Stakes of University Examinations and Their Impact on the Learning Approaches of Undergraduate University Students in Ghana

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Abstract: In recent times, employers and other industry players have lamented over the non-performance of graduates on the job. This is because students find it difficult to apply what is learned in schools in the world of work. This study examined high-stakes examination and its impact on the learning approaches adopted by students in a University in Ghana. The study was carried out using the descriptive survey design. The target population was undergraduate students. Questionnaires were administered to 758 regular undergraduate students through a multi-stage sampling technique. The data collected were analysed using multivariate simple regression and independent-sample t-test analyses. It was discovered that the stakes attached to university examination were a significant positive predictor of deep learning approach, surface learning approach, and strategic learning approach. It was concluded that the stakes attached to university examinations propel students to adopt either deep, surface, or strategic learning approaches in their studies, in their quest to perform excellently in these examinations. It was recommended that undergraduate students should continue to intensify the adoption of lifelong learning approaches such as deep and strategic learning approaches irrespective of the consequences attached to the results of university examinations.

1. Introduction

Students all over the globe are often faced with the challenge of passing one examination or the other (Ringeisen, Buchwald, & Hodapp, 2010). The results of these examinations are used in making important decisions about students, educators, and schools (Paul, 2013). Poor performances on these examinations can have severe consequences on students, educators, and the school at large (Gherasim & Butnaru, 2012). University semester examination plays an important role in the lives of university students (Payea & Baum, 2005). The results of these examinations are cumulatively used in certifying students which plays a crucial role in recruitment purposes, scholarship opportunities, and further studies (Sackett, Borneman, & Connelly, 2008).

Tests are said to be high-stakes if their outcomes are used to make essential decisions about students' promotion to the next grade, job placement, graduation, merit pay for teachers, or school rankings (Alexandra, Greenwood, & Linn, 1999). Similarly, according to the Standards for Educational and Psychological Testing (AERA, APA, & NCME, 2014), "stakes in testing refers to the consequences/importance of test results in decision making for individuals, institutions or groups" (p. 188). The high-stakes nature of university exams puts a lot of pressure on students to perform on these examinations (Hoffman & Assaf, 2005). Due to the importance attached to university examinations, students are likely to adopt either a deep, surface, or strategic learning approach to perform well on these examinations (Kelleghan, Madaus, & Raczek, 1996). While deep learners critically examine what they learn, surface learners use primarily memorisation in learning; strategic learners, on the other hand, manage their time and learn what is expected to achieve the highest grade possible (Duff, 2004).

Regarding high-stakes testing in Ghana, it appears that much has not been documented (Amoako, 2018, Anane, 2010). While Anane's study found out that the overemphasis on the WAEC examination and its uses is gradually shaping the content from broad curriculum to examination-focused teaching, Amoako's study discovered that BECE is a high-stakes test that drives curriculum implementation in Ghana. A critical examination of the literature appears to suggest that, most of the studies done in the area of high-stakes testing focused much attention on the perceived effect of high-stakes testing on teachers. Also, high-stakes as a variable confounds in a way with test anxiety, and that makes it difficult in accepting the findings of previous studies. Since test anxiety is associated with the examination, the current study measured test anxiety as a separate variable; this assisted the researchers to hold test anxiety constant to tell the real degree of the effects of the stakes on students. Again, since students are at the centre regarding the consequences of high-stakes tests (Reddell, 2010), and previous studies also focused on teachers, this study, therefore, focused on examining the stakes of university examination and its impact on the learning approaches adopted by students in the University of Cape Coast (UCC).

University of Cape Coast (UCC) is one of Ghana's foremost publicly owned universities which is sited in the cosmopolitan city of Cape Coast, Central Region. As a result of Ghana's heightened search for a highly qualified and skilled workforce in the educational sector, UCC was established in 1962. It was established to train graduate teachers for second-cycle institutions such as teacher training colleges and technical institutions, a mission that the two existing public universities at the time were unequipped to fulfill. The university has since added to its functions the training of doctors and health care professionals, as well as education planners, administrators, and agriculturalists. The University of Cape Coast is the topmost ranked University in Ghana and West Africa and it is among the top 5 Universities in Africa in the 2022 Times Higher Education World University Rankings. This makes it one of the rare sea-front universities in the world with great academic excellence. In terms of research influence, UCC is also ranked as the number one University in the world by Times Higher Education 2022 World University Rankings.

