

# Awareness of Engineering Faculty on Plagiarism

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## Abstract

Plagiarism has been a-serious and widely-condemned-epidemic, devastating institutions of higher-learning all-over-the-globe, which un-questionably constitutes an-actual-threat, to the-strengthening of global- authentic-scholarship. Moreover, it-has-been suggested that academic-dishonesty, including plagiarism, is growing, requiring universities to-devote increasing-time and resources, to-combat it. The-understanding of various-perspectives of the-phenomenon is vital, for finding long-lasting-solutions. It-is alongside this-notion; therefore, that this-study investigated awareness and perception of engineering-faculty on plagiarism. This-paper presents findings from a-small-part of a-larger-study on-plagiarism, at the-School of Engineering (SOE). The-current-study is a-cross-sectional-survey, conducted in an-institutional-setting, which relied on Situation-Awareness-Theory, to-explain the-associations of the-main-variables. 15 senior-academic-members of staff (N=15), from SOE were invited to-complete a-questionnaire (developed for the-purpose of the-study). The-questioner was pre-tested, to-ensure its-validity and reliability. A trial-survey (pre-testing) was conducted, according to ISO 20252:2006 (E). The-Statistical-Package for Social Sciences (SPSS-17, version 22)-computer software-program was used, to-compute the-Cronbach's alpha co-efficient, which demonstrated high-inter-item-consistency, and, therefore, reliability (Cronbach's  $\alpha=0.817$ ). Descriptive-statistics was used to-analyze, both; qualitative and quantitative-data. Overall, the results of this-study suggest a-worrying-lack of understanding, among engineering-faculty, on basic elements of scientific-writing and resulting-from-it, plagiarism. The-study also revealed complete-lack of legal-framework, to-deal with plagiarism, its-prevention and punishment, at an-institutional-level. Besides, the-current-study provides a-number of steps-forward, into the-field of plagiarism-research. In-particular, more than a-few-key-concerns, such as: (1) Imitation-behavior, inbuilt in us; (2) The-concepts of Intellectual-property, Copyright and Copyright-Law; (3) Widespread-exposure to the-Internet and its-consequences, on-plagiarism; (4) A 'double-edged-sword' of plagiarism; and (5) Code-plagiarism (particularly important, in engineering), were holistically-looked-into, hopefully-offering a-much deeper grasp on the-subject-matter. The-authors also gave few-recommendations, for improving the-current situation, at the-school. This in-turn, will-contribute (in its-small-way) to-ensuring genuine-intellectual offerings, to-excellence, in-scholarship.

**Keywords:** academic dishonesty, academia, attribution, questioner.

## 1. Introduction

### 1.1. The essence of plagiarism

The-readers of this-paper are, most-likely, interested not only about the-plagiarism, itself, but, most-importantly, on how to-avoid and combat the-menace. The term 'plagiarism', without-a-doubt, has a very-negative and even, revolting, reputation, affixed-to-it, as it-is the-most-exposed-type, of academic- misconduct (Titus *et. al.*, 2008; Benos *et. al.*, 2005) and, moreover, plagiarism is considered to-be the- most-vicious, between-peers, because it-constitutes theft of intellectual-property (Mavrinac *et.al.*, 2010), which lies in the-foundation of overall-academic-achievement. In-fact, Petress (2003) describes plagiarism as a 'plague on our-profession' that, perhaps, demolishes rewarding the-ethic of hard-work, eroding the- moral-value of honesty, whilst devaluing the-role of assessment-items, within our-educational- establishments. This-characterization of plagiarism is, to-a-certain-extent, due to-its-historical-roots, positioning plagiarism, within a-legal-discourse, suggesting, that plagiarism refers to-an-act of-theft, of the- individual-ownership, of intellectual-work (Sutherland-Smith, 2005; Ashworth *et al.*, 2003).

So, what, exactly, is plagiarism? Plagiarism is defined as 'unauthorized-appropriation of another's work, ideas, methods, results or words, without acknowledging the-source and original-author' (Bilić-Zulle *et. al.*, 2005). Plagiarism is an-illicit-activity, synonymous with cheating, it-can-be described as corruption of the-process of independent and critical-thinking, that is essential, to-adding to-the-body of knowledge (Gow, 2013). Orim *et al.* (2013) quoted Park (2003), who-described plagiarism as 'academic-malpractice, and a-breach of academic-integrity'. It-is-also often-conceived, as-fraudulent-behavior, that diminishes the- intellectual-property, of the-original-author and rewards plagiarists, for somebody-else' work. A more-inclusive-description, according to Starovoytova & Namango (2016a) 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. The extent of plagiarism in academia

Oxford English dictionary (OED) cites numerous-sources, that mention plagiarism, in-different historical-contexts, starting with a-citation from 1621. The widespread-predominance, however, is traceable to-the-introduction of information and communication technologies (ICTs) in-education, as-well-as the-over-abundance of online-resources (Gow, 2013; McCabe, 2005).

Plagiarism and its-detection, are persistent, and very-real-issues, within universities, which have become major-topics, and a-focus of discussion and special-attention, of many-academic and scientific-communities (ORI, 2009; Titus *et al.*, 2008; COAM, 2007; Bilić-Zulle, 2005; Benos *et al.* 2005; Elzubeir & Rizk, 2003; Petrovecki & Scheetz, 2001), over the last-20-years (Decoo, 2002). As an illustrative-example of a-special-attention; almost 300,000 Euros of European-Union-funding was invested in the-project *Impact of Policies for Plagiarism in Higher Education Across Europe* (IPPHEAE) that was conducted between 2010 and 2013. Besides, plagiarism found-to-be-present, across all-levels of academia (Carroll, 2004; Decoo, 2002).

The-exact-magnitude of plagiarism, in-the-academic and scientific-community, is *not* yet known. However, Martinson *et al.* (2005) reported, that 2% of authors used another's ideas, without obtaining permission, or giving-credit, to the-authors. Regrettably, recent-findings have-suggested, that most-cases of research-misconduct, however, remain undetected (Titus *et al.*, 2008, Roig, 2008).

