

Original Research Article

PLAGIARISM IN HIGHER ACADEMIC INSTITUTIONS, A BLIGHT ON INTELLECTUAL INTEGRITY: AN INTERVENTIONIST APPROACH

ABSTRACT

Although studies on students' plagiarism continue to attract research attention, there are still lacunas in the literature in terms of adequate interventions to combat the menace in higher educational institutions. This study set out to examine plagiarism behaviour among students at Kwame Nkrumah University of Science and Technology, Kumasi (KNUST) a leading Ghanaian university. The study employs a quantitative research technique with findings pointing to the need to treat students' assignments as a process not a product. It was concluded that, covert and overt techniques are the best approaches to ascertaining students' plagiarism tendencies. The implication is to reinforce the notion of software deployment as an alternative approach to combating students' plagiarism. The study recommends the need for organizational structures to deal with the 'menace', plagiarism awareness programmes for students and faculty. A concerted effort and commitment by students and faculty in combating plagiarism at Kwame Nkrumah University of Science and Technology, Kumasi (KNUST) could promote intellectual integrity in the university.

Keywords: *Plagiarism, Intervention, Turnitin, Intellectual Integrity, Higher Academic Institutions*

1. INTRODUCTION

Plagiarism presents higher academic institutions (especially universities) an enduring concern across the globe (Curno, 2016; Hodgkinson, Curtis, MacAlister, and Farrell, 2016; Thomas and De Bruin, 2012; Batane, 2010). As the internet is a tremendous resource for conducting research, it has also become a considerable concern for instructors requiring students to write research papers. The ready availability of information on the internet has greatly facilitated plagiarism in academic papers (Hoanca, 2017).

Growing awareness campaign by institutions of higher learning to fashion measures aimed at bringing this unfortunate academic malaise to reasonable levels of acceptance appear to be rising with the frequency and casualties that perpetuate the phenomenon at different spheres of higher education, both undergraduate and postgraduate levels (Appiah, 2016a; Batane, 2010; Sentleng and King, 2010). Different intervention measures have been proffered from the scholarly literature (Nova and Utami, 2018; Ranawella and Alagaratnam, 2017; Aaron and Roche, 2014) and some have even gone ahead to suggest computer games and simulations as effectively beneficial (Bradley, 2015) in dealing with the phenomenon. Part of the beneficial aspects emphasis the technology in ensuring diminished degree of plagiarism by providing teaching and skills in digital literacy to students. The researchers are of the view that, these intervention mechanisms could be broadened to address the knowledge gap in lack of appropriate mechanisms in detecting and reducing the prevalence of plagiarism among students of higher academic institutions in Ghana. The researcher observed that, ineffective measures and knowledge lacuna are setbacks in combating plagiarism and therefore must be duly considered in any meaningful plagiarism discourse. In this regard, the researchers advance the following theses in the form of hypothesis to guide the study.

H₀: Students' awareness of plagiarism and its consequences on their academic assessment could deter them from plagiarising

H₁: Lack of anti-plagiarism checks heighten undergraduate students' propensity to cheat in their assignments.

H₂: Both covert and overt approaches are appropriate in minimising the incidence of plagiarism

1.1 Plagiarism Explained

Plagiarism has been defined differently by many scholars with an emphasis on intellectual dishonesty in authorship of academic works and how injurious it is to intellectual integrity and scholarship. Plagiarism therefore is negative in character and detrimental to knowledge production, dissemination and promotion. The researchers define plagiarism as an overt or covert act of misrepresenting another person's work as your original work for your benefit without proper acknowledgements of the source. Other definitions of plagiarism are reviewed in the study to examine the nature and character of plagiarism. Plagiarism has been defined as 'Passing off someone else's work, whether intentionally or unintentionally, as your own for your own benefit' (Carroll, 2002 p. 9). From this definition, the issue of unawareness is no longer an excuse in matters of plagiarism. Ignorantia legis neminem excusat ("ignorance of the law excuses no one"). However, there is the possibility for people to pretend to be unaware of plagiarized text. This intentional position finds support in the claim that plagiarism is the intentional and unintentional use of another's text or ideas, published and unpublished, without acknowledging the source of the work (Logue, 2004: p. 40, Jameson, 1993: p. 18). Not acknowledging the source includes content from unpublished but readily accessible works, such as postgraduate theses and doctoral dissertations. Cormeny (Hannabus, 2001) suggests plagiarism applies to using the words or phrases of another person and restating another person's thoughts in slightly different words. Even someone's thought can become a subject of plagiarism, thus plagiarized thought. Badke (2008) views plagiarism as representing someone's ideas as one's own, which

constitutes misrepresentation and fraud (Hodgkinson et al., 2016). Though the definitions on the concept vary, there are consistent variables such as academic dishonesty, offensive, stealing, culturally induced, immoral, deceptive, contract cheating, and among others that emerge in most discussion on plagiarism (instance, Clare, Walker, and Hobson, 2017). The consistent variables provide a common view that illustrates the unethical and academically unacceptable nature of plagiarism which amounts to intellectual dishonesty.