1.1 Classical True-score Theory-Reliability

History has it that Classical True-score Theory (CTT) evolved from the early works of Edward Lee Thorndike in 1904 in his first textbook on test theory. According to the theory, an observed test score (X) is the sum of two components: a stable true score (T) and a random error score (E). This is presented mathematically as $X = T + E$. The observed test score is the score that is seen on the test paper. The stable

true score is the expected value of the observed score over repeated measures. The error score is the difference between the individual's observed test score and his/her true score. For any given examinee and test, T is assumed to be a fixed value, although E and X vary for that examinee on different testing occasions.

In explaining the CTT in connection with the concept of reliability, Amedahe and Asamoah-Gyimah (2015) theoretically defined reliability as the ratio of the true score variance to the observed score variance. This is mathematically, represented as: $\rho^2 X1X2 = \delta2\,T\,/\,\delta2\,X$. This implies that reliability tells the extent to which the variance of the observed score is due to the variance of the true score. Thus, a perfectly reliable test has an equal true score and observed score variances; such a test also has a reliability of +1. Based on this, it can be deduced that as the error score of a test reduces the reliability of the test increases. In furtherance, a reliable test is "the extent to which the scores of the test are repeatable, dependable, and consistent; thus, the extent to which the test scores are free from measurement errors" (AERA, APA, & National Council on Measurements in Education, 1985). This suggests that reliability is inversely related to errors of measurement.

This study, in using the theory of CTT, focuses on how assessments in education contribute to errors in the observed scores of students. In the education system, it is expected that the observed scores of students equal their true score which implies that their observed scores are error-free. Although this is something too difficult to achieve, it is possible to reduce the errors so that these errors would have an insignificant effect on the observed scores.

This theory is significant in its effort to give a comprehensive understanding of how scores and grades of students can be contaminated by several factors. This study also explains how assessment practices of teachers are likely to significantly contribute to the errors in scores. Thus, it can be said that when lecturers construct tests that have characteristics such as unclear definitions, poor sentence structure, ambiguous items, inadequate time limits, difficult tests, the mismatch between learning objectives and test items, test with few items, improper arrangement of items, and identify patterns of answers among others (Amedahe & Asamoah-Gyimah, 2015a); they introduce error scores to students' scores and thus by their actions reduce the reliability of the test scores.

The presence of some of these factors, such as unclear definitions, poor sentence structure, and ambiguous items interfere with students' ability to identify clearly what is being measured. This in turn creates difficulty for the students and tends to lower their scores. When these errors are introduced to students' scores, their scores cannot be relied on for any useful decision-making. The theory further helps to discuss why university students could have good academic achievement in schools but become handicapped when there is the opportunity for them to apply what has been learned in schools. About this study, it can also be said that, in their quest to pass university examinations, students are likely to engage in all forms of examination malpractices due to the stakes/consequences attached to the results of university examinations. The implication of this is that, although students are likely to obtain excellent scores on university examinations by way of engaging in one examination malpractice of the other, the scores obtained by such students on the examination do not reflect their true ability or what they are capable of doing. In order words, such obtained scores cannot be relied on for any useful decision-making due to the error component in the scores.

1.2 Purpose of the Study

The study examined the stakes of university examinations and their impact on the learning approaches adopted by students in the UCC while controlling for test anxiety.

1.3 Research Hypotheses

The study was guided by the following hypotheses:

1. H1: The stakes of university examinations will significantly predict students' learning approaches.
2. H1: There is a statistically significant gender difference in the stakes of university examinations.

2. Methodology

The descriptive survey design was employed to carry out this study. This design was appropriate because the study aimed at gathering one-point data from several respondents to examine the impact of high-stakes examinations on students' learning approaches, without any form of manipulation (Amedahe & Asamoah-Gyimah, 2015). The study targeted all undergraduate regular students of the University of Cape Coast (UCC) who registered for the 2019/2020 academic year. Records from the Student Records and Management Information Section (SRMIS) of UCC indicated a total number of 20,607 comprising 8,725 females and 11,882 males for the 2019/2020 academic year (SRMIS, 2019).

In this study, Krejcie and Morgan's (1970), and Glenn's (1992) sample size determination tables were used to determine the sample size. Based on Krejcie and Morgan's table, a population of 20,607 took a minimum sample of 379. Glenn (1992), however, asserted that adjustment must be made in sample sizes in cases where comparative analysis of subgroups is conducted. Since one of the objectives of this study focused on comparing subgroups in the sample, the sample of 379 obtained from Krejcie and Morgan was doubled. The final sample was therefore 758.