For-example, in 2012, a-prominent-Dutch-scientist was-accused, of self-plagiarism (self-plagiarism is the-inappropriate-presentation of one's own-published-data or text, as-new and original). This was massively-picked up, by the-Dutch-media. A-confusing-debate followed, about whether plagiarizing one's own-work would-be a-research-misconduct. The-Royal-Netherlands-Academy of Arts and Sciences responded, by establishing a-committee, with an-intention to 'clarify how issues in the-transitional-area between plagiarism and self-citation should be interpreted and assessed'. In-April, 2014 the-resulting Academy Advisory Memorandum on correct-citation-practice has-appeared, which can be accessed via <https://www.knaw.nl/en/news/publications/correct-citation-practice>. The-memorandum drawing the-spectrum, from correct-reuse of texts, ideas and other-published-materials, to-clear-instances of plagiarism. It-is-concluded, that there are-many-shades of grey and it-is-not always-easy to-judge, whether a-specific-instance should-be-labeled, as-research-misconduct, as-questionable-research-practice, or as acceptable-behavior. In-addition, taxonomy of reuse of materials, without correct-attribution is proposed, taking into-account, the-harmful-consequences of the-behavior.

A recent-study by Steen *et al.* (2013) pointed-out on 2,047-cases of retracted-papers, from PubMed indexed-journals, as an-encouraging-trend, in recognition and retraction, of plagiarized-articles. While these-statistics are encouraging, yet, most of the-time, detection after-publication *cannot*, obviously, repair the-damage, which had already been done to-science, if plagiarized-articles had already been cited. Marcus & Oransky (2014) also-mention a-high-number of research-articles, based on fake-data, image manipulation, self-plagiarism, fake-peer-reviews and disputed-authorships, which are being retracted, frequently, from reputable-journals.

The-stimulus, to-plagiarize is-affected, by-various-factors, such-as: (1) English, as a-second-language (Vasconcelos, 2009; Roig, 2008), (2) Material and social-benefits (Goodstein, *nd.*), and (3) Lack of respect, for intellectual-property, in certain-cultures (McCabe *et al.*, 2008), among-others.

### 1.3. Text plagiarism and Code (programming) plagiarism

Previous-researchers, for-instance, Vij *et al.* (2009) identified four-types of plagiarism: (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 one's-previous-work and submit it, as a-new-work. Moreover, recent-study by Starovoytova & Namango (2016a) cited iThenticate (2013), which shows, graphically, the-10 sub-types of plagairism, on a more deeper-level, identifying their-seriousness and commonnes.

This-study, on the-other-hand, will-consider plagiarism, form a-different-perspective. In engineering, the-two-major-types of plagiarism: well-known text-plagiarism and particularly-important for engineering, code (programming) plagiarism, are of major-concern, and, therefore, these should-be-given more-attention.

#### 1.3.1. Text plagiarism

To-effectively-communicate in writing, especially, in the-context of concise-scientific-publication, one has to-practice, in-order-to-develop, a-deeper-understanding, of all-writing-aspects, such-as: grammar, spelling, punctuation, syntax and structure. Having a-fundamental-comprehension, of the-language, in-terms of differences, between writing and speech, is also-important (Knapp & Watkins, 2005).

Carroll (2007), for-example, pointed-out, that: 'many-international-authors borrow the-words of indigenous-English-authors, due to-lack of confidence in their-own-abilities to write correct, clear-English'. On-the-other-hand, sometimes, a-reader could-be very-fascinated and, often, attracted to-particular colorful-expressions, which have an-impressive, and unforgettable-impact, resembling a 'verbal-hit', or when a-message is expressed so-precisely and so-eloquently that, anyone would-be-proud to-take a-credit, for it.

To-avoid such-temptations, and therefore, to-escape any-possible-allegations of plagiarism being-made, about one's publication (whether plagiarism was committed, intentionally or unintentionally), it-is important, to-learn how-to-represent the-writings, of another-writer, correctly. For-example, a-short section of text, which is taken from another-author's work and is-unchanged, must-appear within 'quotation-marks', with an-acknowledgement being-given, to the-original-work. A larger-section of a-text, which is quoted, should be indented. An-acknowledgement should appear, either as a-footnote or by the- addition of the-author's name and the-year of the-publication, in the-text, with the-full-citation being- referenced in the-list of references (at the very-end of a-document). References should be detailed-enough, to-allow anyone, reading the-text, to-locate the-full-text of original-work to-the exact-place, it-appears.

Another-common-way, to-avoid plagiarizing another-person's work, is to-paraphrase a-text, ideally referring, to-the-original-author, by-name. The-paraphrased-version should, however, be sufficiently-different, from the-original-version, so that obvious-copying, with only-minor-changes being- made to-the-text, does-not occur. Where little-attempt is made to-paraphrase text, and the-original-author is acknowledged, this can, still, be-regarded as plagiarism.

### 1.3.2. Code plagiarism

According to Lancaster & Tetlow (2005), 'Programming is a-skill, often compared to-riding a-bicycle; it-is not something that can-be picked-up, by-merely reading about-it, instead, it requires practice'. A-very-typical way of learning, how to-programming is to-'imitate', for-instance, how to-use condition-statements such as *if*, *while*, *switch loops*, etc. It-is natural, to, just, copy an-existent-example, in order to-absorb and understand-the-logic of-it. The big-challenge, however, is when, exactly, to-draw the red-line, from-imitation to-plagiarism.

Programming-plagiarism can-be-defined as the-act of reusing program-structure and language-syntax, from someone or somewhere-else (such-as sources, obtained via internet, a-book, etc.) (Burrows *et al*, 2004). The-levels-vary, from lexical-changes (i.e. comments, identifiers, indentation, and re-ordering) to structural/logical-changes (Lancaster & Tetlow, 2005).

The-following-list shows examples of plagiarism-transformations, according to Jones (2001): (1) Verbatim-copying, (2) Changing-comments; (3) Changing white-space and formatting; (4) Renaming- identifiers; (5) Re-ordering code-blocks; (6) Re-ordering statements, within code-blocks; (7) Changing the order of operands/operators, in expressions; (8) Changing data-types; (9) Adding redundant-statements or variables; and (10) Replacing control-structures, with equivalent-structures.