There appears to be persistent misconception among students that using many sources, citations, and quotes amount to acknowledging the authors and a means of avoiding plagiarism (Salleh, Ghazali, Awang, and Sapiai, 2012). Part of this misconception could be attributed to the crucial role the Internet plays in the whole plagiarism discourse. Hoanca, (2017) posits; “as the internet is a tremendous resource for conducting research, it has also become a considerable concern for instructors requiring students to write research papers. The ready availability of information on the internet has greatly facilitated plagiarism in academic papers”. As a result, the Internet has made it possible for massive amounts of information to be accessed anytime, anywhere (Rimer, 2009). Again, with greater access to sophisticated software and flexible editing tools, such as quilbot.com, spinbot.com, para-online.com, caderduck.com, and others, students may be tempted to use these tools negatively in their course work, increasing the likelihood for plagiarism. Appiah (2016) reported that, in Ghana, less attention has been given to plagiarism among students in higher learning institutions. This less attention comes on the back of the awareness that policies about plagiarism are enshrined in the objectives and goals of some universities in Ghana. Unfortunately, these policies are ineffective as far as enforcement is concerned. The situation appears to be worsening among students, who appear to be oblivious or heedless of the consequences of plagiarism on academic integrity.

In this study, the researchers examined Turnitin as an interventionist approach in identifying and reducing the prevalence of plagiarism among Kwame Nkrumah University of Science and Technology, Kumasi (KNUST) students with the goal of improving students' academic writing skills and promoting intellectual integrity at Kwame Nkrumah University of Science and Technology, Kumasi (KNUST).

2. PLAGIARISM: CONTEMPORARY PERSPECTIVES

Scholars' understanding of the concept of plagiarism have led to heated arguments and disagreements as well as mutual agreements and consistencies. These contested notions of the concept need to be addressed to create some consistency as far as this subject matter is concerned. In addition, the concept of plagiarism is ambiguous and lacks the bases for defining the concept, including the parameters that are deemed the act of committing plagiarism. Indeed, Anyanwu (2004) advances the idea that there is the need to develop rules to govern the parameters that constitute academic dishonesty. To be sure, even though the concept of plagiarism hardly ever subjects itself to a consistent, definitive definition, Carroll (2002 p. 9) has famously defined plagiarism as 'Passing off someone else's work, whether intentionally or unintentionally, as your own for your own benefit'. With this definition, people present write-ups to be theirs in scenarios where those texts belong to other people. This popular explanation notwithstanding, the definitions for the concept vary in spite of consistent variables that recur in some of the explanations that have been offered to shed some light on the subject. Some of these consistent variables in the literature include 'academic dishonesty', 'offensive', 'stealing', 'culturally induced', 'immoral', 'deceptive', 'contract cheating', among others (Clare et al., 2017). These consistent variables demonstrate an overarching view of plagiarism as something unethical and academically unacceptable, thus amounting to intellectual dishonesty.

In a separate development, Gilmore *et al.* (2010) examined the rate and cause of plagiarism among graduate students. The study called for the need for a common parameter to determine plagiarism since the concept lacked common understanding among different stakeholders – notably students and faculty.

Scholars have assigned several reasons for the perpetuation of plagiarism by students. The emergence of the digital age that characterises the advancement of information and communication technology, specifically the spread of computers and the pervasive nature of the Internet have come to exacerbate this situation (Curno, 2015). Reproducing texts in different formats continues to be both cheaper and easier. Falsifying, copying, mimicking, or patching and manipulating the works of others without their due acknowledgement is even considered as a form of plagiarism (Appiah, 2016b).

Again an attitude of non-compliance, on the part of students, to scholarly and academic due processes and the lack of standard policies to deter students from cheating by copying other author's works without acknowledgement (Thompson, 2002) go a long way to perpetuate the practice of plagiarism. Inadequate appropriate paraphrasing skills, lack of reading and writing skills and insufficient guidance from tutors, perhaps students' impression that they might not be caught for plagiarism, laziness, procrastination, and poor time management could be factors that lead to plagiarism.

Many researchers have tried to design measures to discourage the rampant incident of student plagiarism (Batane, 2010; Sentleng and King, 2012; Appiah, 2016). For instance, in the UK, Buckley and Cowap (2013) recommended plagiarism software usage among psychology students. Part of the objectives for the use of the anti-plagiarism software include the ability to

influence students to avoid plagiarism, equip students with the skills of paraphrasing and acknowledging authors and other writers they cite or reference in their works.

