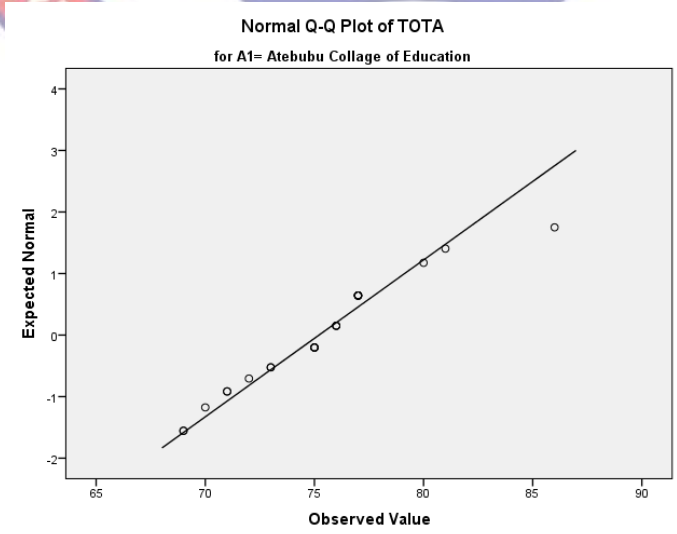












SECTION C

TEST OF HOMOGENEITY OF VARIANCES

TEST OF HOMOGENEITY OF VARIANCES OF TOTAL

PERCEPTION ACCORDING TO GENDER

Levene Statistic	df1	df2	Sig.
1.679	1	367	. 196

SECTION D

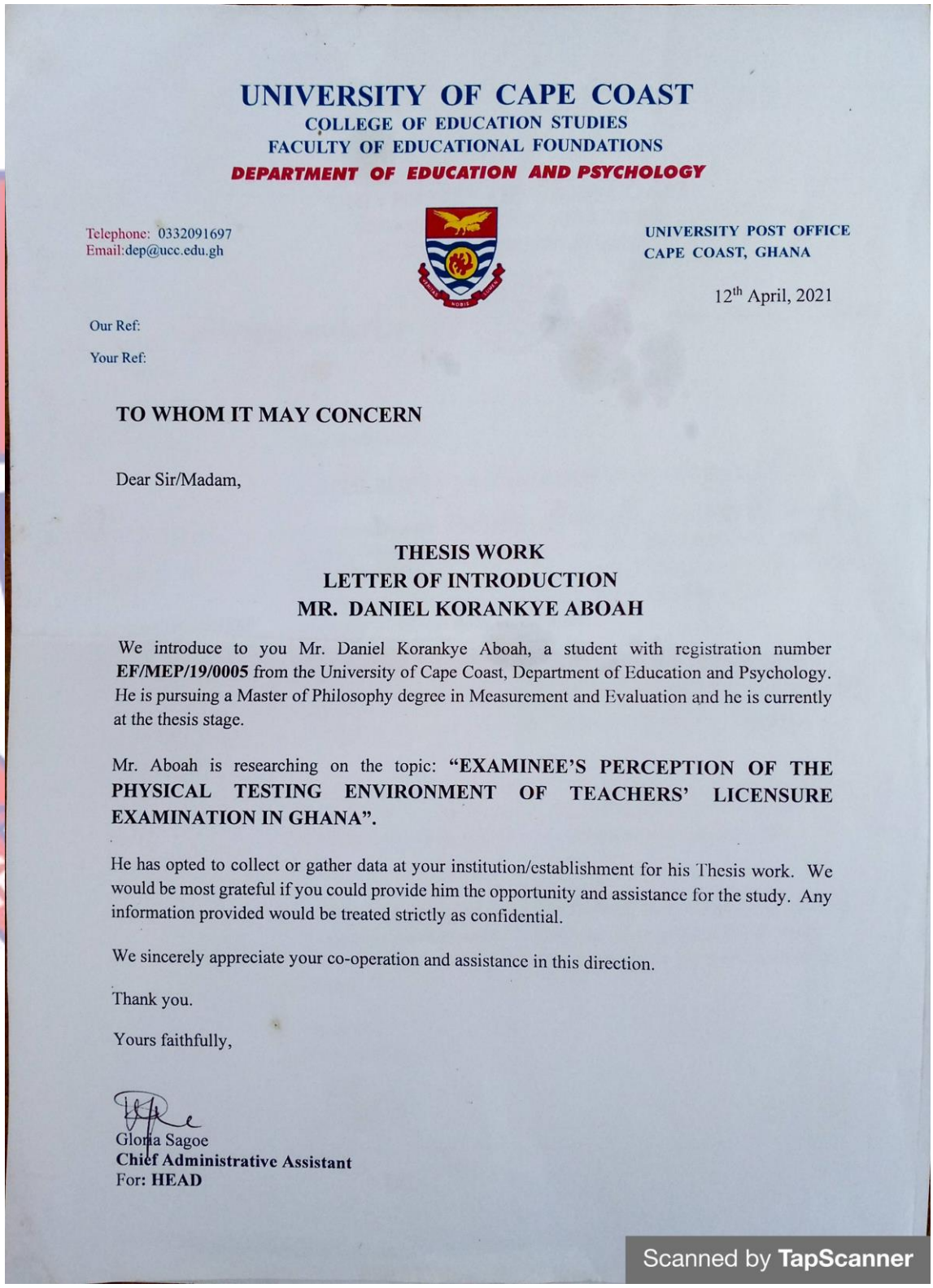
TEST OF HOMOGENEITY OF VARIANCES OF TOTAL

