

Perspective of Malaysian Undergraduate Engineering Students on Academic Plagiarism*

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A fundamental step in formulating an appropriate guideline for plagiarism for undergraduate engineering students in Malaysia is understanding their perspectives on plagiarism in academic exercises. Five key exploratory elements are discussed, i.e., awareness, types, reasons, solutions and impacts of plagiarism in unsupervised academic exercises. The perspectives of 270 students from the four core disciplines, and including the architecture department, which involves first, second, third, and final year students, were obtained using an open-ended survey. Data suggests that engineering undergraduates are fully aware of what plagiarism is and understood that plagiarism is an academic offence. A high percentage 79.7% of the respondents – admit to routinely and consciously committing plagiarism due to the habitual characteristics of a student. The absence of a clear guideline by the university regarding the consequences of committing plagiarism further abetted the students to commit the offense. Seventy-four percent of the respondents preferred that plagiarism cases to be handled internally and settled at the discretion of the module convener. Although the students are highly aware (79.7%) notion of plagiarism, this does not correspond to the same level of awareness in the implications of the consequences of being caught. This suggests that students are not deterred by the moral ramification of plagiarism, whilst justifying their actions based on the overwhelming pressure to get good grades.

Keywords: exploratory elements of plagiarism; Malaysian university; engineering undergraduate students; plagiarism actions

1. Introduction

Engineering faculties at Malaysian universities are committed to and abide by the Washington Accord as a crucial instrument for the recognition and accreditation of engineering programmes. The Engineering Accreditation Council in Malaysia, which administers the accreditation process for engineering programmes, has established twelve mandatory Programme Outcomes (PO) in the Accreditation Manual [1]. Students are expected to have achieved these outcomes, in addition to mastering technical and soft skills, by the time they graduate from universities. One of the POs gives explicit emphasis to ethical issues, where graduates are expected to adhere to ethical principles and commit to the professional ethics, responsibilities, and norms of the engineering practice [2].

One of the complex ethical issues faced by scientists and engineers with regard to publishing and publications is plagiarism [3]. In 2005, the Board of Engineers Malaysia [4] published the ethical principles for engineers in a document known as ‘Code of Ethics for Young Engineers’ to address the issue of plagiarism. These guidelines are presented in the form of *Dos and Don’ts* and comprise five main points on ethical behaviour and

practices: (1) Registration, (2) Consultancy, (3) Supervision, (4) Regulatory requirements, and (5) Code of Ethics.

Points 1.1 and 1.2 of the documents clearly state that ‘An engineer should not be the Submitting Person for designs beyond his/her area of competency’ and ‘An engineer should not endorse his Professional Engineer (PE) stamp and sign on reports or plans not prepared by him.’ This is further elaborated in point 2.3, which states ‘A checker engineer should take full responsibility for the checking of the work himself.’ These three points emphasise the importance of competency and the work done by an individual and prohibit the submission of someone else’s work as one’s own.

Several aspects of plagiarism have been extensively researched over the years, including awareness of plagiarism, the reasons for committing the offense, the factors contributing to it, and its different forms [5–7]. Some of the studies are more specific and investigated the social background, English fluency, field of research, and academic classification [8–10]. Among the factors influencing students’ decisions to commit plagiarism are gender, age, academic ability, social life, and personality. Younger males with lower grade point average (GPA) and active social lives have been

shown to be more inclined to commit academic dishonesty [11]. Students with emotional issues, such as lack of confidence, being pressured, and seeking the approval of parents and peers were also found to be more inclined to commit plagiarism [12]. Not only that, the current Y generation believe that copying material from the Internet is 'fair game' [13] and becomes one of the big challenges in educating them.

Much research has investigated the correlation between plagiarism and students' personal traits, social background, and situational factors. Subject discipline is also believed to be a significant factor in determining whether a student will commit plagiarism. Science and engineering students have been shown to commit more plagiarism in comparison to social science students [14]. The technical content in science and engineering courses are believed to contribute to the increase in acts of plagiarism [15]. Shelley Yeo [15] conducted a study on first year engineering students in Australia found that even though students were aware of the concept of plagiarism, the lack of knowledge regarding the types of plagiarism has contributed to the student's committing plagiarism.

Most of the research and materials in the engineering disciplines are written in English, and very few books are available in the official language of Malaysia. This often makes it difficult for students to sufficiently understand the material and present ideas in their own words. The tendency to commit plagiarism by non-English speaking students has sparked a debate on whether the offense was committed due to cultural factors or rather the lack of mastery of the English language. Stappenbelt et al. [16] has revealed that although postgraduate students that come from the Oceania region were better at identifying plagiarised material, students who came from a non-English speaking background or with English as a second language were nearly as proficient. Asian students typically plagiarise because in their culture it is as a sign of respect and wisdom to use or quote the words of the masters [17, 18]. Liu [19] rebutted this notion and suggested that plagiarising is for the most part committed due to poor mastery of English, both written and oral communication, and that there is no concrete evidence for cultural conditioning.

Undergraduate accounting students in Malaysia were found to commit plagiarism because of ignorance and lack of understanding of the subject, as well as due to personal attitudes such as mediocre interest (in the subject) and laziness [20]. There is no evidence to support the link between plagiarism and pressure, competence and easy access to Internet. Motivated by these findings, this paper attempts to investigate plagiarism awareness and understand-

ing amongst undergraduate engineering students at one Malaysian university. The investigation focused primarily on the students' perspective and experience. The issue of plagiarism is rather contentious, particularly when it comes to paraphrasing and improper citation or referencing procedures. John Walker [21] proposed seven types of plagiarism: sham paraphrasing, other plagiarism, verbatim copying, recycling, ghost writing, illicit paraphrasing and purloining (copying an assignment without the consent or knowledge of the proprietor). Of these seven types of plagiarism, the majority of the students regarded purloining as an obvious form of plagiarism (to the point of stealing) whereas paraphrasing is not regarded as plagiarism [22]. This study does not look at the whole spectrum of plagiarism, but will focus on the commonly understood types of plagiarism, i.e., purloining and ghost writing.