In a related development, Appiah (2016) has considered the Turnitin (a software for detecting plagiarised content) as an effective device for controlling plagiarism in public universities in Ghana. Childers, (2016) citing Li and Bruton, 2013) reaffirmed the potential of Turnitin in dealing with plagiarism. Nonetheless, there are concerns on the extent of its helpfulness in dealing with plagiarism (Mihailova, 2006; Mulcahy and Goodacre, 2004; Savage, 2004).

The researchers also discovered another troubling contributing factor for student plagiarism, which is induced by the assessment modules employed by instructors. Some lecturers, tutors, and teachers provide favourable marks to pupils who can copy seriatim and verbatim their lesson notes, additional reading, and other learning materials that they gave or recommended to their students. Cheap Internet access could partly be blamed. Most of the pieces of the required information for completing an assignment could be found on the Internet. And such required information can be obtained at virtually negligible cost. And there is very little thought of even paraphrasing them. The canker is not only peculiar to students but the crime itself is perpetuated by those who are supposed to train students and help them understand the norms in academia (Curno, 2016).

Stappenbelt and Rowles (2009) examined the effective use of the Turnitin device in schooling students on how to do write-ups. The suggestion is that the Turnitin device has the potential to reduce the rate of plagiarism among students and consequently enhance their skills in acknowledging and properly referencing or citing other authors. Students develop a positive impression about the use of the Turnitin device as a means of reducing the incidence of

plagiarism among their colleagues. Accordingly, students have become subconsciously careful in avoiding plagiarism in the knowledge that they would be exposed and embarrassed when their works are run through the Turnitin software. A sensitisation in this manner reinforces the need for students to avoid plagiarism and imbue in them the ethical implications of safeguarding one's integrity. It seems reasonable to suggest plagiarism can be reduced through Turnitin (Batane, 2010).

However, more is needed to influence students' perception on the ethical dimensions of plagiarism. Mitigation campaigns have been ongoing since 2008 in UK higher institutions. In view of this George *et al.* (2013) have examined ways to curb the incidence of plagiarism among students. Accordingly, students involved in plagiarism were taught to rewrite their rejected assignment as remedial and those that have little knowledge on the concept were allowed to seek further understanding on paraphrasing and plagiarism. It was thus suggested that the plagiarism-reducing initiative be extended to all levels of education.

Drawing on their study, Biggam and McCann (2010) asserted that the Turnitin device acts as a vehicle for reducing plagiarism. However their admonition pointed to the design of adequate measures to control plagiarism. Biggam and McCann (2010) find that a high rate of plagiarism tends to have so many grammatically unacceptable phrases and sentences, thus making the entire work weak in quality.

Beside the above, a study conducted in Botswana suggested that the rate of plagiarism is beyond the accepted average in the University of Botswana (UB) (Batane, 2010). After a series of pilot programmes, the perception of students regarding plagiarism was changed and this reflected in reduced levels of plagiarism among them. Nonetheless, plagiarism was not completely eradicated. According to Batane (2010), Turnitin alone cannot fight the battle against

plagiarism but a holistic plan is needed to address the issue at all levels of education, and that starting from the basic levels of education is the best option (Noynaert, 2004). Students need to be advised and educated that copying from others without trying to rewrite the texts in one's own understanding psychologically douses a person's efforts in the brain and impedes a person from achieving meaningful academic progress. Accordingly, the person's potential to develop could be hampered, hence the need for institutions to create environments that make it exceptionally hard to plagiarise. It is expected that practical exercises are organised on regular bases to enhance the writing skills of students so as to avoid plagiarism. Another way of discouraging plagiarism can be in the form of punishment, which will prevent others from repeating the same habit (Anyanwu, 2004). One way in which universities have attempted to monitor and control academic integrity is through the use of text matching software such as Turnitin. However, Turnitin and other software packages used to detect similarities between text submissions have been widely acknowledge as far from perfect solution to 'solve' plagiarism as they do not inherently detect whether plagiarism has occurred. (Perkins et al. 2020; Heckler et al. 2012; Scheg 2012; McKeever, 2006). By inference, the application of the software alone cannot reduce the propensity of plagiarism among students. To achieve the desirable success in combating the menace, it requires deep commitment from faculty in the application of these interventions. Studies by Perkins et al. (2020); Pazdernik (2018) provide clear evidence of a reduction in plagiarism following a combination of initiatives, including structured educational modules, implementation of policies, increasing the difficulty of plagiarism by requiring students to submit drafts, and ensuring there are consequences of plagiarism. The fear of consequences arising from being caught committing plagiarism was also shown to be a strong deterrent to plagiarism (Perkins et al. (2020); Bennett (2005). Creating awareness could be part of the critical