To get the individual participants, a multi-stage sampling technique was used to select the 758 students. First, a quota sampling technique was proportionately utilised in determining the number of respondents to be sampled out of the element in the population. The elements in the population include three main sub-groups. These sub-groups include College, level of study, and gender of respondents. The quota sampling technique which is the non-probability equivalent of the stratified sampling technique was deemed appropriate because it was technically impossible for the researcher to get the list of all students in the population (sampling frame). To roll in the participants, we conveniently sampled students who were willing and ready to participate in the study.

The questionnaire was used to gather data for the study. The Revised Approaches to Studying Inventory (RASI) was adapted for the study. In addition, a 23-scale was self-designed to gather information on "the stakes of university examination." The scale on the stakes measured the importance students attached to university examination; the development of the scale was guided by available literature (Johnson, Johnson, Farenga & Ness, 2008; Astone & McLanahans, 1991) The RASI scale was developed by Duff (1997) to measure students' learning strategies in higher education. Students' learning strategies were measured on three dimensions: deep, shallow, and strategic. The inventory was made up of 30 items, with 10 items

under each of the three dimensions. Both scales were measure on a 4-point Likert-type scale (i.e., 1 = Strongly disagree, 2 = Disagree, 3 = Agree and 4 = Strongly Agree). The various scales on the questionnaire were validated with Confirmatory Factor Analysis (CFA) through the use of Smart Partial Least Squares (SmartPLS) software. The factor loadings of all the items were above .50. Convergent validity was assessed using the Average Variance Extracted (AVE), and the least among all the latent constructs was.56 In addition, discriminant validity was assessed using the Heterotrait-monotrait (HTMT) ratio of correlation proposed by Henseler, Ringle, and Sarstedt (2015), and values obtained were less than the predefined threshed of 0.90, and this suggests evidence of discriminant validity. The reliability (internal consistency) of the instrument was also assessed using Cronbach's alpha coefficients. Values for the scales ranged from .74 to .87, this suggests that the instrument had fewer errors and high internal consistency (Karagoz, 2016).

Data collected were analysed quantitatively using the Statistical Product for Service Solution (SPSS) software version 25.0 The data collected were analysed using inferential statistics such as multivariate simple regression, independent samples t-test, and one-way ANOVA/Welch. The bootstrap approach was used for the inferential analyses. The use of this approach was efficient in estimating the standard errors and thereby gave a better estimate for the confidence intervals. The bootstrap samples were interpreted in terms of confidence intervals. For a particular result to be significant, the bootstrap upper and lower confidence interval should not contain '0', thus, both the upper and lower confidence intervals should be of the same sign ('+ +' or '- -'). This means the confidence interval does not include 0, and the regression coefficient cannot be 0.

Ethical clearance for this research was granted by the Ethical Review Board (ERB) of the College of Education Studies, University of Cape Coast, Ghana, with the reference number CES-ERB/UCC-EDU/V4/20-08. The study also adhered strictly to ethical issues regulating the conduct of any research. Ethical issues such as informed consent, confidentiality, anonymity, and privacy, among others, were adhered to. Consent of respondents was sought before data collection commenced. The data collected were analysed in groups and so it was not possible to trace the responses of each of the respondents.

3. Results

3.1 Effect of the Stakes on Students' Learning Approaches

This objective sought to determine whether the stakes of university examinations would predict students' learning approaches. Data on this objective was analysed using multivariate simple regression analysis with 1000 bootstrap samples. Since test anxiety confounds with high-stakes tests, the study treated test anxiety as a covariate. This was done to tell the real degree of the stakes on students learning approaches. Details of the results are presented in Table 1 and Figure 1 respectively.

Table 1: Details of the results

Dependent Variable	Parameter	B	Beta	Bias	Std. Error	95% Confidence Interval	
						Lower	Upper
Deep Learning Approach	Intercept	21.778		.006	1.129	19.395	23.986
	High-stakes	.182*	.397	< .001	.017	.148	.214
	Test Anxiety	-.030	-.071	< .001	.016	-.064	< .001
Surface Learning Approach	Intercept	7.611		-.006	1.072	5.408	9.543
	High-stakes	.149*	.291	< .001	.017	.115	.183
	Test Anxiety	.140	.305	< .001	.017	.107	.175
Strategic Learning Approach	Intercept	20.665		.045	1.239	18.234	22.955
	High-stakes	.209*	.387	< .001	.019	.172	.248
	Test Anxiety	-.044	-.088	< .001	.022	-.091	-.004

*Significant, p < .05.