From-the-above-list, assumptions were-made, that transformation (1-6) would-be, more-commonly done by beginner's programmers, while the-level (7-10) require much-more programming-knowledge. It can be-logically-assumed, therefore, that alterations, done by-beginners, would-be-easier, to-detect, due to- less-complexity (Verco & Wise, 1996).

### 1.4. Research purpose

Mallon (1989) explains that plagiarism derives from the-Latin-term "*plagium*", meaning theft, or, literary, adoption of the-thought or works of another; he-also-concludes, that a-plagiarist is 'a-thief in literature; one who steals the thoughts or writings of another'. This-statement seems very-unforgiving, being entirely 'black & white'; plagiarism, however, is not a 'clear-cut', whatsoever; it-is a-rather-complex-issue, reflecting many-shades of grey. Plagiarism is also a-cross-disciplinary-matter (incorporating legal-studies, cultural-studies and second-language writing-research), it-is-also relevant to-cheating (education) or academic-dishonesty or academic-misconduct, and to-moral-judgment (reasoning) or moral-thinking; it-is interrelated to-intellectual-property, copyright-infringement, and authorship, and is discussed, from the perspective of multi-culturalism (Swearingen, 1998).

Cicutto (2008) pointed-out, in-his-study, that:

The Office of Research Integrity, U.S. Department of Health and Human Services, reports that approximately 25% of the-total-allegations received, concern plagiarism, and that, these-allegations typically-represent mis-understandings, of what exactly constitute plagiarism and accurate citation procedures.

In-addition, Martin (2005), cited 5-articles, and reported that: 'Research indicates that a-high percentage of undergraduate-students, cheats'. There are many-more-articles, dealing with students' cheating and plagiarism. However, *not* as-many-articles, could-be found, about plagiarism, in-academia. A-search of the-available-published-resources also-indicates that there-is much-more-concern, about cheating among-students, than among-academic-staff. This-lack of articles on 'plagiarism among university-faculty' could-indicate either that, there is little-plagiarism, among-faculty, or that, they are-not willing to-admit, that there is a-problem of plagiarism, among-faculty (Shahabuddin, 2009).

On the-other-hand, plagiarism is viewed, by-many-academics, as a-kind of Pandora's Box; the elements, contained inside, are too-frightening, to-allow escape, for fear of the-disaster, that may-result (Sutherland-Smith, 2005). *Pandora's box* is an-artifact in Greek-mythology, taken from the-myth of Pandora's

creation, in Hesiod's 'Works and Days' (Athanasakis, 1983). The 'box' was, actually, a large-jar (Gantz, 1996), given to Pandora ('all-gifted, all-giving') (Hesiod, 1914), which contained all-the-evils of the-world. Pandora opened the-jar and all-the-evils...flew-out. Today, the-phrase 'to open Pandora's box' means to-perform an-action, which may-seem small or innocent, but that turns-out, to-have severely-detrimental and far-reaching, negative-consequences (Wikipedia, Pandora Box). This-research, however, will-attempt to-open the-box, optimistically, with *no*-severely-detrimental and far-reaching negative-consequences, but, on a-contrarily, for the-benefits to-potential-readers, of this-paper. To-this-end, the-authors will-try, to-demystify plagiarism, so that the-readers will-be-able, to-make their-own, better-informed-decisions, when dealing, face-to-face, with the-menace.

Plagiarism has-been a-serious and widely-condemned-epidemic; devastating institutions of higher learning, all-over-the-globe (Reinhardt *et al.*, 2015), which, un-questionably, constitutes an- actual-threat, to the-strengthening of global-authentic-scholarship. Moreover, it-has-been-suggested that academic dishonesty, including plagiarism, is growing, requiring universities to-devote, increasing-time and resources, to-combat-it (Carroll, 2005; O'Connor, 2003; Park, 2003; James *et al.*, 2002). The- understanding of various-perspectives, of the-phenomenon, is vital, for finding long-lasting-solutions. It-is alongside this notion; therefore, that this-study investigated awareness and perception of engineering faculty, on plagiarism.

The-research is intended to-provide some-helpful-illuminations, on the-subject-matter and, expectantly, helping to-reduce the-likelihood of plagiarism, among-faculty or other, potential-readers.

## 2. Materials and Methods

The-current-study is a-cross-sectional-survey, conducted in an-institutional-setting. 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 1, according to Starovoytova & Namango (2016 b).

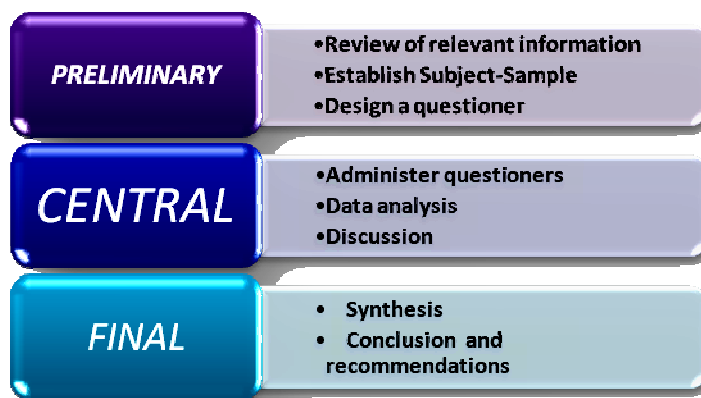


Figure 1: Sequential-parts of the study (Starovoytova & Namango, 2016 b).

### 2.1. A theory and a tool relevant to the study

Cheating-behavior, including plagiarism, is relevant to a-variety of theories and models (see Starovoytova *et al.*, 2016). This-study, however, relied on the-Situation-Awareness-Theory, to-explain the-associations of the-main-variables.

Situation-Awareness-Theory: Stanton *et al.* (2001), cited Gilson (1995) and pointed-out, that the idea, behind situation-awareness, was conceived during the-World-War I, on the-importance of gaining an- awareness of an-enemy, before the-enemy gains a-similar-awareness of you. The-theory further pointed-out, that in-order for people, to-maintain an-adequate-awareness, about a-system status/phenomenon, the-development of events, in those-areas must-be-tracked, as they unfold. Situation-awareness is the- appropriate-awareness, of a-situation, or event. It-is the-perception of the-elements, in-the-environment, within a-specific-time and space, the perception of their-meaning and anticipation, of their-status, in the future (Endsley, 1988).