Several studies have been conducted which focused on Asian engineering students, particularly in a multi-racial academic environment such as in Malaysia. Students in engineering faculties are often regarded as the *crème de la crème* and were accepted into the faculty by virtue of their high cumulative grade point average (CGPA) from their preparation year, usually a CGPA higher than 3.5. They are expected to always be on top of their game, proactive, hardworking and, most importantly, able to express ideas in their own words.

However, the past several years has witnessed the fall of celebrated personalities, including politicians, entertainers, and one scientist and academician, as a result of plagiarism [13]. Considering that the scientist and academician was once a student, it is important, if not imperative, to minimise or eradicate the acts of plagiarism during the study years. Sims [23] has shown that students who cheat (including those who plagiarize) often persist their unethical behaviour throughout their later career.

This study seeks to answer the following critical research question: What are the perspectives of undergraduate engineering students in Malaysia regarding awareness, type, and impact of plagiarism, the reasons for committing plagiarism, and the solutions for it?

2. What are the Students Telling us?

This survey involved 270 undergraduate students from five departments, namely civil, electrical, mechanical, and chemical engineering as well as the architecture department, at a public national university. The participants were informed that their responses would be anonymous and confidential, and would be used only for research purposes. In addition, the participants understood that their

answers would not be used against them and would not affect their grades. The questionnaire was revised based on preliminary feedback, specifically in rewording the questions (in the questionnaire) to ensure that the respondents understand the questions correctly.

It should be noted that the sampling was slightly gender biased towards female students, and only 38.0% of respondents were male. Even though this is not an ideal situation, it is a challenge to obtain a proportionate gender distribution since the current cohort of students is heavily skewed towards female students. All respondents are between 18 and 22 years old.

The respondents were well distributed among the departments, although the highest percentage of returned questionnaires of 30% is from the students in the civil engineering department. Table 1 shows that most of the respondents were beginning their first year and the lowest percentage of returned questionnaire was from the final year students.

The survey was conducted via paper questionnaire, and comprised five sections: (1) students' awareness of plagiarism, (2) commonly plagiarised academic exercises, (3) factors in committing plagiarism, (4) suggested solutions, and (5) impact of plagiarism on students. Each section will be discussed in detail below.

2.1 A: Awareness of Plagiarism amongst Undergraduate Engineering Students

The first section of the questionnaire seeks to identify the degree of plagiarism awareness amongst students. This section includes questions regarding whether students know the definition and understand the meaning of plagiarism. This section also contains introductory questions which gauge the students' awareness of the seriousness of plagiarism. This includes several categories of the plagiarism activities described by [21]. However, all questions in this study were designed to provide an understanding of the common intentions of

plagiarism. The present study does not seek to understand unintentional plagiarism, such as when students fail to follow the proper protocol in citing academic materials due to the lack of knowledge [24], whereby this action are considered as of no malice, accidental and unconscious literary theft [25]. The present study also did not investigate other situations of sham paraphrasing, verbatim copying, recycling, and illicit paraphrasing.

Intentional plagiarism is the deliberate act of literary theft, and this includes:

1. Taking materials from other sources and submitting them as one's own via methods such as copying without proper acknowledgement, and passing off another student's work as one's own, with or without the student's knowledge.
2. Submitting assignments written by someone else as one's own work, either by ghost writing or those prepared by friends and relatives.

In Case 1, the copying is done either with or without the student's knowledge and is known as other plagiarism and purloining, respectively [21]. In Case 2, the definition used for ghost writing is as described by Walker [21].

This section also seeks to identify the sources from which students learned or were informed about plagiarism. Several examples were given, including lecturers, friends, through their own initiative, and an opt-out option of no information. One set of questions seeks to investigate the students' awareness of the university's policy on plagiarism. Two dichotomous questions were asked:

1. 'Are you aware that the university will take strict actions for convicted plagiarism conducted by students?'
2. 'Do you think the university takes plagiarism seriously?'

More than three-quarters of the respondents (>75%) ticked the 'yes' box for the set of dichotomous questions in this section, indicating that they have a high degree of plagiarism awareness. The data presented in Table 2 shows that 89% of the students understood the definition of plagiarism and were aware that plagiarism is an academic offence. High percentage of students aware on the plagiarism is seen as positive improvement, considering that it was reported, in 2011, that the level of awareness for engineering students was considerably low [26].

Data analysis for the second part of this section showed that 51% of respondents learned about and were informed about plagiarism by their lecturers, 36.5% learned through their own initiative, 9.5% from friends and seniors, and 2% claimed that they had no knowledge of plagiarism. The role of

Table 1. Demography of respondents

n = 270	N	%N
Sex		
Male	102	37.8
Female	168	62.2
Year of Study		
First	112	41.5
Second	67	24.8
Third	77	28.5
Final	14	5.2
Department		
Civil	81	30.0
Mechanical	59	21.9
Chemical	48	17.8
Electrical	47	17.4
Architecture	35	12.9

Table 2. Degree of plagiarism awareness amongst students

Plagiarism awareness				
	Yes		No	
(i) know the definition of plagiarism	89%		11%	
(ii) understand the definition of plagiarism	88.5%		11.5%	
(iii) aware of the seriousness of plagiarism	76.3%		23.7%	
(iv) source of information on plagiarism	lecturer	own initiative	friends	no info
	51%	36.5%	9.5%	2%
(v) awareness of university's plagiarism policy	76%		24%	
(vi) implementation of university's plagiarism policy	54%		46%	

lecturers as the academic 'town crier' is critical to ensure that students are well informed or at least have a knowledge of plagiarism. In this case, the faculty members too, need to be fully aware, understand and have the correct attitude towards plagiarism, so that the proper conceptualisation of plagiarism on the students can take place [27]. This study also seeks to investigate whether students are aware of the university's plagiarism policy and position on academic offences such as plagiarism. Data shows that the 76% of the students were aware that the university would take stern action on proven plagiarism cases. However, only 54% of the respondents were aware that the university strictly implements the stringent rules on plagiarism.

