

# Viewpoint of Undergraduate Engineering Students on Plagiarism

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## Abstract

Undoubtedly, plagiarism has been a global-concern, especially so, in institutions of higher-learning. Furthermore, over the past-decades, cases of student-plagiarism, in higher-education, have increased, substantially. This-issue cannot be taken, without due-consideration, and it is crucial for educators, and universities, at large, to find the best-ways, to discourage and reduce the acts of students' plagiarism. The aim of this-study, therefore, was to address plagiarism in professional-university-education from undergraduate-engineering-students' attitudinal-perspective. In particular, to ascertain how plagiarism is defined by the students; which factors, they perceive, exacerbate plagiarism; how they justify plagiarism; and severity and penalty related to the misconduct. This-paper illustrates a fraction of a larger-research on plagiarism at the School of Engineering. The study-design used a descriptive-survey-approach and a document-analysis. A designed confidential self-report-questioner was applied as the main-instrument for this-study, with the sample-size (N=25), and a response-rate (RR=84%). The tool was pre-tested to ensure its validity and reliability. The data-collection-instrument was subjected to the statistical-analysis to determine its reliability via Cronbach's alpha-coefficient, and found high inter-item consistency ( $\alpha > 0.9$ ). The major-results of this-study revealed overall and widespread-deficiency in students' understanding of plagiarism; also more than half of the students, in the-subject-sample, were not adequately-informed about plagiarism in academic-writing; 76% of the respondents agreed, that those who say, they have never plagiarized, are lying; and also that everyone else around are plagiarizing (e.g., students, researchers, and academic-staff); 48% of the respondents agreed, that they keep on plagiarizing, because they have not been caught yet, while 33% stated, that they are tempted to plagiarize because, even if caught, the punishment (if any) will be light (the reward outweighs the risk). Several-specific-recommendations, on how to fight plagiarism, were provided, alongside with identification of areas for further-research. This-study would offer awareness to the undergraduates, lecturers, and the faculty-administrators, on the gravity of plagiarism-acts and how to avoid it, in the university. The study also will make a contribution (in its small-way) to the body of knowledge on the subject-matter.

**Keywords:** Plagiarism, undergraduate, engineering, students.

## 1. Introduction

### 1.1. Plagiarism concept

Everybody in education knows, that plagiarism is something-unethical, and should, therefore, be avoided; but not everyone, however, is confident on its-exact-meaning. Plagiarism is a concept that is not that straightforward, it can be interpreted from numerous-perspectives (Bretag, 2013).

Following is a list of selected-definitions of plagiarism: (1) "One or more passages, that was, word-for-word, the same as another-source, without appropriate-citation and quotation-marks" (Belter & DuPre, 2009); (2) "Using parts, or the whole, of a text, written by another-person, without acknowledgement; submitting the same-paper or parts of it, for credit in more-than-one course, falsification of information" (Colnerud & Rosander, 2009); (3) "Presenting, as one's own, the ideas or words of another-person or persons for academic-evaluation, without proper acknowledgement" (Hard *et al.*, 2006); (4) "Plagiarism involves, literary, theft, stealing (by copying) the words or ideas, of someone else, and passing them-off as one's own, without crediting the source" (Park, 2003); (5) "Using somebody else's work (words and thoughts), without attribution" (Wang, 2008); (6) "Any nonzero percentage detected by TurnItIn (after screening)" (Williams *et al.*, 2010).

A cohesive-elaboration on the above-definitions, is, that plagiarism, is the practice of taking (in its original or slightly-changed-form) someone else's intellectual-property (work, ideas, data, graphs, tables, figures, the spoken-word, graphics, music, photos, poetry, art, audio-clips, and videos from various-media, among others) and passing-them-off as one's own, with no proper and sufficient-acknowledgement, or citation.

### 1.2. Global concern about plagiarism

Undoubtedly, plagiarism has been a global-concern, especially so, in institutions of higher-learning, where, according to Purdy (2009), it has allegedly "reached epidemic-proportions" in student-writing. Moreover, over the past-decades, cases of student-plagiarism in higher-education have increased, substantially (Dee & Jacob, 2012). Some-researchers also claim, that intentional-plagiarism has increased-dramatically, because of the ease of access to information via the Internet (Robinson-Zanartu *et al.*, 2005), and other electronic media-tools have made it easier, for students, to access and use electronic-information (Martin, 2005).

Before 90s, plagiarism was only limited to the printed-sources, such as: books, encyclopedias,

newspapers, and articles from journals, among others; some of which were, apparently, even, not readily or easily-available. In addition, plagiarizing-process, in itself, was rather-wearisome, as one, would, most-likely, after finding the relevant-material, copy text by-hand from a book, an encyclopedia, a newspaper and alike. However, in the 90s, the discovery of internet, has, indeed, amplified the prospect to a scale of a gigantic-plagiarism (indiscriminately-copying of people's works and ideas), due to easy-access to a huge-amount of information (from articles and papers presented or published in prestigious-conferences, journals to websites with texts, written by anonymous-persons), and the fact, that the information can easily be downloaded for one's own-purposes, 24/7, from the worldwide-web (Baruchson-Arbib & Yaari, 2004). This easy-access to the largest-collection of data in the world happens, regardless of one's physical-geographical-location, bringing all the required-information, instantaneously, and from different-search-engines. In addition, the key feature of the GII (Global Information Infrastructure)-its ability to render works of authorship, pervasively and simultaneously, accessible throughout the world, also contributed to wide-spread plagiarism.

Moreover, a well-known and convenient "copy and paste" capability of our-computers, allows for swift and uncomplicated-edit and tailoring of any-published-on the web-material. On the-other-hand, this uncontrollable-usage of the internet is not always done, in the proper-way, by the end-users, and combined with deteriorating-ethical-values of students (Gross, 2011) facilitates the high-prevalence of plagiarism.

Although some-educators excited about the abundance of portable-i-technologies and easy-internet-access, and look for ways, to integrate digital-literacy and writing, into their-classrooms, there is also a kind of anarchy and a twisting of copyright-boundaries on the Web, as some-students assume, that all of the "free" material, available on the Internet, is not governed by the same-rules, as for printed-materials. Moreover, Foltynek *et al.* (2014) also mention the students' limited-awareness of the meaning of copyright and intellectual-property-rights.

Some-students are also, often, not very-familiar with the diverse-complexities of the description of plagiarism; in addition, students are not very-sure on how, precisely, to perform, correctly, citing and referencing, in a text. Hence, undergraduate-students fall into the plagiarism-trap, somewhat, recurrently, without being fully-aware of their-infringements of the academic-integrity. Furthermore, students, wrongly underestimate, the importance or the severity of plagiarism and seem to belittle and justify their and their-fellow-students' behavior (Park, 2003).

### 1.3. Previous studies

Plagiarism has remained a significant-area of concern, for researchers and educators, since an early-study of university-students' self-reported academic-misconduct by Bowers (1964), found that three-quarters of respondents (and, in some instances, even-higher) had engaged in academically-dishonest-practices (Brimble & Stevenson-Clarke, 2005). Other-studies also found the highest-incidences of cheating (Newstead *et al.*, 1996) and "potential plagiarism" (McCullough & Holmberg, 2005), in science, engineering and technology-courses.