PERCEPTION ACCORDING TO TESTING CENTRES

Levene Statistic	df1	df2	Sig.
.702	14	354	.773

APPENDIX C

INTRODUCTORY LETTER



UNIVERSITY OF CAPE COAST
COLLEGE OF EDUCATION STUDIES
FACULTY OF EDUCATIONAL FOUNDATIONS
DEPARTMENT OF EDUCATION AND PSYCHOLOGY

Telephone: 0332091697
Email:dep@ucc.edu.gh

UNIVERSITY POST OFFICE
CAPE COAST, GHANA

12th April, 2021

Our Ref:

Your Ref:

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

THESIS WORK
LETTER OF INTRODUCTION
MR. DANIEL KORANKYE ABOAH

We introduce to you Mr. Daniel Korankye Aboah, a student with registration number **EF/MEP/19/0005** from the University of Cape Coast, Department of Education and Psychology. He is pursuing a Master of Philosophy degree in Measurement and Evaluation and he is currently at the thesis stage.

Mr. Aboah is researching on the topic: **"EXAMINEE'S PERCEPTION OF THE PHYSICAL TESTING ENVIRONMENT OF TEACHERS' LICENSURE EXAMINATION IN GHANA".**

He has opted to collect or gather data at your institution/establishment for his Thesis work. We would be most grateful if you could provide him the opportunity and assistance for the study. Any information provided would be treated strictly as confidential.

We sincerely appreciate your co-operation and assistance in this direction.