This-theory, on-awareness and perception, is relevant to-the-study, as it explains the-relationship between, awareness and perception. The-theory, therefore, projects attitudinal-disposition of faculty and environmental-factors, as-predictors of plagiarism. Institutional-policies, core-values, legal-frameworks, actual-practices, orientation, and enforcements, are-all related, to-scholarship-outcomes, with respect to- originality of content, or plagiarism.

In-addition, 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

15 senior-academic-members of staff (N=15), from the-SOE, invited to-complete a-questionnaire (developed for the-purpose of the-study). The-choice of senior-academic-staff was based on the-assumption, that *all* of them, should have-been-publishing, on their-area of expertise, and therefore, are considered, to be knowledgeable-enough on the-subject-matter-- plagiarism.

Subject-members were selected at-random, regardless of their-mother-department, or any-other factors. Interested-readers could-refer to Starovoytova *et al.* (2015) to-find informative-synopsis regarding Kenya, and its-educational-system. In-addition, refer to Starovoytova & Cherotich (2016), for information on the-university, and on-the-school, where the-study, was-conducted.

## 2.3. Questionnaire and its administration

This-research applies a-style of projective-technique, by asking questionnaire-respondents questions about plagiarism, at the-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.* (2016b).

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 2-faculty-members, selected at-random, from the- outside of the-subject-sample. Discussions, with these-individuals, resulted in the-fine-tuning of wording and 'polishing' of the-final-format of the-questionnaire.

Considering, a-busy-schedule, for most of the-respondents, the-questionnaires were administered by 'drop & pick' method. Consenting-members were-given an-appropriate-amount of time, to complete the questionnaire (approximately 1 week) and were informed, on the-confidentiality of the-process.

The-answers, to-the-open-ended-questions, provided by-the-faculty, 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-the-most-common-method of estimating reliability of an-instrument (Hardy & Bryman, 2009). 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, Analysis of the results, and Discussion

### 3.1. Results

#### 3.1.1. Validation of the-instrument

Upon validation-process, it was established, 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 suitable and the-content was-logically-organized. The general recommendation made is, that the-instrument was adequate, with very-minor-editing.

The final-version of the-self-report-questionnaire consisted of 2-main-parts: demographics and a-research-inquiry. In the-second-part, the-respondents were asked to-read carefully a-paragraph, from a-newspaper-article; so that they can-recognize, the-different-ways it-is used, in the-series of writing-samples (scenarios), that follow. After reading each-sample, they must decide if, and to-what-extent, the-writer committed plagiarism, that is, copied or used it, in-a-bad-way. Participants were presented with six-scenarios: A, B, C, D, E, and F. Accordingly, to-evaluate each-scenario, 3-answers were offered to- choose from, such as: (1) No plagiarism; (2) Some-plagiarism; and (3) Great-amount of plagiarism. The-exercise is adapted from Deckert (1993).

Questionnaire-data were coded, entered into SPSS and checked for errors. Data were analyzed, list-wise in SPSS, so that missing-values were disregarded. 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  $\alpha=0.817$ ).

#### 3.1.2. Questioner-responses

Out of the-total-number of questioners, administered (N=15), 10 were collected-back, within a- specified-period, giving a-response-rate (RR) of 67%.

##### 3.1.2.1. Results part1: Demographic Characteristics.

Figure 2 shows: gender, department, academic-rank and years of teaching-experience (at university-level) of participants.

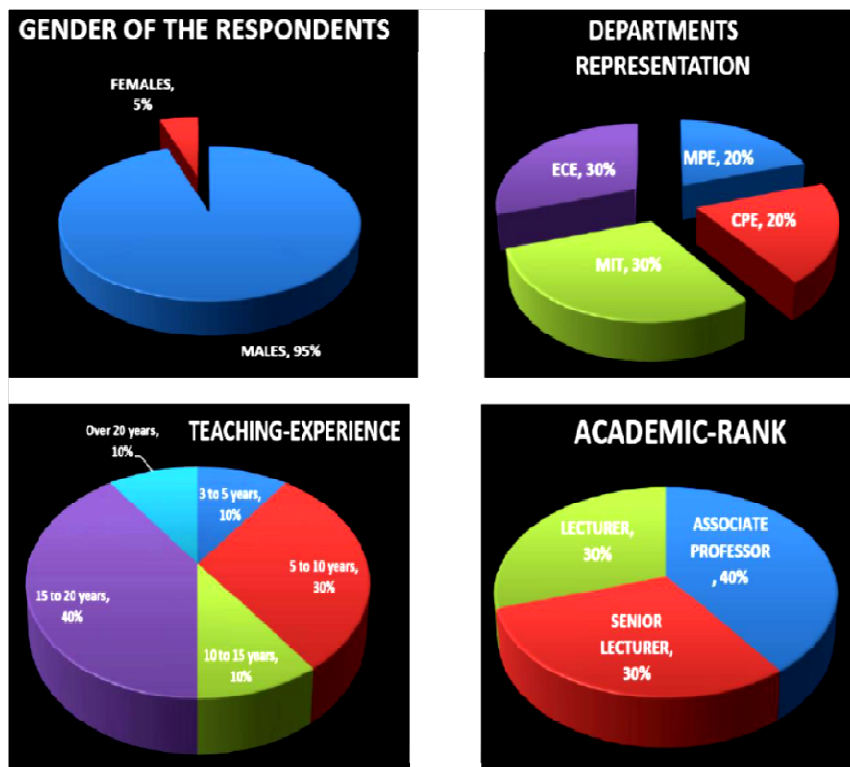


Figure 2: Demographics of the respondents

95% of the respondents were male, while 5% were female; confirming that the-SOE, as any-other engineering-school, is male-dominated. Out of the-5-engineering-departments, of SOE, responses were received only from 4-departments: (1) MIT-Manufacturing, Industrial &Textile Engineering contributed 30% of the respondents; (2) ECE-Electrical &Communication Engineering, 30%; and 20% for each of MPE (Mechanical & Production Engineering) and CPE (Chemical& Process Engineering) departments. The highest-share (40%), of the-participants, was Associate Professors; and Senior-lecturers and Lecturers contributed equally, at 30% each; however, *no* response was received, from full-Professors. The vast-majority of the-faculty (40%) have-been-teaching, at-university-level, from 15 to 20 years; followed by 30% of these taught for 5 to 10years; equal-share (10%) were teaching from 3 to 5 years and from 10 to 15 years; the smallest-representation (10%) taught for over 20 years.