Since then, numerous-studies had been conducted, regarding the issue of academic-dishonesty or plagiarism, in higher-education, for example: Franzky *et al.* (2015); Dee & Jacob (2012); Ryan *et al.* (2009); Devlin & Gray (2007), and Marshall & Garry (2006), to mention just a few.

Plagiarism is a multifaceted-problem, which has been studied, using a variety of frameworks. Some-research has focused on student-characteristics, which predict a greater-likelihood of committing plagiarism, including levels of moral-reasoning and self-esteem, as well as achievement and motivation-orientations (Williams *et al.*, 2010; Rettinger & Kramer, 2009; Angell, 2006). This-perspective attributes the decision to plagiarize to characteristics of the students, discounting outside-factors, which might contribute to the choice to plagiarize.

Other-research has regarded incidents of plagiarism, as being the result of teaching-style (Barnas, 2000) or classroom-culture (Brown, 2012; Feldman, 2001), indicating the cause of plagiarism originates outside the student. From these-perspectives, instructors, are seen as contributing to students' beliefs that, they can submit another author's work as their-own, by not providing an adequate-level of rigor in their-classrooms or by not checking student'-work for plagiarism.

Unintentional-plagiarism has also been used as a framework for research (Belter & Du Pre, 2009; Blum, 2009; Colnerud & Rosander, 2009). This-viewpoint often raises the question of whether students should be penalized, when they are unaware they have plagiarized, and who are still learning to write academic-papers and should not be, therefore, expected to fully-understand how to avoid plagiarism.

Ethics, and in particular, integrity, is another-focus of the research on plagiarism (Hart & Morgan, 2010; Kwong *et al.*, 2010; Conway & Groshek, 2009; Kuther, 2003; McCabe *et al.*, 2001). That-body of work examines plagiarism at the student, instructor, and institution-levels, and emphasizes the need for institutions to convey the importance of honesty to students and for faculty, to model ethical-behavior for them.

More-recently, the focus of plagiarism-research has been on technology-facilitated electronic-access to a text, as a primary-cause of the increase in the number of incidents of plagiarism (Trushell *et al.*, 2012; Jones,

2011; Wang, 2008). This-method of plagiarism has become increasingly-widespread; through the effortless-process of “copying and pasting” and also the fact, that some-students may believe information on the internet does not belong to a particular-author, as being in public-domain, and, therefore, can legitimately be used by them, in course-assignments, and even in thesis-writing.

On the-other-hand, determining the true-prevalence of plagiarism (due to its completely-unpredicted human-behaviors) in higher-education is a challenge, in itself; even so, studies that have asked students to anonymously self-report their-own-acts of plagiarism have found, that between 7% and 55% of university-students, openly-admit, to some-form of intentional-plagiarism (Kraemer, 2008; Selwyn 2008; Carroll 2005; McCabe *et al.*, 2002; Scanlon & Newman, 2002; Roig, 1997), with 9.6% in Scanlon & Neumann’s (2002)-study exposed that they did it “every so often”. For instance, self-reports of plagiarism indicate that anywhere from 30% to 60% of students have engaged in some-form of plagiarism, as least once, in their-academic-career, with more than 10%, admitting to engaging in substantial-amounts of plagiarism (Hughes & McCabe, 2006; McGowan, 2005; Breen & Maassen, 2005; McCabe *et al.*, 2004; Underwood & Szabo, 2003). It has been further-suggested, that these-estimates may, in fact, underestimate the true-prevalence of plagiarism, given that they are derived from students’ self-reported-transgressions (Selwyn, 2008), and hence, research remains inconsistent, in prevalence estimates and suggested-signs of plagiarism.

Educationalists, also indicated several-problems, associated with students’ plagiarism (Roig, 2006; McCabe 2004). Yet, many-faculties do not implement adequate-safeguards, to eliminate or minimize, situations related to plagiarism (Carroll, 2004). While plagiarism is a widespread-problem, students believe, that plagiarism occurs more-often, than it does, and they generally-attribute the high-rate of incidents to strangers, rather than people they know, or themselves (Engler *et al.*, 2008).

Only a few-studies have been conducted to explore students’ perceptions of plagiarism, and these tend to focus only on the reasons, why students plagiarize (Devlin & Gray, 2007; Marsden *et al.*, 2005). Engler *et al.* (2008) and Hard *et al.* (2006), and the current-study, looked at plagiarism from the perspective of social/peer norms. According to social norms theory, individuals learn which behaviors are appropriate, by observing the generally-accepted-behavior of others.

#### 1.4. Research purpose

Plagiarism is a complex and debatable-issue in higher-education, it is perceived, by many, to be wide-spread and increasing, among university-students (Flint *et al.*, 2006; Larkham & Manns, 2002). To confirm this, following-illustrative-examples are presented: Marshall and Garry (2005), conducted a study, on 181 students, at a medium-sized New Zealand University, and revealed, that 72% of the respondents admitted, that they had engaged in different-forms of plagiarism. Also, according to a 2003 study, by Donald McCabe, 38 % of students admitted to “cut-and-paste” Internet-plagiarism in their-previous-year of study.

Moreover, because, currently, there is no legal-framework, such as “Plagiarism Policy” or alike, available, in Moi University to tackle the issue, the academic-staff of SOE finds defining, detecting students’ plagiarism and acting upon it, quite-complex and, sometimes, confusing and also time-consuming, and, therefore, hardly ever performed; hence plagiarism, goes, largely, uncorrected and unpunished. In addition, many-studies of plagiarism do not provide an operational-definition of it, seeming to assume that there is a one-common-understanding, which does not need further-clarification. Powers (2009), however, points-out, that this can affect research-findings, because students’ self-reports of plagiarism are affected by an-individual-understanding of the practices, which could be considered plagiarism. Further, faculty and students often disagree, about exactly what constitutes plagiarism (Kwong *et al.*, 2010).

The aim of the-study, therefore, was to address plagiarism in a professional-university-education, from an undergraduate-engineering-students’ attitudinal-perspective. In particular, to ascertain how plagiarism is defined by the students; which factors, they perceive, exacerbate plagiarism; how they justify plagiarism; and severity and penalty, related to the misconduct.

This-study would provide awareness to the undergraduates, lecturers, and the faculty-administrators, on the gravity of plagiarism-acts in the university. This-issue cannot be taken, without suitable and thoughtful-consideration, and it is crucial for the educators, and the university, at large, to find the best-ways, to discourage and reduce the acts of students’ plagiarism. Moreover, this-study, expectantly, will make a contribution (in its small-way) to the body of knowledge on the subject-matter.

#### 1.5. Types of plagiarism

Overall, plagiarism can be categorized into four-types (Vij *et al.*, 2009): (1) “Complete Plagiarism” – complete copy from one or more-sources, (2) “Copy and paste” – use information edited from digital-sources, (3) “Word Switch” – copy a part of text and do slight-changes, and (4) “Self-plagiarism” – reuse of your previous-work and submit it, as a new-work.