measures of addressing all forms of academic dishonesty. Students usually have a strong tendency to commit academic dishonesty when they are ignorant of the implications of their actions. The thought of cheating and not being caught is another deceptive idea among students that encourages plagiarism. Hence, Betts *et al.* (2012) advocate the promotion of quality writing among first year psychology students by using the Turnitin device. The observation of lack of awareness among previous psychology students was seven out of ten and the introduction of Turnitin reduced the rate of plagiarism to one out of every ten. The foregoing example illustrates the point that academic dishonesty can be effectively minimised through the introduction of the Turnitin software (Betts *et al.*, 2012).

Furthermore, Dodigovic (2013) explored the uses of anti-plagiarism software and its influence on paraphrasing. The anti-plagiarism software directly and indirectly acts as a disciplinary mechanism and offers the platform for students to learn how to paraphrase. The use of the Turnitin device creates the condition for students to develop the skills of paraphrasing texts to skip the incidence of plagiarism. It is thought that students who are familiar with the Turnitin software have a chance of recording encouragingly low similarity indices during plagiarism checks as the familiarity with the software is thought to have a bearing on a shift in attitude (Pickard, 2007).

From the foregoing, it is least surprising to realise that institutions across the globe have devised different ways of dealing with plagiarism but there is some form of similarity in how some in the UK and USA address this academic ill (Draper, Ibezim, and Newton, 2017). These variations are considered to place students in the dilemma of choosing what has been accepted by the masses or comply with institutional rules (de Jager and Brown, 2010). It is also noted elsewhere in the literature that institutions have been unfair to students such that they have failed

to fulfill their obligation to ensure that students have knowledge on the notion of plagiarism to help them avoid being prey to this academic canker (Anyanwu, 2004)

Irrespective of how complex plagiarism might seem, offering training and hands-on practice to students equip students with the capacity of avoiding plagiarism. Students in higher institutions should be taught the right ways to paraphrase, cite authors, proper way of referencing and among others. Institutions should also avoid placing unusually high demands on students regarding course works and assignments, especially when such high demands are disproportionate to the skills and training that go with the doctrines of plagiarism.

In Australia, Smedley *et al.* (2015) examined nursing students' knowledge and understanding on plagiarism before and after intervention measures during their undergraduate programme. Part of the findings suggest that the understanding of students on plagiarism during their first year was poor and discouraging. However, after creating awareness among students, their perspective about plagiarism shifted. Exposing students to the plagiarism software equips them with the knowledge and relevant skill to handle issues concerning academic dishonesty. The inability to address the plagiarism malice may lead to the development of a culture of academic dishonesty in students from the early stages of their tertiary education experience. It is thought that allowing students access to the Turnitin software prior to the submission of their assignments could be a reasonable motivation for minimizing the incidence of plagiarism. Students who have access to anti-plagiarism software have less chances of plagiarizing their document whereas the opposite is true for students who do not have access to the Turnitin software (Baker, Thornton, and Adams, 2008). In view of this, it is imperative to make the Turnitin software accessible to students

In addition, Nova (2018) and Ali (2013) considered the extent to which the Turnitin software promotes academic integrity. To Nova and Ali, the adoption of the Turnitin software restrains the tendency of students to plagiarise. Hence, there is the need for students and lecturers to have access to the software to help them with the practical sense of how to avoid plagiarism. With that students and lecturers alike could have the opportunity to pretest their documents before using it for meaningful academic purposes. Also, lecturers should lead the campaign in ensuring that students understand how the software works. Over time, academic morals have been marred by the wrongful usage of people's intellectual property, described elsewhere as "plagiarism" and 'contract cheating' (Draper et al., 2017; Lancaster and Clarke, 2017). Part of the measures to curb this ongoing academic dishonesty or cheating fraud, resulted in the application of the Turnitin software, for checking the extent of similarity on submitted works (Batane, 2010). The broad aim is to deter and minimize plagiarism to tolerable limits (Silvey, Snowball, and Do, 2016). Hoanca, (2017) suggests a three-pronged approach to reducing the prevalence of plagiarism in higher education. Hoanca's approach is based on a three-component framework;

- The first step is educating students about the differences between quoting, paraphrasing and plagiarizing.
- Students are introduced to plagiarism detection software in use
- Follow-through i.e., reporting students to the university's administrative structures.