Adjusted R2 of deep learning = .149, Adjusted R2 of surface learning = .215, and Adjusted R2 of strategic learning =.143.

The results in Table 1 show that high-stakes explained 14.9%, 21.5%, and 14.3% of the variances in deep learning, surface learning, and strategic learning respectively. The results further revealed that high-stakes was a significant predictor of deep learning approach, B = .18, Boot 95%CI (.15, .21), surface learning approach, B = .15, Boot 95%CI (.12, .18), and strategic learning approach, B = .21, Boot 95%CI (.17, .25).

This implies that the consequences/importance students attach to university examinations (high-stakes tests) influences how they learn. For instance, the results indicate that a unit increase in the high-stakes test would lead to a .21 increase in the strategic learning approach. That is to say, students who attach a lot of importance to the results of university examinations are more likely of adopting a strategic learning approach in their studies. Students who adopt a strategic learning approach often organize their study routines and time to achieve the highest grade possible.

Similarly, the results imply that an additional increase in the high-stakes test would lead to a .18 increase in the deep learning approach. Thus, students who attach a lot of importance to the results of university examinations are more likely of adopting a deep learning approach in their studies. Students who adopt a deep learning approach often try as much as possible to understand the content they study rather than memorising a particular content. Generally, the results of the study revealed that high-stakes test is a

significant predictor of each of the three dimensions of learning approaches. Figure 1 presents a diagrammatic display of the results.
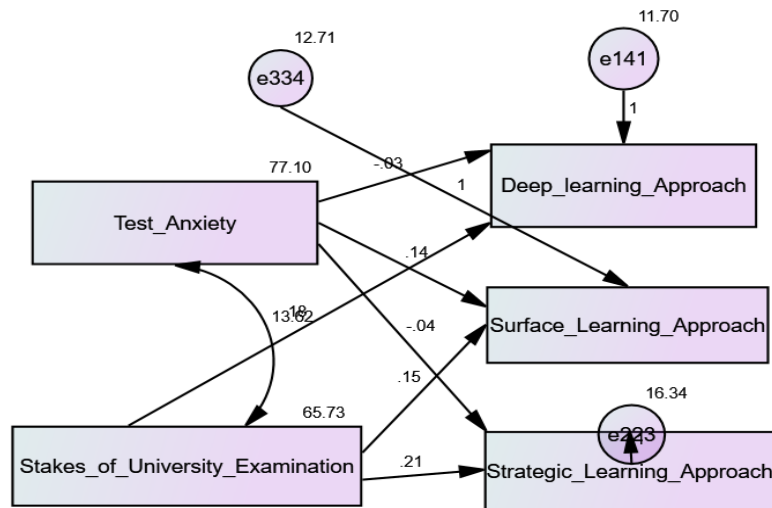

Figure 1: Path model for stakes of university examination, students' learning approaches, and test anxiety

The model as presented in figure 1 confirmed the finding of the current investigation. Thus, the results in figure 1 indicate that, upon controlling for test anxiety, the stakes of university examination were a significant predictor of deep learning approach, surface learning approach, and strategic learning approach.

3.2 Gender Difference in the Stakes of University Examination.

This objective sought to examine whether a statistically significant gender difference exists in the stakes of university examinations. An independent samples t-test was conducted to analyse the data gathered on this objective. The dependent variable was the composite score for the high-stakes test, which was measured continuously. Before the analysis, assumptions underlying the use of independent samples t-test were checked and duly satisfied. Details of the analysis testing the difference between the two groups (males and females) with regards to the dependent variable (stakes of university examination) are presented in Table 2. Test anxiety was however treated as a covariate.