Figure 1 shows 10 sub-types of plagiarism, on a more deeper-level, identifying their-seriousness and

communes; the graph is followed by a brief-concept of each-sub-type, according to iThenticate (2013):

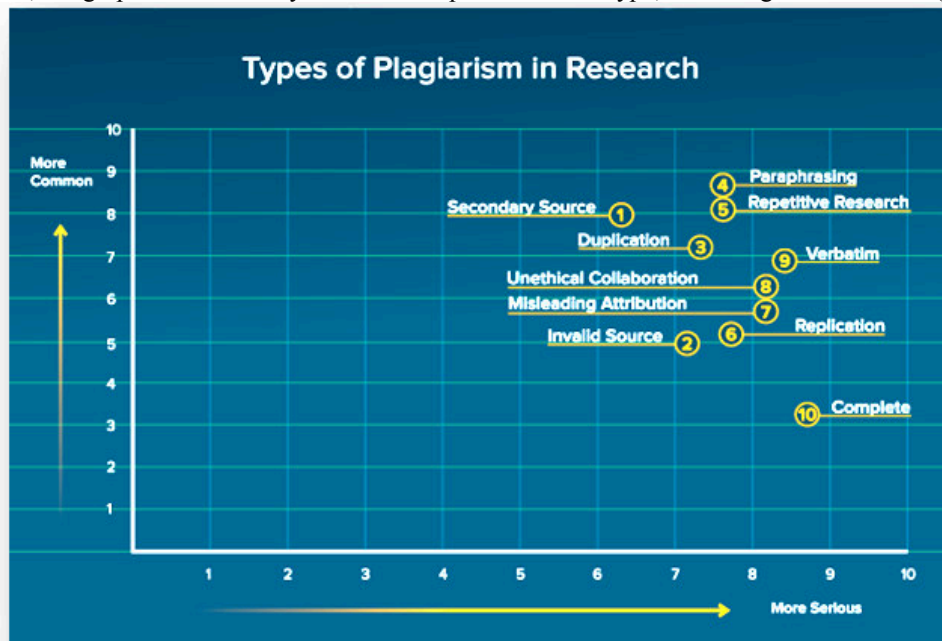


Figure 1: Types of plagairism, showing their seriousness and commonness (iThenticate, 2013).

- 1) Secondary Source (*Inaccurate Citation*) happens, when a researcher uses a secondary-source, like a meta-study, but only cites the primary-sources, contained within the secondary-one. It is not only fails to attribute the work of the authors of the secondary-sources, but also provides a false-sense of the amount of review, that went into the research.
- 2) Invalid Source (*Misleading-citations, Fabrication, and Falsification*) occurs when researchers reference either an incorrect or nonexistent-source. Though this may be the result of sloppy-research, rather than intent to deceive, it can also be an attempt to increase the list of references and hide inadequate-research.
- 3) Duplication (*Self-plagiarism, Reuse*) happens, when a researcher reuses work from their-previous studies and papers, without attribution. The ethics of duplication is highly-debated, and often depends upon the content copied.
- 4) Paraphrasing (*Plagiarism, Intellectual-theft*) is taking another's person's writing and changing the words, making it appears that an idea, or even a piece of research, is original, when, in truth, it came from an incited-outside-source. It ranges from the simple-rephrasing to completely rewriting content, while maintaining the original-idea or concept.
- 5) Repetitive Research (*Self-plagiarism, Reuse*) is the repeating of data or text, from a similar-study with a similar-methodology, in a new-study, without proper-attribution. This often happens, when studies on a related-topic are repeated with similar-results, but the earlier-research is not cited properly.
- 6) Replication (*Author Submission Violation*) is the submission of a paper to multiple-publications, resulting in the same-manuscript, being published more-than-once. This can be an ethical-infracton, particularly, when a researcher claims that a paper is new, when it has been published elsewhere.
- 7) Misleading Attribution (*Inaccurate Authorship*) is an inaccurate or insufficient-list of authors, who contributed to a manuscript. This happens when authors are denied credit, for partial or significant contributions made to a study, or the opposite-when authors are cited in a paper, although no contributions were made.
- 8) Unethical Collaboration (*Inaccurate Authorship*) happens when people who are working together violate a code of conduct. Using written-work, outcomes and ideas, that are the result of collaboration, without citing the collaborative nature of the study and participants involved, is unethical.
- 9) Verbatim Plagiarism (*Copy & paste*) -is the copying another's words and works, without providing proper-attribution, indentation or quotation marks. This can take two-forms: (a) plagiarist may cite the source they borrowed from, but not indicate it is a direct-quote, (b) no attribution, at all, is provided, essentially claiming the words of someone else to be their-own.
- 10) Complete Plagiarism (*Intellectual-theft, Stealing*) - is an extreme-scenario, when a researcher takes

a study or other-work from another-researcher and simply resubmits it, under his/her-name. Any academician, who has written or evaluated a paper, an assignment, or a thesis, knows that plagiarism is not always a “black-and-white” issue. The boundary between plagiarism and ethical-research-work is, often, unclear. Learning to recognize the various-forms of plagiarism, especially the more-vague-ones, is an important-step, in the battle, to prevent, or reduce, its occurrence.

### 1.5 Reasons for students to plagiarize

In order to teach students how to avoid plagiarizing, it may be helpful to appreciate some of the reasons, which increase the tendency to plagiarize.

The literature on plagiarism offers many-different-reasons for student-plagiarism. These include, but are not limited to: time, to complete tasks (poor-time-management); perceived disjuncture between award (grade) and effort-required; too-much-work to complete over too-many-subjects; pressure, to do well; perceptions, that students will not get caught; motivation and self-motivation; and individual-factors (Roig & Caso, 2005; Sheard *et al.*, 2003; Park, 2003; Caruana *et al.*, 2000). These-studies tend to focus on individual-student-characteristics.

Devlin & Gray (2007) and Aluede *et al.* (2006), also found-out, that there were many-other-reasons, why students do plagiarize. These include: desire for a better-grade; pressures, include time-pressure, stress, pressure from the family and society; poor-academic-skills; poor-understanding of plagiarism; and peer-influence, among others. Well-known-researchers, in the area of academic-misconduct, such as Whitley (1998) and McCabe (1992), had initiated identification of the factors that influence academic-dishonesty in colleges and universities. These include: competition for good-grades, tremendously-demanding and unfair-instructional-situations, uncaring or indifferent-faculty to their-own-teaching or to their students’ learning; negligent-attitudes on the part of the faculty, towards academic-dishonesty; peer-pressures, to support a friend; a withdraw sense of academic-integrity and ethical-values, among students (Aluede *et al.*, 2006).

In addition, it has been suggested, that the factors-exacerbating-plagiarism are both, individual and institutional in nature. Specifically, individual-factors found to relate to plagiarist behaviors include: age; sex; personal and professional-pressures; language-skills; cultural-background; competitiveness; and self-efficacy (Martin *et al.*, 2011; Song-Turner, 2008; Devlin & Gray, 2007; Breen & Maassen, 2005). Institutional-factors that have been suggested, as potential-precursors of plagiarism, include: mild or non-existent-punishments for plagiarism; the absence of academic-integrity-policies; insufficient-level of knowledge-application in academic-assessments; and a lack of explicit-instruction for academic-writing (Gullifer & Tyson, 2010; Ryan *et al.*, 2009; Sutherland-Smith, 2008; Zimitat, 2008; Ellery, 2008; Marshall & Garry, 2006; Bamford & Sergiou, 2005; Harris, 2001).