2.2 B: When do the Students Plagiarise?

The questions in Section B were designed to identify the common unsupervised academic exercises in which students are more likely to plagiarise. The examples provided in the questionnaire are the common exercises given to undergraduate engineering students, including assignments, projects, laboratory and project reports, quizzes, theses, and an option for all of the above. It should be noted that here 'assignment' refers to unsupervised assignments which the students have to complete outside of the teaching sessions. The 'thesis' in this section is only applicable to final year students and is research-based, comprising eight credits over two semesters.

This section also includes questions which seek to determine the typical sources used to obtain information and referred to for their academic exercises. Students were asked to state the sources of the materials they used, either digital sources (i.e., Internet), friends or seniors, or printed sources, including books/manuscripts and journals.

Respondents were asked to state the academic exercises in which they have plagiarised, and Table 3 shows that most of the respondents (i.e., 79.7%) admitted to plagiarising the assignments given by lecturers, 6.7% admitted to plagiarising both laboratory and project reports, and 1.3% had plagiarised during quiz sessions and in their final year project theses. The low percentage of plagiarism in quizzes is expected since most quizzes are held during teaching hours and must be handed in immediately.

It is rather alarming that some students admitted to committing plagiarism in their theses or final year projects. Although less than 5% of the respondents commit plagiarism in all academic exercises, this practice must not be taken lightly and must be dealt with firmly. Producing unethical engineers not only tarnishes the university's reputation but also might give rise to other serious problems, such as miscalculated design and involvement in bribery. This anticipation is made on the basis that the engineering (including civil engineering) and construction sectors have been identified as the most corrupt sectors in the world [28].

The questionnaire was also designed to investigate the resources used by the respondents in their academic work. The majority of the respondents (i.e., 46.3%) admitted plagiarising by using resources from the Internet. This is not at all surprising and was expected as the Y generation is very IT-savvy and they have unlimited access to the Internet. The university provides easy, round the clock access to wireless Internet connection, which allows the students to download anything from the comfort of their rooms. This 'cyber cheating' or 'mouse-click plagiarism' phenomenon, as described by Scott Stebelman [29] and Nicole Auer and Ellen

Table 3. Percentage of commonly plagiarised academic exercises and source of information

Type of plagiarism						
(i) type of task	assignment	project	thesis	report	Quiz	All
	79.7%	6.7%	1.3%	6.7%	1.3%	4.3%
(ii) type of source	Internet	friends/seniors		printed sources		others
	46.3%	30.3%		5.4%		18.1%

Krupar [30], is problematic as it is difficult to persuade students that it is not appropriate to present the materials from the web as their own.

In addition, 30.3% of respondents said that they plagiarised assignments by copying answers from colleagues and seniors, while the remaining respondents plagiarise printed books and other resources. The small percentage of plagiarism through traditional method of physical published sources was very much anticipated considering the nature of printed resources, which requires students to be at a specific location, such as the library, whereas the Internet is accessible from anywhere at any time. Undergraduate students were also found to perceive copying from the Internet as being less dishonest in comparison to plagiarising from printed sources [31].

2.3 C: Why do Students Plagiarise?

The third section seeks to identify the factors and reasons which could contribute to plagiarism. The four hypotheses in this section are concerned with attitudes, pressure, academic, and cultural factors. Students were given multiple specific activities as examples, as shown in Table 4.

This section examines the reasons why students commit plagiarism based on four factors: attitude, pressure, academic, and culture. Table 4 shows that most of the respondents cited attitude and pressure as their main reasons for committing plagiarism. Less than 30% of the respondents cited academic and cultural factors. The fact that 9.5% of the respondents cited laziness as the reason for committing plagiarism is rather worrying for a higher learning institution and competitive school such as engineering. Further analysis showed that these respondents were mostly first-year students. First-year students are seemed to misuse or fail to wisely use their newfound academic freedom, compared to the continuous supervision or spoon-fed education they experienced during their secondary and pre-university years.

Table 4. Specific activities associated with the four hypothesize factors for plagiarism amongst undergraduate engineering students and the corresponding percentages

Factor	Specific activity	Percentage (%)
Attitude	Laziness	45
	Poor time management	47
Pressure	Chasing deadline	43
	Getting good grades	49
Academic	Confusion on citation rules	20
	Lack of understanding of the subject	30
	Low self-confidence	25
Culture	Everyone does it	16
	Convenience	25

With regard to pressure, the majority of respondents stated that they committed plagiarism in response to stressful situations, such as not being able to meet a deadline, the pressure to get good grades, assignments were too difficult, and confusion on how to complete a task. Slightly less than 43% of the respondents cited the pressure to meet a deadline as the reason for plagiarising while 49% cited the pressure to obtain good grades. Respondents admitted to having difficulties in completing their assignments, in particular when they are required to answer tough questions and did not have a good comprehension of the subjects. Low ‘self-confidence’ was cited by 15% of the respondents and 20% admitted to not knowing the proper method for citing a reference. In this survey ‘self-confidence’ refers to the students’ ability to believe that their work is correct and worthy of being awarded good grades.

A rather high percentage of students, 16%, cited cultural factors for committing plagiarism. They plagiarise simply because everyone else is doing it and it is just a prevailing practice among students. About 25% of the respondents thought that plagiarising is convenient and that it saves time. The complexities of plagiarism apply even to native English speakers, although the grammar intricacies of the English language add challenges to those who speak English as a second language [9].