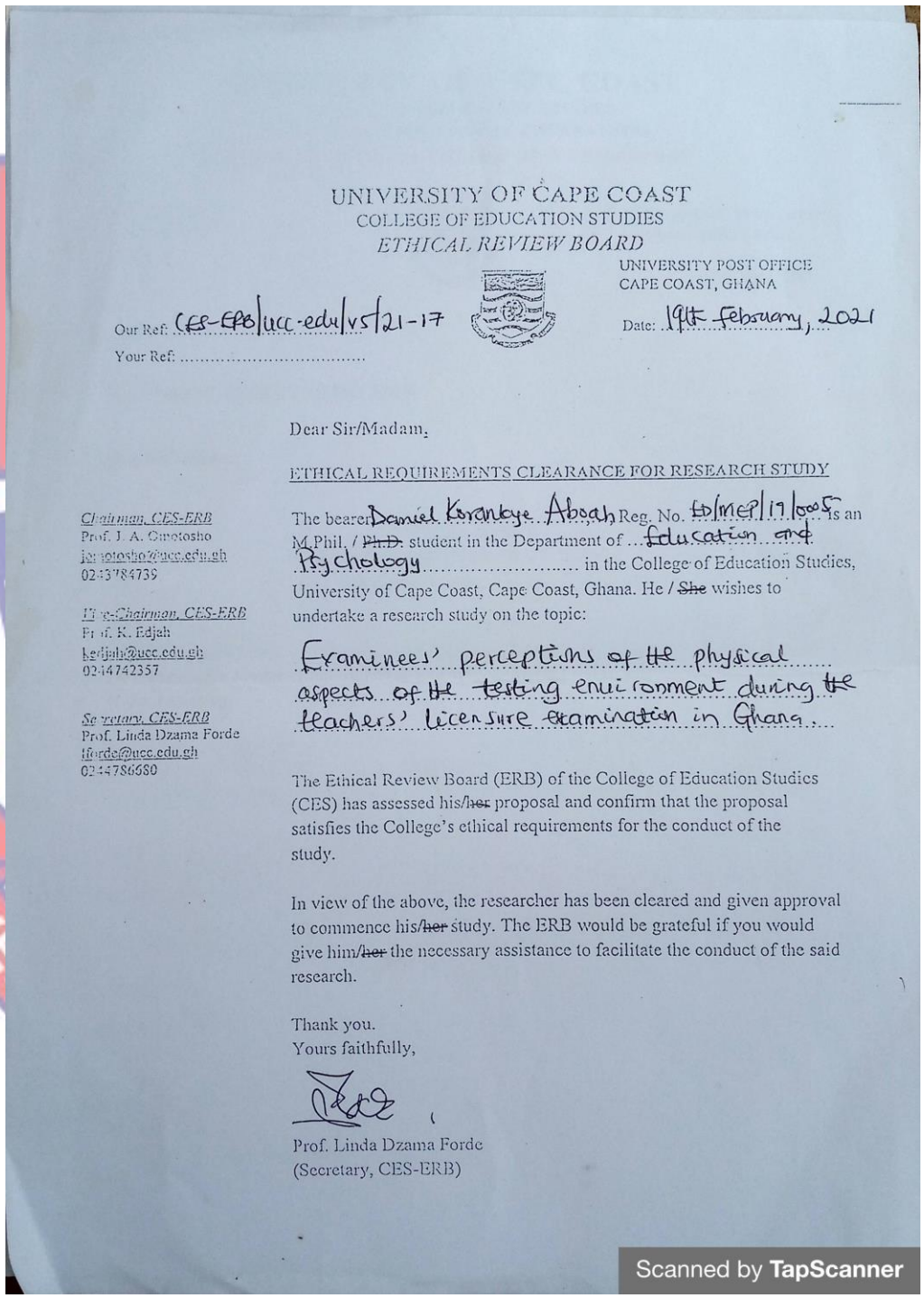
Thank you.

Yours faithfully,

Gloria Sagoe
Chief Administrative Assistant
For: **HEAD**

APPENDIX D

ETHICAL CLEARANCE



UNIVERSITY OF CAPE COAST
COLLEGE OF EDUCATION STUDIES
ETHICAL REVIEW BOARD

UNIVERSITY POST OFFICE
CAPE COAST, GHANA

Our Ref: CES-ERB/ucc-edu/vs/21-17
Your Ref: .....
Date: 19th February, 2021

Dear Sir/Madam,

ETHICAL REQUIREMENTS CLEARANCE FOR RESEARCH STUDY

The bearer Daniel Korankye Aboah, Reg. No. ED/MEP/17/0005 is an M.Phil. / ~~Ph.D.~~ student in the Department of Education and Psychology in the College of Education Studies, University of Cape Coast, Cape Coast, Ghana. He / ~~She~~ wishes to undertake a research study on the topic:

Examinees' perceptions of the physical aspects of the testing environment during the teachers' licensure examination in Ghana.