Additional-factors, that have been suggested, to exacerbate-plagiarist-behaviors, include “electronic-opportunism” (capitalizing on the increasing electronic-availability of scholarly-works and students’ declining-perceptions of plagiarism, as a serious-offense (Baruchson-Arbib & Yaari, 2004). For example, Cheat House website (<http://cheathouse.com>), advertises “Thousands of free-essays in over 130 categories, leading the commercialized-plagiarism-industry, since 1995”. A student has access to over 10,000 papers free, if they agree to contribute to the database. Each article is “ranked” with a smiley-face from previous-customer-satisfaction. Cheat House does not limit itself to sharing essays, it also advertises as a “database of essays, term-papers, reports, assignments, study-notes, book reports and anything-else, you can imagine, a student benefiting from seeing. In addition, there is an increasing-perception, that plagiarizing is a necessary “equalizer”, in the context of faculty-members, often turning a “blind-eye” to students’ plagiarism-practices (McCabe *et al.*, 2001).

Perfectionism, procrastination and circumstances, beyond the student’s control, are the factors influencing plagiarism attitude, as stated by Tamashiro (1998), and coming from cultures, where imitating another-writer is a form of flattery (Oliphant, 2001 ) or where intellectual-property, the legal-concept that a person can “own” an-idea, is inconceivable, as Bowden (1996) emphasizes in his-study.

Further-factors, pointed-out in the studies of Relph & Randle (2006) and Sheard *et al.* (2002) are: less contact with the lecturer, due to large-class-size; lack of interest (students may believe an assignment to be busywork, or that the teacher does not read their-essays, carefully or with honest-interest; they are, therefore, unwilling to work, if their-effort will not be recognized; lack of investment (students may see some-classes, as more-relevant to their-education, than others, or may not be fully invested in the ideal of intellectual inquiry); lack of abilities (students may be unprepared, to tackle a given assignment, but too-embarrassed to seek help); and, finally, plagiarism-detection-tools available.

The persistent-influence of competitiveness in university-life and the achievement of individual-academic-goals, through whatever-means-possible, is another-overall-important influencing factor (Austin *et al.*, 2005; Aggarwal *et al.*, 2002).

If plagiarism is deemed to have taken-place, the reasons why it has happened, are, however, not taken into consideration.

## 2. Materials and Methods

The theoretical-framework for this-article is supplied by the common-impression of a university, as an organization and a social-institution. The-research adopted an explanatory-approach of descriptive-survey research-design. The study was superficially-divided into 3 sequential-parts, which shown in self-explanatory Figure 2.

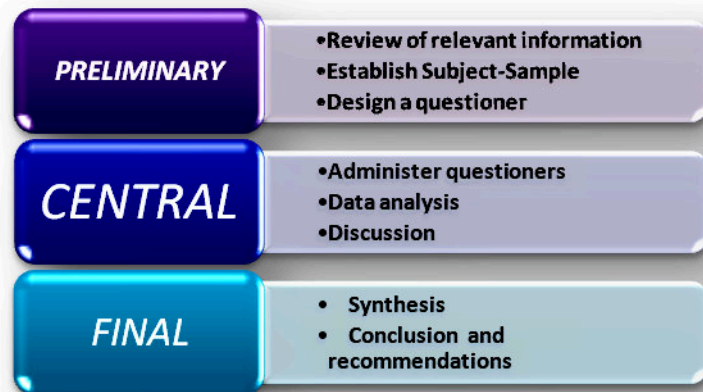


Figure 2: Sequential-parts of the study(Starovoytova & Namango, 2016).

### 2.1. The theory and approaches relevant to the study

There are numerous-theories and models, related to the cheating-behavior (see Starovoytova *et al.*, 2016), this-study, however, was focused on the Attribution Theory (see details in Starovoytova *et al.*, 2016), Theory of Planned Behavior and Social Norms Theory (see Starovoytova *et al.*, 2016). A document-analysis, a well-established (on its own-right)-method, was also used in this-study.

### 2.2 Sample-size and rationale for its selection

25 fifth-year engineering-students (N=25), from the MIT (Manufacturing, Industrial & Textile Engineering) Degree program, SOE, Moi University (MU), were invited to complete a questionnaire (developed for the purpose of the study). The choice of 5<sup>th</sup> (final-year) students was based on the-assumption, that all of them have already been involved in different-types of research-assignments, and therefore, are considered, to be knowledgeable-enough on the subject-matter. MIT department was chosen, due to its most-diverse specialization-nature, in comparison to other 5 departments of SOE. Interested-readers could refer to Starovoytova *et al.*, (2015) to find informative-synopsis regarding: Kenya, and its educational-system, as well as, valuable-particulars, on MU and SOE, where the-study was conducted.

### 2.3. Questionnaire and its administration

Questionnaires are a standard-tool for measuring attitudes (Babbie, 2010; Ajzen, 2006), and numerous-studies have used different-questionnaires, to evaluate attitudes, toward plagiarism (COAM, 2007; Rennie & Crosby, 2001; Harris, 2001), however, most of them, are focused on only the “attitude” of the participants toward plagiarism. (Rennie & Crosby (2001); Elzubeir & Rizk (2003); Mavrinac *et al.* (2010).

The questionnaire was developed, based on the relevant-literature (Mavrinac *et al.* (2010); Ryan *et al.* (2009); Elzubeir & Rizk (2003); Rennie & Crosby (2001). In questionnaire development, Ajzen’s theory of planned behavior (TPB) was chosen, as a model, to predict the intention to plagiarize. TPB is a relevant-predictive-model of academic-dishonesty, which explains behavior, as a final-act, anticipated by logical-thinking (Jordan, 2001). The study implemented a style of projective-technique, by asking questionnaire-respondents questions about plagiarism at SOE. The subject-sensitivity, relative-position of questions, the minimization of excess-length, the visual-impact and ease of comprehension and completion, were all-considered, when designing the questionnaire, according to Starovoytova *et al.*, (2016).

The questioner was pre-tested, to ensure its validity and reliability. A trial-survey (pre-testing), was conducted, according to ISO 20252:2006 (E) Market, Opinion and Social-Research Standard, by administering an initial-version of the questionnaire to the 2 students, selected at random, from the outside of the subject-sample. Discussions, with these-individual-students, resulted in the fine-tuning of wording and “polishing” of the final-format of the questionnaire.

Consenting-students were given an appropriate-amount of time, to complete the questionnaire (approximately 25 minutes) and were informed on the confidentiality of the process.

The answers, to the open-ended-questions, provided by the students, were analyzed using a content-analysis-technique for qualitative-data: the data were unitized, coded, and grouped into themes, according to Denzin & Lincoln (2000) and Lincoln & Guba (1985). To ensure credibility, a principle of qualitative-inquiry, for ascertaining that the analysis and findings are legitimate, was used, according to Lincoln & Guba (1985).

Cronbach's alpha was chosen, as is the most-common-method of estimating reliability of an instrument (Hardy & Bryman, 2009), as additionally, it is also useful for the item-specific-variance in a unidirectional-test (Cortina, 1993). The Statistical Package for Social Sciences (SPSS-17, version 22)-computer software-program was used to compute the Cronbach's alpha co-efficient. Descriptive-statistics was used to analyze, both, qualitative and quantitative-data.

### 3. Results, Discussion and Analysis

#### 3.1. Validation of the instrument

From the validation, it was found, that the instrument had sufficient-information, which would answer all-the-research-questions. The instrument was found adequate-enough; the length of the entire-instrument was found appropriate and the content was logically-organized. The general-recommendation made is that the instrument was acceptable with very-minor-editing.