2.4 D: Perceived Solutions for Plagiarism

This section focuses on analysing students’ perspectives on possible solutions to minimise, if not eradicate plagiarism activities. The questions were designed to investigate which of the following three methods, (1) awareness campaign, (2) academic related activities, or (3) disciplinary procedure, is their most preferred approach. Students were asked to choose two activities from the list presented in Table 5. The students were given the opportunity to give a subjective answer in the space provided in the questionnaire.

More than half of the respondents agreed that general information about plagiarism (for new students) or reminders (for seniors) should be given during the orientation week (or the first week of each semester). In fact, some students prefer to have a compulsory ethics or referencing course, which they hope would facilitate their understanding of the definition and types of plagiarism, as well as effective methods to avoid it. This shows that students want to be reminded of what is expected of them; first-year students in particular preferred awareness campaigns so that they are constantly reminded of the seriousness of plagiarism.

The majority of respondents, 46%, stated that the

Table 5. Set of questions to investigate the perceived solutions for minimising plagiarism and their corresponding percentages

Solution	Specific activity	Percentage (%)
Campaign	Self-awareness	43
	Talk	8
	Referencing class	20
	General introduction class during orientation week	66
	Stated rules and regulations in the university handbook	18
	Compulsory open seminar/workshop	16
Academic	Time planning	20
	Constant reminder by lecturers	16
	Use of software to detect plagiarism	16
	Design assignment which has no room for plagiarism	20
Disciplinary	To be handled internally (i.e. redo assignment)	74
	Bring to the attention of the head of department	18
	Publicize the names of plagiarist	23
	RM50 penalty per case	23
	Lower grades/an F	20
	One-year suspension	14
	Listed as plagiarist in record book	13
	Expel from university	7
	Ignore the offence	8

* RM denotes Ringgit Malaysia (Malaysian currency).

university should publicise the names of those who plagiarise and impose a monetary penalty. However, more than 74% of the respondents preferred for plagiarism cases to be handled internally by the module convener rather than bringing it to the attention of the Head of Department. This is obviously a more straightforward choice since they would not be penalised by the university and the process is discreetly managed. Disciplinary action of expulsion from the university is deemed as burdensome, troublesome, (usually by the module convener due to exhaustive administrative procedures) and only 7% of the respondents agreed to this. A much smaller percentage, i.e., 20% and 14% of the respondents agreed with demotion to lower grades or a failure and a one-year suspension, respectively.

Yeo [15] surveyed the physical science and engineering degree programmes in Australia found that students did not favour penalties or hefty fines. In the study, students perceived the act of plagiarism as a not serious offense which would require stringent rules and regulations. They preferred 'soft' punishment, such as deduction of marks, to formal procedures, which is consistent with the findings in this survey.

The respondents admitted that poor time planning or time management is a contributing factor to committing plagiarism when completing unsupervised assignments within the given time frame. Virtually all respondents who cited this reason are those who commit plagiarism due to their inability to meet deadlines. Respondents have to divide their time between their study, social life, involvement in college activities (particularly when their enrolment for the following semester is contingent upon their

active participation in college activities), as well as family responsibilities. Furthermore, each subject is a problem-based learning method of delivery, and this demands a great deal of the students' time in addition to making up a significant percentage of their final grades. This has a strong influence in the respondents' decision to commit plagiarism, particularly for 'easier' academic exercises such as assignments and tutorials.

Concerning the actions that could be taken by the instructors/professors, the respondents suggested that it is vital for them to be reminded not to plagiarise by the module convener at the beginning of each semester. Some of the respondents (17.6%) proposed alternative methods to avoid plagiarism, for instance the use of anti-plagiarism software such as Turnitin, which has been proven a successful tool in detecting plagiarism [32, 33]. Misis et al. [34] has also proved that JPlag and Moss to be effective tools for plagiarism detection for programming assignments, as they clearly indicated cases of similarity which were manually confirmed by human code inspection. The respondents stated that one of the ways to reduce plagiarism is by giving assignments that are designed with no possibility for cheating.

2.5 E: Personal Impact of Plagiarism

The final section aims to obtain respondents' understandings of the impact and consequences of plagiarism. The personal impact of plagiarism comprises four elements: (1) crime, (2) reputation, (3) personal trait, and (4) IQ. The impact of crime consists of two scenarios, the possibility of committing a crime, and its legal consequence. The specific activities for other elements surveyed is presented in Table 6.

Table 6. Specific activities related to plagiarism in the impact model and their corresponding percentage

Impact	Specific impact	Percentage (%)
Crime	Commit a crime	7
	Face legal action	10
Reputation	Negative impact on academic performance	43
	Personal reputation	45
	Credibility as an engineer	15
Personal trait	Incompetent engineering graduates	33
	Dependence on Internet for information/knowledge	16
Level of IQ	Does not develop critical thinking	50
	Lack of creativity and innovative ideas	36
	Inhibit intellectual growth	30

Results showed that the respondents were aware that plagiarism is a serious offence and is strongly related to cheating, with 45% of the respondents being fully aware of the effects of plagiarism on their future career, academic reputation, and undesired personality traits. A total of 43% of respondents agreed that plagiarism damages academic performance, and 50% of students agreed that plagiarism impedes the development of critical thinking. These results clearly support the view of 15% of the respondents that plagiarism has an effect on their future career as engineers. However, low percentage of respondents citing this reason indicate that the impact is not as significant as the other reasons described in Table 6. Despite the clear awareness of the gravity of committing plagiarism, respondents still chose to plagiarise because they believed that they would not be caught. In addition, even if they were caught plagiarising the respondent believed that the offense would be dealt with internally and would not have any long-term repercussions.