3. METHODOLOGY

Drawing on positivist philosophy, the study utilized quantitative research technique by empirically observing and gathering data via descriptive survey design. The researchers considered these data as given and for which reason they have no active role in formulating or

establishing them. The researchers relied on the data provided by the respondents as they afforded us a means of strengthening the internal logical integrity of the study (Brewer, 2000). The descriptive research enhances the researchers' knowledge on the issues under study in terms of the considered variables (Zikmund, *et al.*, 2012; Ethridge, 2004). Again, the researchers employed the quantitative technique to test their working assumptions or hypotheses (as indicated in the introduction) and to enrich the calculation of empirical data (Crotty, 2015). The target population consisted of students from Faculty of Art, College of Art and Built Environment, Kwame Nkrumah University of Science and Technology, Kumasi. An estimated 500 respondents were involved in the study employing Cooper and Schindler (2006) statistical formulae at 95% confidence interval.

Information regarding the motivating rationale for plagiarism was elicited as well as participants' awareness and understanding and mechanics of the Turnitin software. However, 190 responses were received recording 38% response rate. Both primary and secondary data were used for the study. Stratified sampling technique and structured questionnaires were concurrently applied to elicit information from the 190 participants. The research instruments were adopted and modified from Appiah (2016) and Sentleng and King (2012). This questionnaire contained 10 items on approaches to minimise and prevent plagiarism. These instruments were measured on Likert Scale (where 1=Strongly Disagree 2=Disagree, 3= Neutral, 4= Agree and 5= Strongly Agree). Secondary data was collected from some scientific research databases on matters of plagiarism to deepen our appreciation of the divergent issues on the subject matter. Data collected were analysed using Statistical Package for Social Sciences (SPSS) Version 23 and validated. Both descriptive and inferential analyses were conducted based on the working objectives of the study. Specifically, paired t-test, means, standard deviations and percentages were the principal

means of performing analyses in this study. Since the study took place within an academic environment the researchers adhered to pertinent institutional ethics such as informed consent, respect for privacy and strictest adherence to confidentiality, protection from harm and professional integrity.

4. FINDINGS AND DISCUSSIONS

4.1 Descriptive Statistics on Academic Plagiarism Interventions

Table 1 presents descriptive statistical results on measures targeted at discouraging students to engage in plagiarism. Observing research assignments in its entirety and not in parts could help eliminate the proclivity of students to plagiarise. For instance, below half (49%) of the respondents surveyed agreed to this observation. On the contrary, 15.6% do not consent to that assertion. About one-fourth (25%) of the total respondents were unsure. Over (51%) believed that strengthening plagiarism policies was the best approach to dealing with the plagiarism menace **as advocated by Kock**, (1999). At least 8.4% of the respondents **did** not accept this approach as an effective measure of dealing with students' plagiarism.

Table 1

Descriptive Statistics on Academic Plagiarism Interventions					
Statements	SA	A	N	D	SD
See research assignment in its entirety not in parts.	27.1%	21.9%	26.0%	13.5%	2.1%
Strengthen plagiarism policies.	51.0%	24.4%	13.5%	4.2%	4.2%
Adequate students' preparation on academic writing.	72.9%	6.3%	9.4%	4.2%	3.1%
Design questions that demand personal views from students.	57.3%	20.8%	14.6%	4.2%	1.0%
Allow individuals to answer different questions.	28.1%	14.6%	26.0%	11.5%	17.7%
Give frequent tests.	29.2%	30.2%	17.7%	11.5%	8.3%

Engage students to do more class activities.	38.5%	28.1%	20.8%	5.2%	4.2%
Discourage make up exams.	15.6%	24.0%	29.2%	10.4%	15.6%
Change curriculum.	29.2%	20.8%	30.2%	11.5%	5.2%
Develop role model attitude	42.7%	20.8%	15.6%	11.5%	6.3%
Deepen students' knowledge on plagiarism	76.0%	10.4%	3.1%	4.2%	1.0%

Source: Field Survey, 2017. Where SA=Strongly Agree; A=Agree; N=Neutral; D=Disagree; SD=Strongly Disagree

A significant majority (72.9%) agreed that adequate students' preparation on academic writing could aid in the fight against plagiarism. Meanwhile, 7.3% did not consent to training as a potent way of discouraging plagiarism. These views and perspectives reaffirm the work of Batane (2010) who suggested the idea that Turnitin alone could not fight the battle against plagiarism and therefore recounted the need for a holistic approach to address the issue at all levels of education. His contention was that starting from the basic level of education constituted the best approach. Students need to be warned ahead of time about the fact that copying from others without any effort at rewriting texts in one's own understanding psychologically impedes a person from exploring their talents in their chosen area of endeavour in terms of credible academic writing. Again, it also has implications for their potential to develop their writing skills. Hence academic institutions are advised to create environments that make it impossible to plagiarise. To this end, practical exercises should be conducted on regular bases to enhance the writing skills of students in order to avoid plagiarism. Relating this result to previous studies, Appiah and Awuah (2016) opine that undergraduate students should do well to desist from copying and pasting texts from the Internet. They further asserted that education is needed in any strategy aimed at dealing with academic plagiarism. Besides, the authors should reinforce the notion that a research assignment must be viewed in its entirety and not in parts.