The final-version of the self-report-questionnaire consisted of 2 main-parts: demographics and research-inquiry, giving in total 25 questions, 2 of which were open-ended; the rest of the questions, required students to choose one answer from a "agree" or "disagree" options provided.

Questionnaire-data were coded, entered into SPSS and checked for errors. Data were analyzed, list-wise in SPSS, so that missing-values were ignored. Cronbach's-alpha-test of internal-consistency was performed on for perceptions and self-reports on plagiarism and demonstrated high inter-item-consistency (Cronbach's  $\alpha=0.904 > 0.9$ ).

#### 3.2. Questioner-responses

Out of the total-number of questioners, administered (N=25), 21 were submitted-back, giving a response-rate (RR) of 84%.

##### 3.2.1. Analysis of part1: Demographic Characteristics

95% of the respondents were male, while 5% were female. The majority, (80%) of the students, was between 22 and 25 years-old; followed by 15% of the respondents in the oldest-age-bracket of (25-27), and remaining 5% represented the youngest- students, aging from 20 to 22 years-old.

##### 3.2.2. Analysis of part 2: Research-questions.

###### 3.2.2.1. Opening

In the preamble-section, the students were asked two-questions; the first-question was to define (in simple-terms) "plagiarism". The majority, (86%) of the students, were defining plagiarism, as simply "using and presenting somebody else's ideas, writing, etc., as their-own". Only 14% of the respondents, have extended their-definition, by adding: "...without acknowledgement of the owners, by citing the sources".

While defining plagiarism is a rather-difficult-undertaking in itself, it is important, from the beginning, to distinguish plagiarism from plain poor-documentation. The Council of Writing Program Administrators (WPA) defines plagiarism as follows: "In an institutional-setting, plagiarism occurs when a writer deliberately uses someone else's language, ideas, or other-original (not common-knowledge)-material, without acknowledging its source". The WPA-definition is noting the *deliberate* nature of plagiarism; hence, a poorly-documented-paper is not, necessarily, plagiarized. This-definition will also help to distinguish students, who need more-instruction from those, who are behaving deliberately-dishonestly. Consequently, as lecturers, it is our-complicated, but crucial-task, to treat students fairly, in fulfilling our-pedagogical-duty, as many-incidents of plagiarism are, likely to result from lack of knowledge, rather than planned-plagiarism.

Regarding the-second-question, 52% of the respondents indicated, that plagiarism was never mentioned, or explained, to them at SOE, MU, while the remaining 48% said, that it was.

The pattern of the above-results, suggests, that more than half of the students, in our-subject-sample, were not adequately-informed about plagiarism in academic-writing. This is in accord with other-studies, where researchers pointed-out on an uncertainty, regarding perceived-plagiarism, among-students (Weiss & Bader, 2003; Heron, 2001; Lathrop & Foss, 2000).

###### 3.2.2.2. Factors that Exacerbate Plagiarism

Figure 3 shows the response (%) on the factors that exacerbate plagiarism

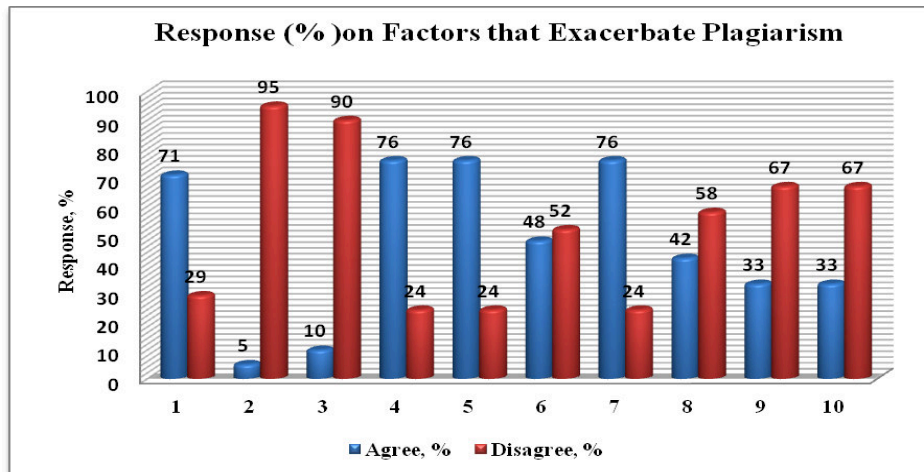


Figure 3: Response (%) on the factors that exacerbate plagiarism

**Keys:**

1. Short-deadlines or a heavy-workload give me the right to plagiarize a bit;
2. If another-student gives me permission to copy from his/her paper, I am not doing anything bad, because I have his/her-permission;
3. A plagiarized-paper does no harm to the value of a university-degree;
4. Those who say, they have never plagiarized, are lying;
5. Sometimes, I am tempted to plagiarize, because everyone else is doing it (e.g., students, researchers, and academic-staff);
6. I keep on plagiarizing, because I haven't been caught yet;
7. Sometimes, I copy a sentence or two, just to become inspired for further-writing;
8. Plagiarism is against my ethical-values;
9. Plagiarism is only a big-deal, if a substantial-portion of the report has been plagiarized;
10. I am tempted to plagiarize because, even if caught, the punishment (if any) will be light (the reward outweighs the risk).

3.2.2.3. Justification for Plagiarism

Figure 4 shows the response (%) on Justification for Plagiarism.

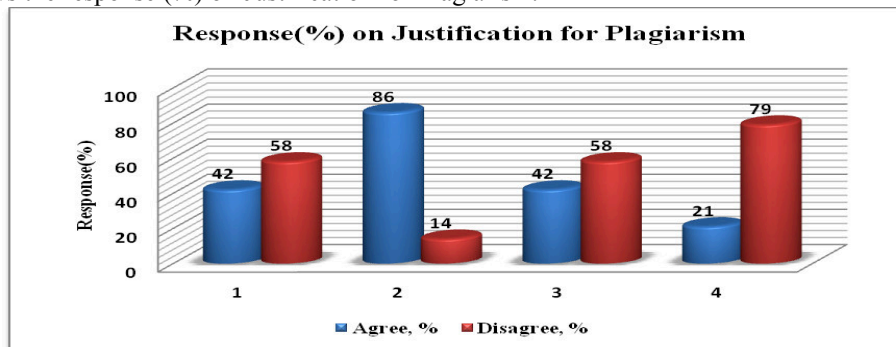


Figure 4: Response (%) on the Justification for Plagiarism

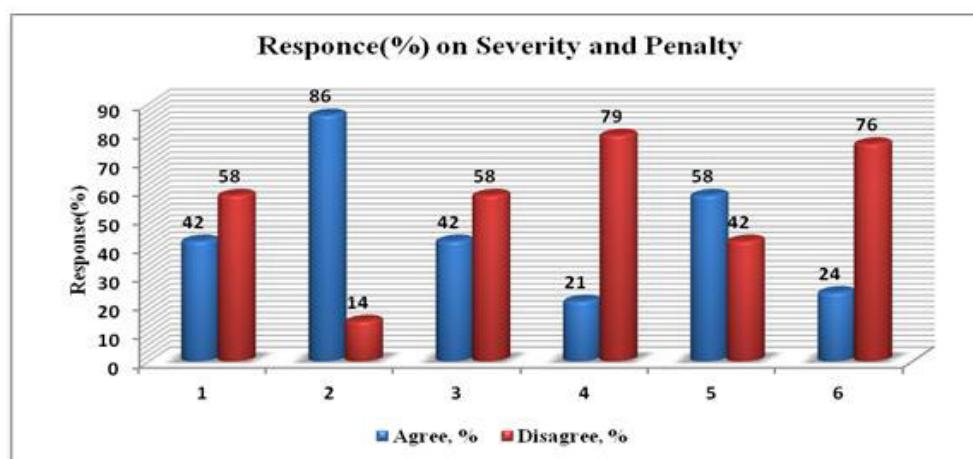
**Keys:**

1. Sometimes, you cannot avoid using other people's words, because there are only so-many-ways to describe something.
2. It is OK to use previous-descriptions of a concept/theory, because they remain the same.
3. Self-plagiarism is not punishable, because it is not harmful (as you cannot steal from yourself).
4. Since plagiarism is taking other people's words, rather than tangible-assets, it should not be considered a serious-offence.