3. Discussion

3.1 A: Plagiarism Awareness

Plagiarism awareness increased steadily with the number of years spent at institutions of higher education. Differences in didactic practices and cultures contribute to the debate on the awareness and types of plagiarism. The Malaysian education assessment gives much emphasis to the national-scale written examinations and is based on schematic answers. Most students are provided with the answer schemes, to ensure that they give the perfect answers for each question, and as a result, the system indirectly churns out students who are not intellectually independent. The 'top-down' style of teaching and learning practised by Malaysian teachers and students in primary and secondary schools has a strong impact on students' ability to self-regulate in their learning strategies and detach themselves from the 'spoon-feeding' type of education [35–36]. The consistent spoon-feeding of schematic information reinforces the prevailing understanding that verbatim reiteration is a norm.

Students only gain a full comprehension of plagiarism after entering universities, which might be considered too late in the course of a student's formal learning experience. The maturity achieved by the students leads them to reinvent their study strategies and concepts, engaging them in understanding the real ideology behind the concept, effects, the practice of plagiarism as an academic offence, and the university's policy and actions taken on plagiarism cases.

It is this level of maturity that has to be nurtured amongst Malaysian students in their early years of learning. It is believed that the concept of plagiarism should be instilled starting from the preschool by providing them learning experiences which are continuously engaging, developing, and promote individual creativity. Teachers on the other hand should celebrate out of the box answers and not only restricted to the designed schematic answers, as ways to encourage students to be comfortable in their own thinking and presentation.

3.2 B: Types of Plagiarism

A majority of students admitted to having committed plagiarism in their assignments due to the nature of the exercise, which allows and promotes such practice. Assignments rely heavily on trust and self-control, and students must be mature enough to complete the exercises independently. Students must have a curiosity to acquire personal competences in a specific area and monitor their own lifelong learning, so that they will not be left behind in updated knowledge and technologies. If students are not able to achieve the required level of maturity, the assignments or exercises must be completed with supervision or directly incorporated into team discussion to minimise the opportunity to commit plagiarism/cheat.

The study group or peer leader technique has been practised for a long time and has been proven to be an effective learning technique [37–39] The correlation derived from this technique is that: (1) individuals who get good grades tend to associate with friends who also have good grades, and (2)

individuals are influenced by their peers to get good grades [40]. Based on these findings, mature, excellent students tend to rely heavily on friends and seniors who are knowledgeable and have achieved excellent results in a particular subject to provide them with quick and definite answers. Needless to say, good grades motivate them to pursue the action, while peer group study is a proper learning technique only if it is practised ethically.

The pressure to meet the expectations of becoming successful motivate the members of the groups to make the grades, thus opening up the opportunity for them to be helped by other members (in the peer group) to obtain the resources required for them to complete their academic task, including providing completed and evaluated work. The peer group culture not only applicable in education, but also extended to circle of close friends, place of work and even more distinct in political movement [41]. Thus, the practices in plagiarism may even be practiced when the students have graduated and finished their studies.

Results shown that the internet is the most popular academic sources, due to easily accessible and is unarguably the most preferred information gateway. Numerous academic materials, such as reviews, journal papers, proceedings, etc. are widely available and essentially assist the students in getting good information, particularly for their academic exercises. It is a valid information research tool and will only be defined as plagiarism if students did not appropriately cite the resources and references.

3.3 C: Factors Contributing to Plagiarism

Attitude and pressure are the main factors contributing to plagiarism, echoing the findings from Ehrich et al., [42]. Students are under constant pressure to meet deadlines and get good grades. Although personal attitude was identified as one of the main factors, it was believed that the plagiarism rate can be decreased if strict policies are imposed by the university [27]. Attitude involves life as a teenager (or adolescent) and problems that come with this stage of life such as depression, attention problems, delinquency and substance abuse [43]. Although most individuals pass through this developmental period with favourable outcomes, a significant number of other individuals experience difficulties in dealing with various issues. Psychological disorders, such as depression and anxiety, including stress, reduce effectiveness in learning and contribute to a high percentage of high school dropouts [44]. Furthermore, adolescents have the highest arrest rate among all age groups for a high consumption of alcohol and drug abuse [45].

Social-related distractions are partly responsible

for poor time management, which often results in academic procrastination [46]. The time overspent elsewhere on non-academic matters and autonomy in time management correlates with academic procrastination [47, 48]. This results in students not being able to thoroughly reflect on their assignment as well as a high possibility of them not being able to meet deadlines. In their desperation to meet a deadline, it might be that the easier choice is to copy from the Internet or from their seniors and friends [20].

Good students perceive the hard work required to get good grades as a part of the learning process and consider it as a challenge in their quest for knowledge. On the contrary, students who lack motivation generally view schooling as a burden, particularly with regard to completing assignments and projects, as well as reading to gain information [49]. The completion of academic exercises requires a lot of attention, time and a high level of cognitive effort in contrast to the much easier method of 'copy and paste.' New engineering students often struggle to develop self-regulated learning skills, which is one of the academic skills required in tertiary education in order for them to be able to complete assignments and homework with little or no supervision from the module convenor [50].

University education requires students to achieve the highest cognitive ability, and to create and evaluate, as described in Bloom's Taxonomy [51]. There is a constant demand for students to think creatively and unconventionally and students are constantly trained to do these throughout their engineering study programme. This, undoubtedly, requires a long period of time and effort to develop, and the process of nurturing an individual to acquire these complex cognitive skills requires an encouraging and conducive environment.