### 3.1.2.2. Results part 2: Research-questions.

Figure 3 shows faculty' responses on six-scenarios.

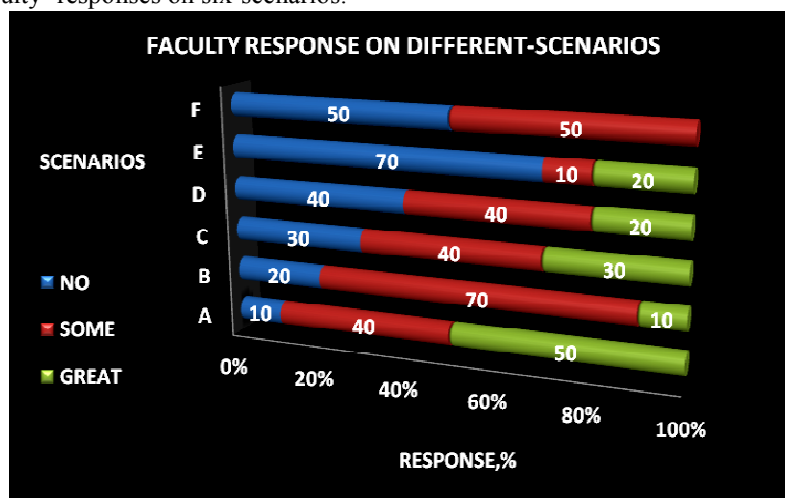


Figure 3: Faculty' Responses on six-scenarios.

*Scenario A*, was pre-designed, to-have Some-plagiarism; only 40% of the-respondents identified it as-

such; the-majority (50%) were marked it as having Great amount of plagiarism; and 10% identified it as having No plagiarism.

*Scenario B*, was designed, similar, to A, as having Some-plagiarism; here vast-majority (70%) indicated the correct-answer; followed by 20% of these identified the-paragraph, as having No plagiarism, while remaining 10% said, it contained Great amount of plagiarism.

*Scenario C*, was having Great amount of plagiarism (the text was paraphrased, with no attribution to the original-author). Only 30% identified it as such, 40% said it had Some-plagiarism, while 30% marked it as NO plagiarism.

*Scenario D*, has Some-plagiarism pre-defaulted; Equal share (40%) of the-respondents identified it as-both; correct-response (Some-plagiarism) and also said, that the-passage contained No plagiaris, while the-remaining 20% believed it contained Great-amount of plagiarism.

*Scenario E*, with NO plagiarism; was identified as-such, by vast-majority(70%), 20% was of opposite-opinion, that it has Great-amount of plagiarism, while the-rest (10%) were indicated Some- plagiarism.

*Scenario F*, had Some-plagiarism; the-responces splitted at-the-middle: 50% said NO-plagiarism, while the-rest said, that the-passage contained Some-plagiarism.

### 3.2 Analysis of Results and Discussion

It-is-apparent, that the-attitude of the-faculty-members, reflected in-relatively-low-response-rate, inadequate-level of seriousness and responsiveness, with which plagiarism is perceived. That is, the low-response-rate and weak-enthusiasm support the-findings of the IPPHEAE' study for Belgium: students, staff-members and HEI-managers, tend to-display a-lack of interest-toward-plagiarism.

This-study identified that 30 to 60% of the-faculty did-not-identify plagiarized-versions correctly, which indicates that faculty, in this-survey, were unclear on exact-meaning of plagiarism. The-study initially-presumed, that all-the-respondents are published-authors, in-their-field, and, therefore, supposed to be familiar with the-ways to-avoid plagiarism; by understanding of proper-referencing and having citation-skills. According to Scouller *et al.* (2008), however, analysis of such-responses, indicated a-failure to-put this 'knowledge' into-practice. There was, hence, an-apparent-gap, between expected-knowledge and the-ability to-apply it, in-their-survey.

The-finding also correlates-well with the-study of Carroll (2004), where he pointed-out, that many-authors had difficulty expressing their-own-ideas and differentiating between a-common-knowledge and information that needed to-be-referenced. The-finding is also in-accord with the other-research-findings of Roig (1997) where he stated, that majority of respondents were-unable to-identify plagiarism in passages, due to mis-understandings, concerning plagiarism and correct-paraphrasing.

The logical-conclusion of the-study is, therefore, that many-incidents of plagiarism are likely to- result, from lack of knowledge, or even bare-ignorance, rather than planned-plagiarism. To-support this-point, Orim, *et al.* (2013), pointed-out, that most-plagiarism-cases occurred as a-result of lack of awareness and proper-skills.

Other-major-reasons, contributing to-widespread of plagiarism, are (Reddy, 2011): (1) The wealth of information, which could-be-accessed, at our-fingertips, through the-Internet; (2) 'Copy and paste' technique to-become more-widely used, in order to-copy the-ideas, words and works of others into one's own-research-work; (3) Lack of writing-skills; and (4) The-pressure, within-oneself, to-increase the-number of publications, as a-credit of their-own, so called academic-pressure of 'publish or perish'.

With regard to-reason number (4), above, Bretag (2013) emphasized, that plagiarism 'is a symptom of a deeply-entrenched academic-culture, that arguably places tangible-rewards (grades, diplomas, publications, promotions, grants), above the-intrinsic-value of learning and knowledge-creation'. Furthermore, some-plagiarism-behavior, such-as collusion, is clearly intentional, and un-ethical, whereas, some-other could-be-accidental or unintentional, which-could-be-referred-to as poor-practice (Elander *et al.*, 2010; Devlin & Gray, 2007; Hayes & Inrona, 2005; James *et al.*, 2002; Brown & Howell, 2001).