3.2.2.4. Severity and Penalty

Figure 5 shows the response (%) on severity and penalty relevant to plagiarism.





**Keys:**

1. Plagiarized-parts of a student’s report should be ignored, if the document is, otherwise, of high-quality.
2. Self-plagiarism should not be punishable in the same way as other-types of plagiarism are.
3. If you cannot write well, because of unfamiliarity with the topic-area, it is justified to copy parts of a paper, already-published in that-area, in order to accurately represent-those-ideas.
4. Given a commonly-perceived decline in moral and ethical-standards, it is important to discuss issues like plagiarism and self-plagiarism at the very-beginning of the study at university.
5. Plagiarism is as bad, as stealing an exam.
6. Plagiarism undermines independent thought.

3.2.2.5. Solutions

This-section represents the responses to a very-last question of the questioner, asking the students to propose how to minimize, or even, eradicate, plagiarism at SOE. Table 1 shows the summary of the responses, with indication of their-prevalence.

Table1: Suggestions, made by the respondents, on how to combat plagiarism, at SOE.

Suggestion Content	Frequency	
Creating awareness on plagiarism as early as 1 <sup>st</sup> year of study at SOE.	11	2
Initiate and implement a SOE policy, that any-assignment should be submitted in both; a soft-copy and a hard-copy, to enable to do checking by anti-plagiarism soft-ware(s).	6	9
Providing enough-time for research-assignments, reducing work-load and encouraging group-work.	2	0
A clear and elaborate-policy of plagiarism (with examples) should be developed by SOE.	2	0
Instead of penalty, the plagiarized-assignment should be return to the student and the lecturer should, personally, explain the issue and also advice how to correct it.	2	0
SOE should introduce a compulsory-course on academic writing & ethics.	1	
Lecturers should be the role-models, and also repeat the brief on plagiarism every-time, before an assignment is given, emphasizing on the importance of ethical-work and also informing on penalties, pertaining to plagiarism.	1	
Each- course lecturer should create a website, which contains reference materials pertaining to the specific-assignments.	1	
Course-lecturers should avoid repeating the same-assignment, as students can easily get a copy from the previous-year students, therefore enticing plagiarism.	1	
Outwit discontinuation at all, as this-penalty put fear in students, pushing them to plagiarize.	1	
The same-penalties as cheating an exam should be applicable, in case of plagiarism.	1	
10 years imprisonment for the plagiarism-misconduct.	1	
Rejecting the plagiarized-assignment and giving a zero-mark.	1	
A penalty, up to 50% mark-reduction.	1	

**3.3. Discussions**

3.3.1. Lack of clear comprehension on plagiarism

Overall and widespread-deficiency in students’ understanding of plagiarism was found across majority of the

respondents, which correlates-well with Carroll' (2005) suggestions, that it is this-lack of clarity about plagiarism that influences how students perceive plagiarism. On the other-hand, McCabe *et al.* (2005) stated, that 44% of faculty indicated that they had ignored at least one-act of academic-dishonesty, including plagiarism, in their classrooms. If students see faculty turning a "blind-eye" to acts of academic-dishonesty, then cheating is, likely, to increase in proportion to its perceived lack of enforcement.

All of the students, in the subject-sample, were formally-exposed to introductory-concepts of academic-writing and research-ethics; this was done, however, at a small-scale, and only at their-third-year of study under MIT 301: Research Methodology (one-unit, not-examinable and, overall, not a comprehensive-course); the research-findings are consistent with those of Shirazi *et al.* (2010), who have attributed lack of knowledge of proper referencing and citing, as a possible-cause of plagiarism in students.

A dedicated-compulsory-three-unit-course, such as "*Introduction of information ethics*" on research-methodology, analytical and referencing-techniques should be integrated in undergraduate engineering-curriculum, to further develop the research-environment in SOE, MU. This, in turn, calls for: (1) a revision of undergraduate-engineering-curriculum, irrespective of their-departments, so that students can be taught on plagiarism and on policies, that govern the use and reuse of information, and (2) faculty-training, with an emphasis in teaching the current-best-practices and ethics of academic-engineering-research and ethical-writing.

### 3.3.2. Overestimation of plagiarism prevalence.

76% of the respondents agreed, that those who say, they have never plagiarized, are lying; and also that everyone else around are plagiarizing (e.g., students, researchers, and academic-staff).

It is important to consider students' overestimates of plagiarism by others because students' perceptions of peer-behavior have a powerful-effect on their own-behavior (Rettinger & Kramer, 2009; Hard *et al.*, 2006; McCabe *et al.*, 2001). Consistent with the findings from other-research by Engler *et al.* (2008), the participants reported that other students were markedly more likely, than them, to commit plagiarism.

The implications of these-findings must be considered in relation to Social Norms Theory (Berkowitz, 2004; Perkins, 2003) and the research by McCabe *et al.* (2001) and Rettinger & Kramer (2009), which found, that when students believe others have cheated, they are more likely to choose to cheat them-selves.

### 3.3.3. Light-or no-punishment.

48% of the respondents agreed, that they keep on plagiarizing, because they have not been caught yet, while 33% stated, that they are tempted to plagiarize because, even if caught, the punishment (if any) will be light (the reward outweighs the risk).

Decoo (2002) claims, that four-reasons contribute to this dilemma: (1) if done cleverly, plagiarism goes undetected; (2) many-cases are never-reported, even if discovered; (3) interpersonal-concerns discourage potential whistleblowers from reporting; and (4) many-institutions try to keep these-reports quiet.

### 3.3.4. Plagiarism, the value of a university-degree and overall Corporate-Image of university.

Although, only 10% of the students agreed that, a plagiarized-paper does *no* harm to the value of a university-degree, the authors believe, that this-issue, probably, needs a closer-look, for the benefit of these, who would answer "Agree".

Plagiarism, as a worldwide-phenomenon and a component of academic-dishonesty, undermines the value of university-degrees, scholarship and intellectual-progress and poses a potential-threat, to the University's goal of realizing the highest-international-standards of academic and professional-performance. Plagiarism is a severe-offence, as it undermines fundamental-doctrine on which higher-education is founded, in that the student fails to: (1) develop the ability to analyze, interpret and evaluate available-knowledge and information; (2) acquire the requisite-knowledge, competencies and skills for the workplace; (3) develop a personal-style of writing; and (4) establish/develop an independent-voice, that articulates knowledge and information in a unique-way (UOJ, 2013).