Some students only seek to achieve a passing mark, which is a minimum requirement for graduation. These voluntarily (to be) low-achievers are not motivated to pursue knowledge and are content with a passing mark of D for every subject. The lack of positive attitude and motivation results in inefficient learning and study strategies, which often translate into low academic performance [52]. They commit plagiarism as a fast and sure way (in their opinion) to pass if they were not caught. They are willing to take this risk since the penalties for most plagiarism cases are not publicised to the student population and, more often than not, they will only be given a warning by their respective lecturers.

Given that English is spoken as a second language in Malaysia, the inevitable challenge of expressing one's own thoughts and ideas in English is formidable. Furthermore, the existing definition of plagiarism, which focuses primarily on citation

and referencing conventions, restricts the opportunity for critical thinking, in particular for non-English native speakers [53]. Comparing with other studies, which focusing on the students with English as second language, students claimed they did not have adequate knowledge on plagiarism [54, 55], did not know what constitutes plagiarism [56, 57], were not aware of the proper citation techniques [58], or could be not interested in the subjects at all [59].

The concept of plagiarism needs to be redefined by clearly segregating the transgressive intertextual practices (that are obvious, such as verbatim copying and purloining) and the non-transgressive approach such as paraphrasing or patch writing. Paraphrasing, in fact, is considered as an essential skill, which must be mastered by students, particularly when writing on unfamiliar topics. This skill has been shown to be successful in helping students to better express themselves in writing a research and critical reading [60].

The authors believe that a more stringent approach in dealing with (transgressive intertextual) plagiarism cases must be implemented primarily at the executive level of universities. A guideline on plagiarism must be developed based on local language, identity, education and knowledge [53]. The guideline must be endorsed for all types of academic exercises, and applicable to the entire academic population, students and staff. The authors believe that lecturers who are well versed with the concept of plagiarism are more capable of dealing with this issue. It is recommended that the guideline be discussed at the national level and adopted as a national policy, and subsequently, instilled as part of the building blocks for a plagiarism act at the national judiciary level.

3.4 D: Perceived Solutions for Plagiarism

Based on the provided options to solve the problem of plagiarism, the majority of the respondents preferred for plagiarism cases to be dealt with internally. Malaysian students, in general preferred disciplinary actions to be taken discreetly rather than publicly when handling their plagiarism cases. Aware of the impact of academic plagiarism and due to the court case of *Fauziah Salleh v Universiti Malaysia Terengganu* [2012] 4 CLJ 601, Malaysian universities, in general, have amended, displayed and publicised the ethical guideline on plagiarism. The academic regulation, which included provisions on plagiarism, including the definition, types and associated penalty, was accessible to the students. The university sees curbing plagiarism as critical, with infographic posters widely disseminated through emails and social media platforms. The fact that 66% of the respondents prefer a

'general introduction class during orientation week' again highlights the mentality of students that must be constantly reminded. Despite efforts from the university, we believe that the lack of knowledge on what constitutes plagiarism is the key factor [27, 61] in equipping the student not to plagiarise. Thus, a 1-hour slot in one of the subjects for each semester could refresh the students on academic plagiarism and possibly minimise the occurrence of it throughout the semester.

Tabsh et al. [62] also reported that a university in the middle east had developed a more comprehensive student academic integrity code, established an adjudication process for the code violators, introduced first-year students to the concept of academic integrity during their orientation, asked new students to sign an academic integrity pledge, encouraged faculty to define academic integrity rules in their courses syllabus clearly, and asked faculty to report violators of the code to the administration.

Although there are good insights into Malaysian students' perceptions of plagiarism, the findings could only be deemed accurate representations for some Malaysian students. Limitations include that the questionnaire has multiple-choice answers, whereas an open-ended question would provide more information. Although the respondents are Gen Z generation, a different cohort of students, particularly those enrolled after 2020 (due to the pandemic-induced online teaching and learning), probably will have a different perspective.

4. Conclusion

Undergraduate engineering students in Malaysia in general have a good understanding of the definition of plagiarism and they know that it is an academic offence. Students frequently commit plagiarism when completing their assignments. Attitude and pressure are the two main reasons why students felt that committing plagiarism is unavoidable.

Despite clear consciences on plagiarism, the urge to commit plagiarism comes from the consideration that the chances of being caught are low and the impression of likely pliable subsequent disciplinary actions. Students are concerned about their public reputation and prefer that the matter, should they be found guilty of committing plagiarism, be managed in a manner that preserves their dignity and status in society.

Based on the highest percentage of responses given by Malaysian students in this study, conducting plagiarism is more of a student's inherent characteristics and personality. The traditional perceptual style of visual (using presentation) and auditory, and usually teacher-centred, one-way communication, is common in Asian countries,

including Malaysia. Thus, we believe that learning styles play an important role in shaping Malaysian student's attitudes toward the learning process. As the learning style of most Western and English-speaking countries, which is more aware and less prone to plagiarise, is personality-based, changing the learning lifestyle from perceptual to personality might have a different scenario on the plagiarism activities. We encourage problem-based learning,

open-ended assignments and assessment, shifting to student-centred learning from the usual teacher centred. These kinds of activities forced the students to be creative and innovative as the answers are not readily available, and we believe that it will minimise the act of plagiarism.