To-examine the-very-root-cause of the-plagiarism-problem, from the-angle of behavioural sciences, it-would be-beneficial, also to-look at a-growth and development-process, of a-human-being, and in particular, at the-imitation-behaviour, naturally-inbuilt in-us.

#### 3.2.1. Imitation-behaviour, inbuilt in us

In-certain-cultures, like the-Chinese-one, for-example, 'follow-the-expert' is a-commonly-accepted and widely-used-learning-method. Solomon (1996) pointed-out, that this-type of learning-model is an- 'every-day' model, where people learn from experience of their-ancestors. According to Eisner & Vicinus (2008) imitating the-expert, and imitating as-close-as-possible, is 'a way of acknowledging the greatness of the-expert's ideas'.

On the-other-hand, replication, mimicry, and learning 'parrot-way', apparently, are imperative parts of any-learning. This is, usually, how any-child learns how to-speak, how to-write and how to-perform simple-tasks. They try to-reproduce the-information, by replicating or imitating 'a model' (could be a-parent, a-family-member, a-teacher, etc). As-adults, subconsciously, we rely on the-learning-strategies, which we absorbed, as-

children. In-the-spirit of this-notion, a-similar-tactic is applicable for faculty, when learning, how to-write a-scientific-manuscript or a-program (Fawler, 2004).

The-imitation-method, however, ideally, should be just a ‘warming-up’, which supposed to initiate, propel, develop and boost the-reasoning and independent-thinking of a-writer.

### 3.2.2. Value of proper and accurate-attribution.

According to Robert Merton, an-ultimate-value of a-scientist is to-have inquisitiveness and a-passion for the-truth (Merton, 1993). In-writing, authors draw-upon others’ ideas, expressions and the-intellectual-heritage, underlying the-very-essence of human-progress. Scholarship, on the-other-hand, entails researching, understanding, and building-upon the-work of others, but also requires that proper-credit be-given, for any-‘borrowed’-material, by citing (Davis, 2015).

Giving-recognition to the-original-author, by citing-sources, is the-only-way, to use other-people’s work, without-plagiarizing. A ‘citation’ is a-routine-practice, of paramount-value, in academic-writing, by which an-author informs readers, that certain-material in theirs’-work emerged from another-author/source. Moreover, it-gives the-readers, the-information, necessary to-find that-source again, including: (1) Information about the-authors (names, affiliations, contacts, and short-academic-autobiography (for some-journals), etc.); (2) The-title of the-work; (3) The-name of the-journal, with its-details, such as: official-website-address, ISSN numbers and other-important-information; (4) The-date (meaning the specific-volume and issue of the-journal, the-work was-published); and optionally, (5) The-exact-page numbers, of the-borrowed-material.

Additionally, there are other-reasons, to-cite-sources, such-as (Masic, 2014): (1) Citations are extremely-helpful to-anyone, who wants to-find-out more, about author(s)’-ideas and where they came from; (2) Not every-source, cited, is bright or accurate, and hence, the author(s)-own-ideas may, sometimes, be-more-precise or, even, more-interesting, than those of the-sources. Proper-citation will-keep an-author blameless, for someone else’s bad-ideas; (3) Citing-sources, also, shows the-magnitude, value and relevance of research, an-author had-done; and (4) Citing-sources reinforce author’-work, by providing outside-support to author’-ideas.

It-is also-important, to-mention-here, that there-are-particular fundamentally-distinct prescribed styles of citation; the-most-common, however, are: (1) Chicago, (2) MLA (modern language association), (3) ACS (American chemical society), (4) IEEE (Institute of electrical and electronics engineers), (5) NLM (National library of medicine), (6) Vancouver (Biological sciences), and (7) APA (American psychological association).

### 3.2.4. Widespread-exposure to the-Internet and its-facilitation of plagiarism

According to the-recent-study, by Starovoytova & Namango (2016a):

...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.

The-term ‘ghost-writing’ has several-distinct-meanings, depending on the-levels of involvement, of the-ghost-writer (Bosch & Ross, 2012). It-is-often linked to-contract-writing, in which (POGO, 2011): (1) the-author, who takes the-credit, often acknowledges the-ghost-writer as the ‘editor’ of their-article. In this-case, the-ghost-writer does everything, from start to-finish, including research, writing and editing, but with constant-supervision, by the ‘author’. Also, the-former will-be attributed by latter (e.g. in most-biographies) and therefore, it-is ethically-acceptable; (2) The ghost-writer is only employed, to-edit and re-write a-draft (often disguisedly called ‘proof-reading’); (3) The ghost-writing only comes in, after the research-phase, but the-bulk of the-article, is written, by the-ghost-writer; and (4) Is simply using (or paying) ghost-writers, to-do the-entire-project, from start to-finish, without any-contacts, with the-authors (e.g. ‘paper-mills’).

The-charging-practices differ, from writer to-writer (on-average, however, it is 3-5 UK pence/word and the-minimum-charge is 100 pounds). Others said that their-charges depend on the-complexity of the- project (from 150 to 1000 £) for an-undergraduate-level-assignment and for a-PhD- thesis, respectively.

On the-other-hand, popular, today, social-networking has influenced, not only our-social-life, but also the-way we conduct-business and doing-research (Roblyer *et al*, 2010; Connell, 2009). Social networking-websites have several-millions of unique users/visitors, and the-number of visitors is growing each-year. Providers of some-social-networking-sites, utilize the-popularity of the-media, where they can approach anyone, instantaneously, directly and discretely, and use these-sites as an-advertisement-platform, for any-academic-needs (Roblyer *et al*, 2010; Peluchette & Karl, 2008; Todi, 2008).

The-use of customized-assignments/reports writing-companies, ‘paper-mills’ and other-paid third-parties, appears-to-be-widespread, in-modern-higher-education, and almost-any-sort of academic writing-work is now available, for-purchase. They are-relatively-cheap, the-results can-be-obtained very quickly, they are also-difficult, to-detect. Overall these-sites are attractive, for some-unethical-writers; hence, their-use represents a serious-threat to-academic-integrity, around the-world.

### 3.2.5. A ‘double-edged-sword’ of plagiarism.

Common-access, to-the-Internet and other-electronic-media, has served as a-‘double-edged sword’, regarding



plagiarism; the-Web allows one to-plagiarize with ‘cut-and-paste’ ease, but also allows identifying, more-easily, the-source of the-plagiarized-material, when plagiarism is-suspected (Lyon *et al.*, 2006).