Plagiarism, among the students in public-educational-institutions, nowadays, is an actual-subject of morality, which influences the five-fundamental-values of academic-integrity pointed-out by Gu & Brooks (2008), namely: honesty, trust, fairness, respect and responsibility. It is also believed, that the issue of plagiarism may affect the corporate-image of an institution of higher-education (Salleh *et.al*, 2012). Those, who plagiarize tarnish the reputation of the academic-institution and degrade the value of their-Education; if that-institution becomes known as a place, where students can plagiarize with impunity (Saupe, 1998). The reputation of any-university and the value of a university-degree suffer, if employers find graduates lacking the expected-abilities their-degrees should guarantee. As such, any considerate-university has the humanistic-goal of creating a citizen, who is not only educated, but also ethical and cosmopolitan (Alsup *et al.*, 2006).

To this-end, Salleh *et.al* (2012), developed Plagiarism and Corporate-Image (PCI) model to examine the effect of plagiarism behavior on the corporate-image, of a public-university (including value of academic-degree). The PCI model has demonstrated the six-main-constructs, including: (1) attitude concerning plagiarism, (2) subjective-norm, and (3) perceived plagiarism-control, as the independent variables, (4) intention to plagiarize, and (5) actual-plagiarism, as the mediating-variables and (6) corporate image, as the dependent-

variable (see Figure 6).

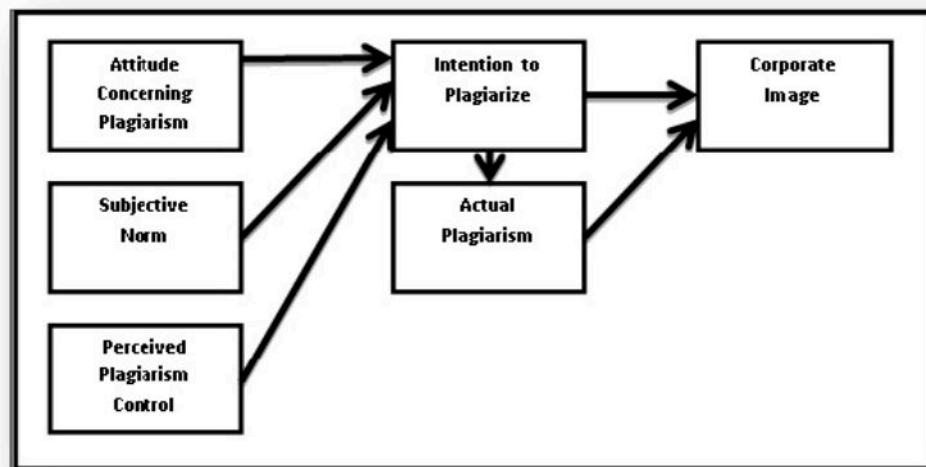


Figure 6: Extended TPB model: PCI model (Salleh *et.al*, 2012).

As well as studying plagiarism, the model also may be applicable to assess other-types of academic-dishonesty-behaviors, such as: cheating on tests, exams and on assignments; and electronic-cheating for both, qualitative and quantitative-methods. It is also stimulating to discover the root and effect relationships, between plagiarism-behavior and corporate-image, at the-same-time.

Any-credible-university should be fully-committed to the ideal of renowned-scholarship, excellence in education and learning, and the provision of trustworthy and innovative-research-findings, which carry national, regional and international-recognition and legitimacy. Academic-honesty and integrity are pre-requisites for fulfilling this-ambitious-ideal.

#### 3.3.4. Possible-solutions

Majority (52%) of respondents proposed creating awareness on plagiarism, as early as 1<sup>st</sup> year of study, at SOE. Around 1/3 of the students also proposed to initiate and implement a SOE policy, that any-assignment should be submitted to the course-lecturer in both; a soft-copy and a hard-copy, to enable to do checking by anti-plagiarism soft-ware(s). The rest of suggestions were given by a smaller-number of the respondents (5-10%); nevertheless, these-suggestions should be, also, considered and evaluated, by the SOE' faculty at a departmental-level of involvement.

The unstoppable-growth of web-based-information, paper-mills, cheat-sites, and effortlessly downloadable-resources (documents, scientific-papers, and even, complete-theses, among others) jointly with easily-reformatted-texts and diminishing-ethical-values, has been progressively distorting the foundation of intellectual-property.

In dealing with dishonesty and plagiarism, a balanced-approach should be taken that includes both prevention and deterrence (Lambert *et al.*, 2006; McCabe, 2005). For example, McInnis & Devlin (2002), recommend a four-part-strategy aimed at minimizing plagiarism:

- (1) Maintaining a consistent and collaborative-effort, to recognize and counter plagiarism, at every-level, from policy, through faculty and school/department-procedures, to individual-staff-practices;
- (2) Educating students about the expected-rules for authorship and the appropriate-use and acknowledgment of all-forms of intellectual-material;
- (3) Designing approaches to assessment, that support students' learning and minimize the possibility for students to submit plagiarized-material, while not reducing the quality and rigor of assessment requirements;
- (4) Implementing visible-procedures for monitoring and detecting cheating, including appropriate punishment and re-education measures.

To fight academic-dishonesty, including plagiarism, a so-called 3D-approach (involving: prevention, detection, and penalty) should be applied, in a reasonable-equilibrium.

##### 3.3.4.1. Prevention

In a recent-study, Dee & Jacob (2012) set up a field-experiment in which they looked into the effect of a web-based-tutorial, explaining and demonstrating plagiarism and its prevalence. The tutorial led to an increase in the students' awareness and knowledge of the topic, hence suggesting that prevention and education are more effective and efficient, rather than the probability of getting caught and punished.

##### Awareness

SOE, MU is yet to establish a Plagiarism Policy. With no policy in place, there is a wide-spread-perplexity about what exactly plagiarism is and also how to effectively-avoid it. Giving plagiarism the indispensable-

consideration in an educational-program, focusing on prevention, rather than penalty, and stressing-out the importance of academic-integrity, needs to be part of SOE-plagiarism-policy. Therefore, in order to deter plagiarism, faculty must establish a solid-plagiarism-policy, inform students of the policy, and enforce the policy with strict-consequences. To circumvent any-confusion on understanding, what, exactly, plagiarism means and how to avoid it, it is, therefore imperative, that expectations for academic-integrity are communicated explicitly, straightforwardly, and repeatedly.

Furthermore, according to McCormick (n. d.), not all school-policies specify the mental-state, required for a finding of plagiarism or another-form of academic-misconduct. Of those which do, the mental-states specified include: intent, knowledge, recklessness, negligence, or some combination thereof. In the authors-opinion, these-issues should be considered during the design-phase of the policy.

#### *Faculty contribution*

Clearly, university-departments must re-evaluate their-approaches in dealing with the issue of student-plagiarism with their-staff. The findings indicate that open and intellectual-engagement with the issue of plagiarism is overdue.