Table 2: Gender differences on the stakes of university examinations

	Gender	N	Mean	SD	t-value	df	p-value
High-stakes	Male	393	65.320	8.2869			
	Female	287	65.659	7.8799	-.536	678	.592
Test Anxiety	Male	393	32.277	8.6945			
	Female	287	32.689	8.9226	- .604	678	.546

*Significant, $p < .05$

As presented in Table 2, there was no statistically significant gender difference in the stakes of university examinations, t (678) = -.536, p=.592. Thus, male and female students in the University of Cape Coast did not differ in terms of the stakes attached to university examinations. This implies that the stakes attached to the university semester examination were the same for both female and male students. In other words, the consequences of the results of university examinations are the same for female students as well as their male counterparts. Thus, comparatively, it can be said that both undergraduate male and female students attach equal importance to the results of university examinations.

4. Discussion

4.1 Stakes and Students' Learning Approaches

The study revealed that the stakes attached to the university examination (high-stakes test) were a significant positive predictor of each of the three dimensions of students' learning approaches (deep learning approach, surface learning approach, and strategic learning approach). The results led to the rejection of the null hypothesis which stated that "The stakes of university semester examinations will not significantly predict students' learning approaches." The findings of this study agree with McClenny (2018) who found that high-stakes tests affected the transfer of learning among undergraduate nursing students. In that, students were unable to apply what they have learned in practical situations outside the classroom environment. This could suggest that such students adopted a shallow learning approach, hence their inability to transfer to real life, what they were taught in the classroom. The findings of this study also corroborate with that of Adegokei (2017) who investigated the effect of high-stakes examination on the teaching and learning of Physics in Secondary Schools in Nigeria. The findings of Adegokei (2017) revealed that the majority of the students who studied physics tried to understand the basic concepts of Physics, mastered the fundamental principles of Physics, memorised formulae and procedures, as well as practiced old/past examination questions. Adegokei's finding suggests that students adopted both deep and shallow approaches in their quest to understand the concepts of Physics and also perform very well in their final examinations.

Although the result from this present study confirmed that of McClenny (2018) and Adegokei (2017), both studies possess some methodological differences compared with this current study. While McClenny adopted a qualitative approach in his study, Adegokei's study was conducted among Secondary School students in Nigeria. Additionally, differences exist regarding the level of study and the context in which the aforementioned studies were conducted, compared with this study. However, it is possible that these different samples adopted similar learning approaches due to the stakes attached to the respective examinations written by the respondents.

Other studies have equally revealed findings that are in harmony with the present study (Gundogdu, Kiziltas, & Cimen, 2010; Aysel, 2012). Gundogdu et al. (2010), for example, investigated students' perception regarding a high-stakes examination (SBS assessment) used to determine entry into the different types of high schools and found that the nature and consequences attached to the SBS examination propelled students to study in a more planned and orderly manner. Thus, students adopted a strategic learning approach in their studies as a result of the consequences of the SBS examination.

Aysel (2012) on the other hand, examined the impact of high-stakes examination systems in Ireland and Turkey on the teaching and learning of mathematics in post-primary education and found that although Irish and Turkish instructors adopted different methods of teaching, their students combined both the deep and the shallow learning approaches in their preparation to write high-stakes examinations. Despite the similarities in the findings, the study conducted by Gundogdu et al. (2010) and Aysel (2012) sampled Junior High School students while the current study sampled university students. The results are consistent because students at the respective levels of education understood the consequences attached to the results of their examinations.

This result implies that the consequences/importance students attach to university examinations (high-stakes tests) influence how they learn. That is to say, since the results of university semester examinations are cumulatively used in certifying students, and are also used in making critical decisions regarding students' recruitment for better job offers, scholarship opportunities, as well as opportunities for further studies, students of the University of Cape Coast often combine the three aforementioned learning approaches in their studies, in their quest to perform excellently on high-stakes examinations.

The results of this current investigation provide enough evidence to suggest that, students at the University of Cape Coast are tactical in adopting a particular learning approach in their studies. That is to say, they take into consideration several factors such as the nature of their courses, the format of the questions they anticipate to meet in their examinations, as well as their lecturer's style of crafting test items, before settling on adopting either deep, shallow, or strategic learning approach in their studies.

For instance, a lecturer who assesses university students mainly with the use of recall questions is likely to propel students to adopt a rote learning approach in their studies; this in effect does not promote proper and better understanding on the part of the students. On another hand, university students are likely to adopt a deep learning approach in an instance where a lecturer assesses students in a way that does not require them to memorise concepts but rather, bring on board what they have learned, by applying them in practical situations. This will in effect result in lifelong learning outcomes where students exhibit critical thinking in applying their knowledge in new situations.