There-are many-anti-plagiarism-soft-wares available now; some of them are-free and safe, to-download. Interested-readers can refer to Starovoytova & Namango (2016a) for more-details. Even a-best-machine, however, cannot determine: Plagiarism of text, outside the-database; Plagiarism of ideas; Plagiarism of graphics/equations; Plagiarism by omission; Incorrect-citation; Acceptable or unacceptable ‘self-plagiarism’; Coincidence; and Acceptable-copying.

Nevertheless, Hellaby (2011) pointed-out, that a-growing-number of Higher Educational Institutions (HEIs) is taking action, against plagiarism, and actively-scans for plagiarized-work via anti-plagiarism-detection-soft-wares. Besides, over the-last-few-years, a-downward-trend, regarding cases of plagiarism, is apparent, in-universities, across-Belgium. According to the-university-board, this-decrease is, mainly, the-consequence of the-deterrent-effect of the-implementation of the-software *TurnItIn* (DeMorgen, 2013).

This-study, therefore, will *only* highlight one of the-most-popular, and, now, common, in many-universities all-over-the-globe--*TurnItIn.com* software. It-compares, a-written-submission, against a-large-number of sources, by-reporting the-percentage of overlaps, against a-massive-database and other-online-sources. This-percentage, alone, however, does *not*-reflect whether or not, an-academic violation has-taken-place; but it-can-raise suspicions of plagiarism, necessitating further-investigations, of the-text. Therefore, academics and journal-editors, have to-read and interpret, when overlap between papers is coincidental, and, when it-is a-plagiarism (McKeever, 2006). Given that, some-systems, now allow one to-upload, their-own-writing, to-check for plagiarism, before submitting a-manuscript, rates of unintentional-plagiarism may-drop, making the-remaining-intentional-plagiarism much-easier, to-detect.

Notwithstanding *Turnitin.com*’ potential-benefits, it however, cannot, at all-times, detect plagiarism in computer-programming (code-plagiarism), very-technical-writing or other-obscure-sources (Kraemer, 2008; Royce, 2003). It-is-also important to-realize, that *Turnitin.com* is not a ‘silver-bullet’; rather, it-should-be-seen, as a-helpful-tool, for detecting suspicious-papers and further-identifying the sources of plagiarism (Youmans, 2011). Additional-limitation, with all-anti-plagiarism soft-wares, is that they do *not* prevent plagiarism, but catch-it, after it-has-occurred (Beute *et al.*, 2008).

### 3.2.6. Battling plagiarism

At the-beginning of this-paper, it-was-stated, that ‘The readers of this-paper are, most-likely, interested not only about the-plagiarism, itself, but, most-importantly, on how to-avoid and combat the-menace’. The -following-brief, will-try, to-put some-light, on-this-issue. To-combat cheating, including plagiarism, a well-known, 3D-approach can-be-used: prevention, detection and punishment. The-authors already discussed the first-two; therefore, the-next sub-topic will-be-dedicated to the-punishment-approach.

### 3.2.7. Intellectual-property, Copyright and Copyright-Law

Plagiarism is commonly-understood as ‘theft’ of words and/or ideas, in writing. The-logical-question is immediately comes to mind: ‘Can words and ideas (being intangible) really be stolen?’ Apparently, yes, as words are considered to-be a-form of an-intellectual-input, generally-known as *intellectual-property*. And, therefore, as any-property, they can-be-stolen.

*Copyright* is the ‘intangible-property’, which allows the-copyright-owner, or those authorized by the-copyright-owner, the-exclusive-right to-prohibit, or to-perform certain-acts. For example, in-Australia, when an-author fails to-give a-correct-attribution, to the-original-author, their-legislation considers it as a- violation of moral-property-rights to-the literary-work. This-view is paralleled, in-England and in the United States of America (Titus, 2008).

Signatory-nations to the-Berne Convention, agree to-comply, and uphold international copyright protections and regulations, for-authorship. It-should-be, however, recognized that copyright, in-itself, does *not* protect ideas, or information, rather, it-protects the-way, in which an-idea, or information is expressed, in a-material-form.

*Copyright-laws* exists, to-protect an-intellectual-property. They make-it-illegal, to-reproduce someone else’s expression of ideas or information, without permission and proper-attribution. This can include music, images, written words, video, and a variety of other-media. At one-time, a-work was only protected by-copyright, if it included a copyright-trademark (the © symbol). According to-laws, established in 1989, however, works are now copyright-protected, with or without the-inclusion of this-symbol (Titus, 2008).

At an-implementation-level, however, this brought some-confusion, as some-authors still-perceive, that any-copyright-protected-material should-have *not* only the-copyright-trademark, but also an- official-statement on ‘copyright-brief’. In-the-absence of these, the-authors assume that the-information is not-protected, in any-way, and therefore, it-gives them freedom to-use it, under the-umbrella of ‘common knowledge’ or ‘public-domain’. Works that are no-longer protected by-copyright, or never have been, are considered as ‘public-domain’. This-means that one may freely-borrow material, from these-works, without fear of plagiarism, provided one makes proper-attributions. In-general, anything published more-than 75 years-ago is now in the

public-domain (Titus, 2008).

In the U. S.A., and many-other-countries, for example, the expression of original-ideas, words or ‘facts’ is considered intellectual-property, of the-author, and is protected by-copyright-laws, just like original-inventions (patents). Almost-all-forms of expression fall-under copyright-protection, as-long-as they are recorded, in some-written-media (such as a-manuscript, a-book, or a-computer-file). Anyone, who reproduces copyrighted-material, improperly, however, can-be prosecuted, in a-court of law. It does *not* matter, if the-form or content of the-original has-been-altered, as-long-as any-material can-be-shown, to-be substantially-similar, to the-original, it may be-considered, as a-violation, of the-copyright-law.