A reasonable majority (57.3%) of the respondents strongly agreed to the view that to prevent plagiarism among students, tutors should design questions that demand personal views and input from students. However, than half (42.7%) of the respondents were of the view that allowing individuals to answer different questions could help in the fight against student plagiarism, 26% of the respondents were unsure about this development, 28.2% disagreed with this approach. Moreover, majority (59.2%) believed that giving frequent tests could reduce plagiarism among students, 17.7% were unsure but 19.8% disapprove of this strategy. It was realized that nearly two-thirds (63.6%) of the respondents maintained that plagiarism could be prevented when more activities were assigned in class. Meanwhile, 20.8% were unsure while 9.4% disapproved of this strategy. The study found that 39.6% supported discouraging makeup exams, 29.2% were unsure but 26% disagreed with this approach.

Half (50%) of the respondents supported change of curriculum to deal with students' plagiarism, while one-third (30.2%) were undecided and 16.7% disagreed. In addition, a large majority (63.5%) consented to developing role model attitudes as a strategy to effectively reducing plagiarism among students but 17.8% disagreed. Finally, a significant majority (86.4%) supported deepening students' knowledge on plagiarism as a means to dealing with plagiarism. Anyanwu's (2004) study of alleged students' plagiarism, indicated that academic institutions have been unfair to students to the extent that they have failed to fulfill their obligation to ensure that students have adequate knowledge on the concept and implications of plagiarism. To Anyanwu, the awareness is critical in helping students avoid being victims to the embarrassing experiences of scholarly cheating or fraud. Irrespective of how complex plagiarism might seem, offering training and hands-on experience to students could have better chances of improving students' ability to avoid plagiarism. Drawing on the point that sometimes the concept of

plagiarism is ambiguous and lacks a common understanding, including the criteria for determining the commission of plagiarism, Anyanwu (2004) suggested, quite appropriately, that there was the need to develop rules to govern the threshold that constitutes academic dishonesty. Students in higher academic institutions should be taught **how** to paraphrase, cite authors, reference their texts and among others.

4.2 T-test Results on Plagiarism Interventions

Table 2 presents T-Test results on Academic Plagiarism Interventions. The survey found significant statistical mean difference ($t_{184} = 10.97$, $p\text{-value} = 0.000 < 0.05$) between prior and post Turnitin percentage scores regarding students' plagiarised work. On average the study found prior Turnitin scores were 23.59% points higher than post Turnitin (95% CI [19.34, 27.84]). This result supports several related studies on plagiarism interventions involving technology deployment. For instance, Appiah (2016) contends that Turnitin is effective in dealing with plagiarism. Similarly, Stappenbelt and Rowles (2009) maintain the productive use of the Turnitin software in training students on how to engage in scholarly writing or academic write-ups. It is thought Turnitin was able to reduce the rate of plagiarism among students and has enhanced their skills in acknowledging other authors in their assignments and written texts. Students appear to be positive about the use of the Turnitin to reduce the incidence of plagiarism in their works. And they tend to be careful about plagiarism when they know their works will be tested through the software. In a related development, Ali (2013) examined ways to curb the incidence of plagiarism among faculty and students in the United Kingdom and further suggested mitigation campaigns have been ongoing since 2008 in UK higher institutions. Students involved in plagiarism were tutored to rewrite it as remedial and those that have little knowledge on the concept were allowed to seek further understanding on paraphrasing and plagiarism. George *et*

al. (2013) advanced the idea that the anti-plagiarism initiative should be extended to all levels of education.

Again, Biggam and McCann (2010) presume the Turnitin software acts as a vehicle for reducing plagiarism. Although students had knowledge on to the Turnitin while doing their research, traces of plagiarism were identified in their final works. During the plagiarism testing, students were found to have been involved in direct copying while others replaced words with their synonyms.

Furthermore, the study found significant statistical mean differences ($t_{173} = 30.93$, $p\text{-value} = 0.000 < 0.05$) between a group of students who see research assignment in its entirety and those who see it in parts. On average, students who have never treated writing an assignment in its entirety and not in parts were 2.64 points higher than those who did not (95% CI [2.48, 281]). The study found significant statistical mean differences ($t_{185} = 39.45$, $p\text{-value} = 0.000 < 0.05$) between a group of students who considered strengthening plagiarism policies as a means to avert the practice and those who did not. Interestingly, students who agreed to strengthening plagiarism policies were 3.17 points higher than those who did not (95% CI [3.01, 3.33]).