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References

1. Engineering Accreditation Council (EAC), *Engineering Programme Accreditation Manual*, Board of Engineers Malaysia, 2015.
2. Engineering Accreditation Council (EAC), *Engineering Programme Accreditation Manual*, Board of Engineers Malaysia, 2012.
3. L. Visser, T. Haideggeran and N. Papanikolopoulos, Pitfalls of publications: On the sensitive issues of plagiarism, *IEEE Robotics and Automation Magazine*, **19**(4), pp. 85–87, 2012.
4. Board of Engineers Malaysia (BEM), *Brief Introduction to Code of Ethics for Young Engineers*, Document number BEM/RD/PPC/12, Kuala Lumpur, 2005.
5. D. D. Carpenter, T. S. Harding, C. J. Finelli, S. M. Montgomery and H. J. Passow, Engineering students' perceptions of and attitudes towards cheating, *Journal of Engineering Education*, **95**(3), pp. 181–194, 2006.
6. J. Walker, Measuring plagiarism: researching what students do, not what they say they do, *Studies in Higher Education*, **35**(1), pp. 41–59, 2010.
7. R. Comas-Forgas and J. Sureda-Negre, Academic plagiarism: explanatory factors from the students' perspective, *Journal of Academic Ethics*, **8**, pp. 217–232, 2010.
8. L. Bilic-Zulle, V. Frkovic, T. Turk, J. Azman and M. Petroveckii, Prevalence of Plagiarism among Medical Students, *Croat Medical Journal*, **46**(1), pp. 126–131, 2005.
9. A. Maxwell, G. J. Curtis and L. Vardanega, Does culture influence understanding and perceived seriousness of plagiarism?, *International Journal for Educational Integrity*, **4**(2), pp. 25–40, 2008.
10. R. H. Schrimsher, L. A. Northrup and S. P. Alverson, A survey of Samford University students regarding plagiarism and academic misconduct, *International Journal for Educational Integrity*, **7**(1), pp. 3–17, 2011.
11. D. Straw, The plagiarism of generation 'why not?', *Community College Week*, 8 July, **14** (24), pp. 4–7, 2002.
12. W. G. Raffetto, The cheat, *Community and Junior College Journal*, **56** (2), pp. 26–27, 1985.
13. C. Park, In Other (People's) Words: plagiarism by university students – literature and lessons. *Assessment and Evaluation in Higher Education*, **28**(5), pp. 471–488, 2003.
14. S. Newstead, A. Franklyn-Stokes and P. Armstead, Individual differences in student cheating, *Journal of Educational Psychology*, **88**(2), pp. 229–241, 1996.
15. S. Yeo, First-year university science and engineering students' understanding of plagiarism, *Higher Education Research and Development*, **26**(2), pp. 199–216, 2007.
16. B. Stappenbelt, S. Kiridena, D. Hastie and A. Basu, An investigation of international postgraduate engineering students' attitudes and abilities related to avoiding plagiarism, *The International Journal of Engineering Education*, **32**(6), pp. 1621–1634, 2016.
17. L. Buranen and A. M. Roy, (Eds), *Perspectives on plagiarism and intellectual property in a postmodern world*, (pp. 41–51), Albany, NY State: University of New York Press, 1991.
18. C. Sowden, Plagiarism and the culture of multilingual students in higher education abroad, *ELT Journal*, **59**(3), 2005.
19. D. Liu, Plagiarism in ESOL students: is cultural conditioning truly the major culprit?, *ELT Journal*, **59**(3), pp. 234–241, 2005.
20. M. Smith, N. Ghazali and S. F. Noor Minhad, Attitudes towards plagiarism among undergraduate accounting students: Malaysian evidence, *Asian Review of Accounting*, **15**(2), pp. 122–146, 2007.
21. J. Walker, Student plagiarism in universities: What are we doing about it?, *Higher Education Research and Development*, **17**(1), pp. 89–106, 1998.
22. G. J. Curtis and R. Popal, An examination of factors related to plagiarism and a five-year follow-up of plagiarism at an Australian university, *International Journal of Educational Integrity*, **7**(1), pp. 30–42, 2011.
23. R. L. Sims, The relationship between academic dishonesty and unethical business practices, *Journal of Education for Business*, **68**(4), pp. 207–211, 1993.
24. C. Mills, Acknowledging sources in written assignments, *Journal of Geography in Higher Education*, **18**(2), pp. 263–269, 1994.
25. A. Colon, Avoid the pitfalls of plagiarism, *Writer*, **114**(1), p. 8, 2001.
26. R. Wan, S. Md Nordin, M. Halib and Z. Ghazali, Plagiarism among undergraduate students in an engineering-based university: An exploratory analysis, *European Journal of Social Sciences*, **2**(4), pp. 537–549, 2011.
27. F. Md Husain, G. K. S. Al-Shaibani and O. H. A. Mahfoodh, Perceptions of and Attitudes toward Plagiarism and Factors Contributing to Plagiarism: a Review of Studies, *J. Acad. Ethics*, **15**, pp. 167–195, 2017.
28. M. de Jong, W. Henry and N. Stansbury, *Eliminating Corruption in Our Engineering/Construction Industry*, Leadership Manage, Eng. 9, Special Issue: Addressing Corruption in our Global Engineering/Construction Industry, pp. 105–111, 2009.
29. S. Stebelman, Cybercheating: dishonesty goes digital, *American Libraries*, **29**(8), 48–51, 1998.
30. N. J. Auer and E. M. Krupar, Mouse click plagiarism: the role of technology in plagiarism and the librarian's role in combating it, *Library Trends*, **49**(3), pp. 415–433, 2001.
31. S. Baruchson-Arbib and E. Yaari, Printed versus internet plagiarism: A study of students' perception, *International Journal of Information Ethics*, **1**(6), pp. 29–34, 2004.
32. B. Marsh, Turnitin.com and the scriptural enterprise of plagiarism detection, *Computers and Composition*, **21**(4), pp. 427–438, 2004.