It-is important to-recognize, however, that ignorance of the-law is, by no-means, an-excuse. On the-other-hand, there-are different-punishments for willful-infringement (deliberate-plagiarism), and innocent infringement (accidental-plagiarism). Most-firms, companies, businesses and institutions will *not* tolerate any-form of plagiarism. Hence, there-has-been a-significant-number of cases around-the-world, where people have lost their-jobs or been denied positions, or promotions, as a-result of plagiarism.

Moreover, if, for-example, the-plagiarism involves money, prizes, or job-placement or job-promotion, it constitutes a-crime, punishable in-court (in-some-countries, e.g. USA). Most-cases of plagiarism, there, are considered misdemeanors, punishable by fines (between \$100 and \$50,000) and up to 1-year in jail. Plagiarism, can-also be considered, a-felony, under certain-state and federal-laws. For example, if a-plagiarist copies and earns more than \$2,500, from copyrighted-material, they-may face-up to \$250,000 in fines, and up to 10-years in jail.

In a-Kenyan-context, a-Copyright-law, applicable to-scientific-writing is, yet, to-be-written; analogues, at SOE, currently, there is *no* official-Plagiarism-Policy; only Rules on Examination Irregularities are-in-place. One of the-contributing-factors, to this-end, could-be, a-lack of finances for an- educational-sector, as in most-developing-countries, plagiarism is not a-priority, in the-institutional-culture.

To-support this-rationalization, an-example of the-Academic Integrity Maturity Model (AIMM) is presented here, which was-developed, to-measure the-level of academic-integrity-maturity, for a- particular-country. The-assessment of ‘maturity’ of policies, at a-national-level, was-based on-nine-criteria: research, training, level of knowledge, communications, prevention-strategies, use of software-tools, consistency of sanctions, and of policies, and transparency of processes. The-correlation between AIMM and GDP is shown, that the more-mature the-academic-integrity, in a-particular-country, the-richer the-country. This-relationship could be-logically-explained: as the-richer the-country, the-more-money goes to an- education-system. Therefore, higher-education-institutions can afford software-tools, integrity-officers and other-bodies, promoting and enforcing academic-integrity, at-particular-institutions. On-the-other-hand, building the-integrity-structures, raising-awareness, about integrity-issues, and rising authors’ integrity-level, makes any-educational or other-institution or business, more-ethically-mature, causing more-trust, promoting trade, and increasing GDP. Therefore, devotedly-promoting academic-integrity, directly or expansively, tends to-impact, positively on-national-economies (Glendinning, 2014). In-addition, the-integrity, skills, credibility and honesty, of the-scientific-researchers, and academic-writers, are essential-qualities, in-order to-gain the-confidence, of the-academic and scientific-community, and general-public, thereby sustaining credibility, of an-affiliated-institution. To this-end, this-study proposes a holistic-approach to-combat plagiarism, which will-be discussed in-the-following-section.

### 3. 2.8. Holistic-approach to combat plagiarism

The-goal of scholarship is: to-discover, to-understand, and to-create. That-purpose is defeated, when old-knowledge is fraudulently-presented, as-original and new. Thus, plagiarism is a-completely unacceptable-practice for all-scholars, which should-be-avoided.

According to Macdonald & Carroll (2006), in a-holistic-approach to-plagiarism, ‘the emphasis is on promoting good-scholarly, academic-practices, rather than focusing on potential-problems and channeling all-the-institution’s energies into deterring, through detection and punishment’. A holistic-institutional-approach is, therefore, necessary, because plagiarism is a-complex-challenge, to education, which-cannot-be resolved, by the-students and the-faculty, by-creating institutional-rules and regulations, alone, or simply by electronic-text-recognition-programs. All-stakeholders should-be involved and tackle the-various-plagiarism-challenges, from different-angles, the-results are more-likely to ‘foster a scholarly-community, based on shared-understanding and practices of academic- integrity’ (Bretag, 2013).

## 4. Conclusion and Recommendations.

### 4.1. Conclusion

Overall, the-results, of this-study, suggest a-worrying-lack of understanding, among engineering-faculty, on the basic-elements of scientific-writing and on plagiarism. The-study-also revealed a-complete-lack of a- legal-framework, to-deal, with-plagiarism, its-prevention, and punishment, at-an-institutional-level.

A-famous-Newton’s-quote, cited by-Cohen (2004) states, that: ‘If I have seen further, it-is by standing

on the-shoulders of Giants'. This-passage, very-eloquently, captures the-truth and the-essence of our focal-point, that every-new-knowledge is based on the-previously-published-research (left to us, as a recorded-‘inheritance’, which we must, not only use, but use, judiciously, furthermore striving to-add our-own-value to-it). Therefore, paying recognition, to these-predecessors (for their-expertise, ideas, time, and effort) is an-obligation for any-ethical-writer. Ethical-writers ought, to make every-possible-effort, to acknowledge sources, adequately and correctly, in-accordance with the-contexts and the-field of their-writing. If plagiarism, however, continues, being: undetected, uncorrected and unpunished; research becomes an-effortless-photocopy or duplication of earlier-studies, and suffers from lack of imagination, innovation, uniqueness and, therefore, resulting in research of no-scientific-value, whatsoever.

The-current-study also provides a-number of steps-forward, into the-field of plagiarism-research and understanding. In particular, more than a few-key-concerns (such-as Imitation-behavior, inbuilt in us; The-concepts of Intellectual-property, Copyright and Copyright Law; Widespread-exposure to the Internet and its consequences on plagiarism; and a 'double-edged-sword' of plagiarism, among others) were holistically-looked-into, hopefully offering a-much-deeper-grasp, on the-subject-matter. This in-turn, will contribute (in its small-way) to-ensure genuine-intellectual-contributions, to-excellence in scholarship.

Lastly, the-sample-size for this *unfunded*-study, was rather-small, and therefore the-findings cannot be generalized.

### 5.2. Recommendations

Based on the-findings and the-discussion, the-following-recommendations are put-forward:

The university should:

- (1) Establish official-rules and regulations (such as Plagiarism Policy) to-prevent and deal with plagiarism,
- (2) Subscribe-to and install official-anti-plagiarism-software (such as TurnItIn), to-detect plagiarism, in the-work, submitted by-students, as-well-as faculty-members, before publication of scientific-papers.
- (3) Facilitate further-studies on plagiarism, on a-larger- and more-deeper-scale.

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