This stands to reason that, students' choice of combining the three learning approaches in the studies, amidst the high-stakes nature of university examinations, is to a large extent dependent on the format or styles lecturers adopt in assessing their students. It is however important to emphasise that among the three dimensions of the learning approaches, students adopted more of a strategic learning approach in their studies compared to the deep and shallow learning approach. Students who adopt a strategic learning approach in their studies often organise their study routines and time and learn what is expected to achieve the highest grade possible (Duff, 2004).

It has also been established in the Classical True-Score Theory that an observed score (X) could be envisioned as the composite of two hypothetical components: a true score (T) and a random error score (E). This suggests that the scores obtained by students in university examinations are a component of students' true ability (True score) and some error component emanating from the testing conditions. About this study, it can be said that the high-stakes nature of the university examination could propel students in adopting a learning approach that does not assist in reflecting their true abilities as students. That is means

that, students are likely to adopt a rote learning approach in response to a lecturer who assesses students mainly with the use of recall questions. Thus, although such students may not feel comfortable adopting the aforementioned learning approach in their studies, they have little or no option, since the nature of the examination questions demands a recall approach to learning. The implication is that such students would be denied the opportunity to reflect on their true abilities in terms of their capabilities.

On gender and the stakes of university examinations, the study found no significant difference in the stakes of university examinations based on gender. The current study's findings contradict several studies (Attali, Neeman, & Schlosser, 2018; Zawistowska 2017; Azmat, Calsamiglia, & Iriberri, 2015; Brailovsky, Grand-Maison, Miller, & Rainsberry, 1997). Unlike the current study, the authors of the aforementioned studies found a significant gender difference in students' performance on a high-stakes test. For example, in their studies, Attali, et al. (2018) examined how different demographic groups responded to "consequences" by comparing their performance in "high" and "low" stakes situations. The authors found that male students outperformed their female counterparts in the GRE high-stake situation. The performance of the male students however dwindled in the GRE low-stakes situations. Similarly, Zawistowska (2017) investigated the gender gaps in the results of secondary school exit exams (Matura) in mathematics in Poland and found that male students performed better than their female counterparts on the Matura exam in Mathematics. The findings of these studies contradict the findings of the present study due to differences in some aspects of their methodology. Whereas this study surveyed university students', secondary school students were sampled in the studies of Attali, et al. (2018) and Zawistowska (2017).

This implies that the stakes attached to the university examination were the same for both female and male students. In other words, the consequences of the results of university examinations were the same for female students as well as their male counterparts. Thus, comparatively, it can be said that both undergraduate male and female students attach equal importance to the results of university examinations. This result makes a lot of meaning, in that, students within the University of Cape Coast, irrespective of their gender, are expected by the University's academic policy to pass all their examinations to qualify for the award of a degree (Academic Programmes, Policies, and Regulations for Undergraduate Studies, 2018). As a result, it is expected that all students who desire to be certified as degree holders in their respective program of study, attach the necessary importance/seriousness to their studies. This could perhaps explain the reason why the stakes attached to the university semester examination did not differ for females as well as male students.

5. Conclusions and Recommendations

Based on the findings, it can be concluded that the stakes attached to university examination propel students to adopt either deep, surface, or strategic learning approaches in their studies. Thus, students in the University of Cape Coast combine these three learning approaches in their studies, in their quest to perform excellently on high-stakes examinations. This provides enough evidence to suggest that, students at the University of Cape Coast are tactical in adopting a particular learning approach in their studies. Again, students take into consideration several factors before settling on adopting any of the three aforementioned learning approaches in their studies. The study further concluded that students irrespective of their gender attached equal importance to university examinations. Based on the findings of the study

and the conclusion drawn, the following recommendations were made to guide the development of policy and practice:

3. Undergraduate students of the University of Cape Coast should adopt the three learning approaches which would assist them to understand and internalise the content of what they study in their various programme areas.

4. Lecturers, academic advisors, as well as the management of the University of Cape Coast, are encouraged to organise workshops that would sensitise and educate undergraduate students on the importance of adopting lifelong learning approaches (deep and strategic learning approaches) in their quest to perform excellently in university examinations.

5. Lecturers of the University of Cape Coast are by the findings of this study encouraged to craft test items in a way that would require students to implement or adopt deep and more lasting learning approaches in their studies, since high-stakes tests accounted for more of the variances in surface learning approach compared to the other learning approaches.

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