Table 2

T-test Results on Prevention of Academic Plagiarism					
Statements	t-value	df	95%CI	P-value	MD
See research assignment in its entirety not in parts.	30.93	173	2.48-2.81	0.000	2.64
Strengthen plagiarism policies.	39.45	185	3.01-3.33	0.000	3.17
Adequate students' preparation on academic writing.	44.92	183	3.33-3.63	0.000	3.48
Design questions that demand personal views from students.	21.29	187	3.18-3.46	0.000	3.32
Allow individuals to answer different questions	28.31	187	2.04-2.45	0.000	2.24
Give frequent tests.	36.39	185	2.44-2.81	0.000	2.62

Engage students to do more class activities.	36.39	185	2.79-3.11	0.000	2.95
Discourage make up exams.	22.37	181	1.95-2.33	0.000	2.14
Change curriculum.	29.76	185	2.42-2.76	0.000	2.59
Develop role model attitude	30.33	185	2.66-3.03	0.000	2.85
Deepen students' knowledge on plagiarism	59.11	181	3.53-3.77	0.000	3.65

The researchers found significant statistical mean differences ($t_{183} = 44.92$, $p\text{-value} = 0.000 < 0.05$) between a group of students who considered adequate students preparation on academic writing as a means to avert the unhealthy academic practice and those who did not. Overall, the number of students who agreed to adequate students' preparation on academic writing were 3.48 points higher than those who did not (95% CI [3.33, 3.63]).

Another finding from the study was significant statistical mean differences ($t_{187} = 21.29$, $p\text{-value} = 0.000 < 0.05$) between a group of students who considered designing questions that demand personal view from students as a means to avert the practice and those who do not. On average students who agreed on designing questions that demand personal view from students were 3.32 points higher than those who do not (95% CI [3.18-3.46]). The researchers found significant statistical mean differences ($t_{187} = 28.31$, $p\text{-value} = 0.000 < 0.05$) between a group of students who considered allowing individuals to answer different questions as a means to avert the practice and those who do not. The total number of students who agreed on allowing individuals to answer different questions were 2.24 points higher than those who do not (95% CI [2.04, 2.45]). The researchers also found significant statistical mean differences ($t_{185} = 36.39$, $p\text{-value} = 0.000 < 0.05$) between a group of students who considered giving frequent tests as a

means to avert the practice and those who do not. Overall, the number of students who agreed to give frequent tests were 2.62 points higher than those who did not (95% CI [2.44, 2.81]).

The study found significant statistical ($t_{185} = 36.39$, $p\text{-value} = 0.000 < 0.05$) mean differences between groups of students who considered engaging students to do more class activities as a means to averting the practice and those who do not. On average students who agreed, engage students to do more class activities were 2.95 points higher than those who plagiarised (95% CI [2.79, 3.11]). The study found significant statistical ($t_{181} = 22.37$, $p\text{-value} = 0.000 < 0.05$) mean differences between groups of students who considered discourage make up tests as a means to avert the practice and those who do not. On average students who agreed discourage make up tests were 2.95 points higher than those who plagiarised (95% CI [1.95, 2.33]).

The study found significant statistical mean differences ($t_{185} = 29.76$, $p\text{-value} = 0.000 < 0.05$) between a group of students who considered changing curriculum as a means to avert the practice and those who do not. On average students who agreed to changing curriculum were 2.59 points higher than those who did not (95% CI [2.42, 2.76]). The study found significant statistical mean differences ($t_{185} = 30.33$, $p\text{-value} = 0.000 < 0.05$) between a group of students who considered developing a role model attitude as a means to avert the practice and those who do not. On average students who agreed were 2.85 points higher than those who did not (95% CI [2.66, 3.03]). The study found significant statistical mean differences ($t_{185} = 59.11$, $p\text{-value} = 0.000 < 0.05$) between a group who considered deepening student's knowledge on plagiarism as a means to avert the practice and those who do not. On average students who agreed to deepen students' knowledge on plagiarism were 3.65 points higher than those who did not (95% CI [3.53-3.77]).

4.3 Relative Important Index on Plagiarism Interventions

Table 3 presents relative importance index results on plagiarism interventions. The various prevention techniques of plagiarism were ranked using, relative importance index to determine prevention of academic dishonesty and cheating. The survey found that deepening students' knowledge on plagiarism was a major means of preventing plagiarism infringement. Adequate students' preparation on academic writing was the second in the pecking order of academic dishonesty among students while the last plagiarism infringement prevention technique was designing questions that demanded personal view from students. Strengthening plagiarism policies was ranked as the fourth in the scale of preference as a measure of discouraging plagiarism among students. Again, engaging students to do more class activities was ranked fifth, developing a role model attitude for students was ranked sixth as ways to prevent academic dishonesty. Also giving frequent tests, changing curriculum, seeing research assignments in its entirety and not in parts, allowing individuals to answer different questions and discourage make up exams were respectively ranked the 7th to 11th way to prevent students' plagiarism.