Faculty plays a crucial-role in helping students to develop academic-integrity. Although it may not be possible to eliminate plagiarism, completely, it is potentially-promising for faculty-members, to educate their-students and construct assignments in such a way that plagiarism is greatly-reduced. According to Turnitin.com, their research "... is designed to help educators and students develop a better-understanding of the complex-issues, surrounding plagiarism in the information age, and to teach the planning, organizational, and citation-skills, essential for producing quality-writing and research." There are many-contexts, in which faculty can explicitly teach students what academic-honesty is, for example: (1) at the beginning of the semester, when they are introducing the subject and the rules for learning; (2) before a research-assignment, (3) when students must be confronted with the evidence of dishonesty; and, finally, (4) as lecturers model integrity, in their-own teaching and scholarship.

#### *Software-based approach of prevention*

Diverse and progressively-more sophisticated-programs are, now, available, to assist lecturers, who may be in doubt, about the uniqueness of work, submitted. These-programs look at linguistic-similarities and also, some of them, can, even, identify, when essay(s) have been bought, from particular-websites. However, these-programs can only be used on assignments, which are submitted-electronically; and in addition regrettably, they are coming at a cost. Few selected-examples are presented below:

(1) *My Drop Box*, where student-documents are compared to (a) Internet, (b), published-works in password-protected databases, newspapers, magazines, term paper mills, and online reference sites, and (c) institution's own-databases to prevent peer-to-peer cheating (with an institutional-license). Options include requiring that students submit their-papers, directly to the website or submit drafts of their-written assignments, to see which parts of their-papers require proper-referencing. Papers being reviewed by Drop Box will be sent to back to the instructor with plagiarized-sections displayed, using a different-color for each-source on the plagiarized-document (\$89.90 per year individual-license, or institutional-license-option are available) (<http://mydropbox.com>).

(2) *Eve2*; EVE stands for "Essay Verification Engine." Submitted-papers are compared to information on the Internet. If Eve2 finds evidence of plagiarized-work, it will record the URL, from which the material was copied and report the percentage of work plagiarized, from each URL, indicated on the student's paper in red. A trial-version can be downloaded online, prior to purchase (runs on Windows OS, \$19.99 per license) (<http://www.canexus.com/eve/>)

(3) *TurnItIn* is a website, which checks for Internet-plagiarism and is designed for students to submit reports and faculty to check students' work. Each submitted-paper is checked against (a) 4.5 billion Internet-pages, (b) extensive-databases of published-works, and (c) database of student-papers, previously submitted to Turnitin and it offers the possibility to compare texts with references and can, therefore, easily-detect similarities with other-documents (pricing is by individual, department, or campus) (<http://www.turnitin.com>).

Additional plagiarism-detection-software, such as: Glatt's Plagiarism Services, WordCHECK, KeyWORD, MOSS, eTblast, arXiv, CopyGauard, Docol©, and SafeAssignment (Maurer *et al*, 2000) among-others, can be used by the students, before submitting their final-assignments. Additionally, a new teaching-tool "Voluntary Plagiarism Check" was established at the PH Freiburg, Germany.

Moreover, several-helpful reference-links can be found in Maxymuck (2006)'work, in particular, the websites of: (1) 8 universities, directing faculty on how to detect plagiarism and (2) 4 universities, helping students learn how to avoid plagiarism, (3) 11 universities that provide online-tutorials, to test students'-knowledge of plagiarism.

On the other-hand, research has shown, that introducing a plagiarism-detection-mechanism does not automatically-imply that students will not plagiarize. Although software-detection-tools may help students and staff to control written-work for plagiarism, Youmans (2011) found that when students are warned, beforehand,

that the plagiarism-detection-tool would be applied, to scan their-texts, this warning, apparently, did not decrease the number of plagiarism-cases.

Lastly, in the research of McCabe (2005) it is stated, that if an institution just intend to police cheating, then measures, such as stricter-penalties and enforcement of policies, along with plagiarism detection-softwares, could be effective in mitigating incidences of cheating in the classroom. Yet, Donald McCabe notes, that expansion the gap, between teacher and student, rather than bridging it, can alter the culture of the university-classroom, as it pits a teacher against a student. McCabe advises educators to “find innovative and creative-ways to use academic-integrity, as a building-block, in our-efforts to develop more-responsible-students and, ultimately, more-responsible citizens” and emphasizes that “campuses must become places, where the entire “village”- the community of students, faculty, and administrators- actively works together, to achieve this-goal” (McCabe, 2005).

And as a final-point, the authors would like to add, that exposing the nature and frequency of plagiarism at school-level, or even, departmental-level, is a relatively-cost-free and potentially effective-way, not only to reduce the time-consuming and emotionally-difficult-process of dealing with incidents of plagiarism, but in addition, to advance student learning.

## 4. Conclusion and Recommendations

### 4.1. Conclusion

This-study probed undergraduate-engineering-students’ knowledge, attitudes, and behaviors, regarding plagiarism at SOE, MU (the second-largest public-university) in Kenya.

The-authors trust, that this-*unfunded* and concise-contribution (by providing some-informative and useful-information on plagiarism and on selected-strategies, to combat the menace) will assist in creating, or increasing, its awareness and consequently, avoiding the risk of plagiarism, among students, and any-other potential-readers. The study also highlights the importance of achieving a balance, among the 3D-approach in plagiarism-management: prevention, detection, and penalty. Moreover, the-study represents an opening-step in facilitating the-necessary-discussions and determining appropriate, tailored, to SOE, actions.

Whilst the findings from this-succinct-study cannot be generalized, because they are based on a relatively-small-number of students’ from a particular-department at one-engineering-school; the findings, do, provide informative-synopsis on plagiarism, alongside with relevant-to it-issues. Another-limitation of this-study is the reliance on student self-reports about their-behavior. It is possible that some-respondents were purposely-untruthful or that they inaccurately-reported they had not plagiarized.

Behaviors, attitudes, and core-values that are acquired by students, during their-engineering degree-program, set an important-foundation for their-future-professional-career and practice. Of particular-relevance to this-practice are those-behaviors and attitudes, associated with academic-dishonesty; plagiarism, in particular. The long-term-benefits of an academic-environment, where academic-integrity, particularly, in research and academic-writing, are cultivated, cannot, consequently, be overrated. Therefore, it is a collective-responsibility, of all-the-stakeholders, to make every-effort to combat the persistent menace of plagiarism.

### 4.2. Recommendations

Plagiarism is a severe-type of academic-misconduct, and, therefore, it should be treated as such by the university. Several-recommendations, on how to fight plagiarism, were, hence, stated in sub-section 3. The major-ones are summarized below:

(1) A specifically-designed, dedicated and compulsory three-unit-course, such as “*Introduction of information ethics*” on research-methodology, analytical and referencing-techniques should be designed and integrated in undergraduate-engineering-curriculum.

(2) In order to prevent plagiarism, faculty must establish “Plagiarism Policy”, inform students of the policy, and enforce the policy, with steadfast-consequences.

(3) Lecturers should require students to submit their-assignments in both, soft and printed-copy, and encourage their-students to use plagiarism-detection-software, such as: Turnitin.com, Glatt’s Plagiarism Services, WordCHECK, KeyWORD, and MOSS, among others, before submitting their-final-assignments.

(4) This-unfunded-study was based on only one-engineering-school, hence more-focused-research is desirable to further-illuminate the root-causes of continuing-plagiarism-behaviors and the intervention strategies, that can best address them. In addition, further-studies should be conducted at SOE, to determine whether sharing (early in students’ school-live) accurate-information about plagiarism and how to avoid it, will reduce the overall-likelihood of incidents.

## 5. Acknowledgement

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