33. R. Goddard and R. Rudzki, Using an electronic text-matching tool (Turnitin) to detect plagiarism in a New Zealand university, *Journal of University Teaching and Learning Practice*, **2**(3), Article 7, 2005.
34. M. Mistic, Z. Siustran and J. A. Protic, Comparison of software tools for plagiarism detection in programming assignments, *The International Journal of Engineering Education*, **32**(2), (Parte A), pp., 2016.
35. K. P. Mohnan, Spoon-feeding, *Centre for Development of Teaching and Learning (CDTL) Brief.*, **3**(2), pp. 1–3, 2000.
36. S. A. Abu Samah, K. Jusof and A. D. Silong, Does spoon-feeding impede independent learning?, *Canadian Social Science*, **5**(3), pp. 82–90, 2009.
37. P. Cipollone and A. Rosolia, Social Interactions in High School: Lessons from an Earthquake, *American Economic Review, American Economic Association*, **3**, pp. 948–965, 2007.
38. A. Gaviria and S. Raphael, School-Based Peer Effects and Juvenile Behavior, *The Review of Economics and Statistics*, MIT Press, **83**(2), pp. 257–268, 2001.
39. G. J. Bobonis and F. Finan, Neighborhood Peer Effects in Secondary School Enrolment Decisions, *The Review of Economics and Statistics*, MIT Press, **91**(4), pp. 695–716, 2009.
40. T. J. Halliday and S. Kwak, What is a peer? The role of network definitions in estimation of endogenous peer effects, *Applied Economics*, **44**(3), pp. 289–302, 2012.
41. A. T. F. Syed Mohamed, N. M. Yusof and R. S. Hashim, Making of a Native Orientalist: Latent Orientalism in Confessions of an Old Boy: The Dato' Hamid Adventures, *The South East Asian Journal of English Literature*, **16**(2), pp. 140–168, 2010.
42. S. J. Howard, J. F. Ehrlich and R. Walton, Measuring students' perception of plagiarism: modification and Rasch validation of a plagiarism attitude scale, *Journal of Applied Measurement*, **15**(4), pp. 372–393, 2014.
43. J. D. McLeod, R. Uemura and S. Rohrman, Adolescent Mental Health, Behavior Problems and Academic Achievement, *Journal of Health and Social Behavior*, **53**, pp. 482–497, 2012.
44. M. A. S. Md Yasin and M. A. Dzulkifli, Differences in depression, anxiety and stress between low-and high-achieving students, *Journal of Sustainability Science and Management*, **6**(1), pp. 169–178, 2011.
45. J. A. Graber, J. Brooks-Gunn and A. C. Petersen, *Adolescent transitions in context*, In J. A. Graber, J. Brooks-Gunn, and A. C. Petersen (Eds.), *Transitions through adolescence: Interpersonal domains and context* (pp. 369–383), Mahwah, NJ: Lawrence Erlbaum, 1996.
46. K. B. Klingsieck, A. Grund, S. Schmid and S. Fries, Why students procrastinate: A qualitative approach, *Journal of College Student Development*, **54**(4), pp. 397–412, 2013.
47. C. Sénécal, E. Julien and F. Guay, Role conflict and academic procrastination: A self-determination perspective, *European Journal of Social Psychology*, **33**, pp. 135–145, 2003.
48. L. Visser, F. A. J. Korthagen and J. Schoonenboom, Differences in Learning Characteristics Between Students with High, Average, and Low Levels of Academic Procrastination: Students' Views on Factors Influencing Their Learning, *Frontiers in Psychology*, **9**, Article 808, 2018.
49. G. Dislen, The reasons of lack of motivation from the students' and teachers' voices, *The Journal of Academic Social Science*, **1**(1), pp. 35–45, 2013.
50. W. Li, R. M. Bennett, T. Olsen and R. McCord, Engage engineering students in homework: attribution of low completion and suggestions for interventions, *American Journal of Engineering Education*, **9**(1), pp. 23–38, 2018.
51. L. W. Anderson and L. D. R. Krathwoh, (Eds.), *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives*, New York: Longman, 2001.
52. M. C. W Yip, Differences in learning and study strategies between high and low achieving university students: a Hong Kong study, *Educational Psychology*, **27**(5), pp. 597–606, 2007.
53. R. Chandrasoma, C. Thompson, and A. Pennycook, Beyond plagiarism: transgressive and nontransgressive intertextuality, *Journal of Language, Identity, and Education*, **3**(3), pp. 171–193, 2004.
54. G. Murtaza, S. Zafar, I. Bashir and I. Hussain, Evaluation of student's perception and behavior towards plagiarism in Pakistani universities, *Acta Bioethica*, **19**(1), pp. 125–130, 2013.
55. F. Amiri and S. A. Razmjoo, On Iranian EFL undergraduate students' perceptions of plagiarism, *Journal of Academic Ethics*, **14**(2), pp. 115–131, 2016.
56. C. Mu, "I only cited some of his words": the dilemma of EFL students and their perceptions of plagiarism in academic writing, *Journal of Asia TEFL*, **7**(4), pp. 103–130, 2010.
57. M. S. S. Gomez, L. Shivanna and B. S. Shivanna, Assessment of the attitude towards plagiarism among dental postgraduate students and faculty members in Bapuji dental college and hospital, Davangere—a cross sectional survey, *Journal of Dental and Medical Sciences*, **13**(5), pp. 1–6, 2014.
58. S. C. Chien, Cultural constructions of plagiarism in student writing: teachers' perceptions and responses, *Research in the Teaching of English*, **49**(2), pp. 120–140, 2014.
59. Y. Chen and C. Chou, Are We on the same page? College Students' and Faculty's Perception of Student Plagiarism in Taiwan, *Ethics and Behavior*, pp. 1–21, 2016.
60. R. M. Howard and L. J. Davies, Plagiarism in the Internet Age, *Educational Leadership*, **66**(6), pp. 64–67, 2009.
61. S. C. Yang, Attitudes and behaviors related to academic dishonesty: a survey of Taiwanese graduate students, *Ethics & Behavior*, **22**(3), pp. 218–237, 2012.
62. S. W. Tasbh, H. El Kadi and A. Abdelfatah, Past and present engineering students' views on academic dishonesty at a middle-eastern university, *International Journal of Engineering Education*, **31**(5), pp. 1334–1342, 2015.

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