The Ethical Review Board (ERB) of the College of Education Studies (CES) has assessed his/~~her~~ proposal and confirm that the proposal satisfies the College's ethical requirements for the conduct of the study.

In view of the above, the researcher has been cleared and given approval to commence his/~~her~~ study. The ERB would be grateful if you would give him/~~her~~ the necessary assistance to facilitate the conduct of the said research.

Thank you.
Yours faithfully,

Prof. Linda Dzama Forde
(Secretary, CES-ERB)

Chairman, CES-ERB
Prof. J. A. Omotosho
jaomotosho@ucc.edu.gh
0243784739

Vice-Chairman, CES-ERB
Prof. K. Edjah
kedjah@ucc.edu.gh
0244742357

Secretary, CES-ERB
Prof. Linda Dzama Forde
lforde@ucc.edu.gh
0244786680

APPENDIX E

DISTRIBUTION OF TEACHER LICENSURE EXAMINEES ACCORDING TO ZONES AND TESTING CENTRES

Testing Centres	Zone	Examinees
Agogo Presbyterian College of Education	Ashanti/B.Ahafo	540
Berekum College of Education, Berekum	Ashanti/B.Ahafo	602
Mampong Technical College of Education	Ashanti/B.Ahafo	560
Ambrose College of Education, Dormaa Akwamu	Ashanti/B.Ahafo	522
Joseph's College of Education, Bechem	Ashanti/B.Ahafo	701
Louis College of Education, Kumasi	Ashanti/B.Ahafo	504
Monica's College of Education, Mampong	Ashanti/B.Ahafo	403
Wesley College of Education, Kumasi	Ashanti/B.Ahafo	620
Agona SDA College of Education	Ashanti/B.Ahafo	543
Offinso College of Education, Offinso	Ashanti/B.Ahafo	620
Al-Faruq College of Education	Ashanti/B.Ahafo	340
Atebubu College of Education, Atebubu	Ashanti/B.Ahafo	511
Wiawso College of Education	Central/Western	622
Bia Lamplighter College of Education	Central/Western	420
Enchi College of Education, Enchi	Central/Western	632
Foso College of Education	Central/Western	702
Holy Child College of Education, Sekondi-Takoradi	Central/Western	620
Komenda College of Education	Central/Western	625

Our Lady of Apostles (OLA) College of Education, Cape Coast	Central/Western	525
Abetifi Presbyterian College of Education	Eastern/G.Accra	511
Accra College of Education, Greater Accra	Eastern/G.Accra	504
Ada College of Education, Ada	Eastern/G.Accra	502
Akrokerri College of Education, Akrokerri	Eastern/G.Accra	532
Kibi Presbyterian College of Education	Eastern/G.Accra	701
Methodist College of Education (Ghana), Akim Oda	Eastern/G.Accra	455
Mount Mary College of Education, Somanya	Eastern/G.Accra	401
Presbyterian Women's College of Education, Aburi	Eastern/G.Accra	410
Presbyterian College of Education, Akropong–Akuapem	Eastern/G.Accra	701
Seventh-Day Adventist (SDA) College of Education, Asokore	Eastern/G.Accra	620
Bagabaga College of Education, Tamale	Northern	570
Vincent College of Education, Yendi	Northern	428
Dambai College of Education, Dambai	Northern	625
Nusrat Jahan Ahmadiyya College of Education, Wa	Northern	603
Gambaga College of Education	Northern	457
Gbewaa College of Education	Northern	625

McCoy College of Education	Northern	630
Offinso College of Education, Tamale	Northern	621
Tumu College of Education, Tumu	Northern	421
Evangelical Presbyterian College of Education	Northern	345
John Bosco's College of Education	Northern	401
Akatsi College of Education, Akatsi	Volta	733
Jasikan College of Education, Jasikan	Volta	403
Evangelical Presbyterian College of Education	Volta	632
Peki College of Education, Peki	Volta	402
Teresa's College of Education, Hohoe	Volta	620
Francis College of Education, Hohoe	Volta	314
Total	5	24,159

Source: NTC, 2021