Table 3

Relative Important Index on Prevention of Academic Plagiarism				
Statements	Mean \pm SD	RII	Rank	RII Index
See research assignment in its entirety not in parts.	3.64 \pm 1.13	0.66	9 th	Medium important
Strengthen plagiarism policies.	4.17 \pm 1.09	0.81	4 th	Medium important
Train students on academic writing	4.48 \pm 1.05	0.86	2 nd	High important
Design questions that demand personal views from students.	4.32 \pm 0.95	0.85	3 rd	High important
Allow individuals to answer different questions	3.24 \pm 1.45	0.64	10 th	Low important
Give frequent tests.	3.62 \pm 1.26	0.70	7 th	Medium important
Engage students to do more class activities.	3.95 \pm 1.10	0.76	5 th	Medium important
Discourage make up exams.	3.14 \pm 1.29	0.59	11 th	Low important
Change curriculum.	3.59 \pm 1.19	0.69	8 th	Medium important
Develop role model attitude	3.85 \pm 1.28	0.75	6 th	Medium important
Deepen students' knowledge on plagiarism	4.65 \pm 0.83	0.88	1 st	High important

Source: Field Survey, 2017. To measure the relative importance of each factor or variable used indices of range 0.85-1.00=High important; 0.65-0.84=Medium important; 0.00-0.64=Low important

5. IMPLICATIONS

This study was conducted to examine the interventions aimed at minimising the incidence of plagiarism among students at the Kwame Nkrumah University of Science and Technology, Kumasi. The study employed descriptive research design and quantitative research approach. Also, it adopted stratified sampling technique to randomly select 500 students from the Faculty of Arts to participate in the study out of which 190 responses were obtained. Part of the findings suggests that students are most likely to abandon plagiarism tendencies when they become aware that their projects/assignments would be checked through appropriate technological software (Turnitin). The study discovered a significant statistical mean difference ($t_{184} = 10.97$, $p\text{-value} = 0.000 < 0.05$) between prior and post Turnitin percentage

scores regarding students' plagiarism checks. The study found, on average, that prior Turnitin scores were 23.59% points higher than post Turnitin. The study concludes that covert and overt techniques are the best approaches to ascertain undergraduate students' plagiarism tendencies. The former helps to establish the causes while the latter had proven to be more productive in preventing plagiarised work among undergraduate students. It is the considered view of this paper that software deployment is the best approach to combating the scourge of undergraduate plagiarism. Moreover, students' skills development and determined policies are pivotal in the fight against plagiarism. Adequate students' preparation on academic write-ups are probably another influential set of powerful tools to minimize and diminish the popularity of the canker of plagiarism among undergraduate students. A critical look at the survey analyses implied that plagiarism cannot be completely eradicated irrespective of the applied approaches to addressing this form of academic dishonesty. Though they constitute a minority, about 7.3% rejected the idea that adequate students' preparation on academic writings has the capacity to fight the attitude of plagiarism among students. Similarly, about 5.3% students were of the opinion that deepening students' knowledge on plagiarism has no influence on changing the perception of students about the phenomenon.

These notwithstanding, the study revealed that allowing individuals to answer different questions, designing questions that demands personal view from students, as well as engaging students to do more class activities have their own shortfalls. This reflects the notion that not one approach can be altogether effective in dealing with plagiarism among students. A pragmatic technique aimed at understanding the unique nature of students' attitude to academic work is therefore encouraged. The essence is to ensure a sensible means of minimising academic

dishonesty to a level that is acceptable in enhancing the confidence level of students in their own academic write-ups.

Conclusion

In conclusion, The researchers anticipate future research should delve into the application of qualitative research techniques designed to bring our real stories of the rationale that drives the penchant for students' propensity (both at the undergraduate and postgraduate levels) to plagiarise. This would help unearth the narratives stimulating the various motivations underlying plagiarism in our academic institutions. In addition, it would be interesting to see studies that would apply the philosophical assumptions of mixed research methods designed to determine the nature of the phenomenon at the postgraduate level. The researchers recommend the need for organizational structures to deal with the 'menace', plagiarism awareness programmes for students and faculty. Finally, a concerted effort and commitment by students and faculty in combating plagiarism at Kwame Nkrumah University of Science and Technology, Kumasi (KNUST) could promote intellectual integrity in the university.

Ethical Approval:

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

Consent

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

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