Computer Science Students and Their Sense of Academic Integrity

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***Abstract*—The impact of information technologies on the ways people use and interacts with information has caused increasing concerns towards academic dishonesty or more commonly referred to as college cheating. Similarly, in Taiwan, strong emphasis is placed in fostering college students' honor and integrity. Moreover, with the current emergence of the ubiquitous nature of information technology; students are easily tempted to take advantage of such innovations. In the other spectrum, studies with regards to the factors affecting engineering students' academic dishonesty are still quite limited. Hence, this case study shall attempt to describe the factors that affect the notion of academic dishonesty within computer science students; wherein information technology is so abundant and readily available. Participants are volunteer computer science students of a Science and Technology University. A series of focus group interviews were conducted in order to gather insights into the different facets of academic dishonesty. Findings suggest that the entire campus climate including the students' peer pressure, and both the teachers' and school's policies towards academic dishonesty have all contributed to the overall perceived factors affecting the prevalence of college cheating in the university.**

***Index Terms*—Academic dishonesty, computer science students, peer pressure, school policy, students' perception.**

I. Introduction

The world-wide-web and the rise of technological advancement have drastically changed the way we conduct of daily lives. Similarly, technological change has also brought interconnectivity to all aspects of life, wherein people maintain connected to each other by means of various type of technology [1]. As students embraces the age of *multiliteracies*; a term coined by the New London Group [2], which describe the impact of information technologies on the ways people use and interacts with information, increasing concerns with regards to academic dishonesty was also observed. Such dishonesty has been argued to be made easier with the prevalent use of information and communications technologies (ICT) in education [3].

In Taiwan, studies have shown that there is an increased in occurrence of academic dishonesty in college students [4]. However, some reported that such dishonesty is probably caused by the pressure incurred from the need to have a high grade and college degree [5], while some students inadvertent or unintentional commit academic dishonesty due to the lack of proper guidelines and policies [6].

In response, this case study shall attempt to describe the different factors that influence the level of students' academic dishonesty. More specifically this case study shall involve computer science students; wherein information technology is so readily available. In addition, recommendations regarding preemptive educational strategies or measures towards academic dishonesty will also be provided.

The following section shall include the review of relevant literature, which will be followed by a description of the methodology used. This is then followed by the discussion of the results and finally concluded with the implications of the different factors affecting the level of students' academic dishonesty. Additional suggestions and recommendations shall also be provided to serve as preemptive educational strategies towards academic dishonesty. Initial research questions are as follows:

1) What is the level of students' academic dishonesty in the Science and Technology University?
2) What are the factors that influence the students' academic dishonesty?
3) What is the role of technology in the prevalence of academic dishonesty?
4) What are some effective strategies that can preempt or minimize the students' academic dishonesty?

A. Significance of the Study

The current study seeks to provide various insights and implications with emphasis on the following significance:

1) The results shall bridge the gap between students and school (faculty and administration) with regards to the students' needs and perception on learning.
2) With the realization on the goals of learning, students shall become a better person that can better served the society in the future.
3) Understand the role of information technology in the students' concepts on learning.
4) Have a clearer picture on the notion of academic dishonesty in the current era of technological advancements.

B. Limitations of the Study

As since this is only a case study, results gathered from the data are applicable to students with similar background and interests. However, since the concepts of academic dishonesty in computer science students are quite new, results might be of contribution to other educators as a sort of eye opener of what might happen in a similar type of learning environment.

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II. Review of Related Literature

A. Academic Dishonesty in Higher Education Students

Academic dishonesty in students has long been a problem for higher education institutions around the world. Researchers typically approach the studies regarding with students' academic dishonesty either to identify personal characteristics that may be predictive of higher levels of cheating and those that examine the situational or contextual factors that may lead to higher levels of cheating in different settings [7]. However, such problems in academic dishonesty are not increasing, but are also evolving in terms of its scope and methodology [8].

Definition of academic dishonesty in general has been noted to encompass a wide range of misconducts, such as cheating, fabrication, plagiarism, deception, bribery, sabotage, and many others. Most higher education institutions equate academic dishonesty as to the cheating, plagiarism, or knowingly furnishing false information to the University are examples of dishonesty. To overcome the prevalent academic dishonesty in students, researches regarding the attitudes of students on academic dishonesty have been studied extensively.

In a study regarding 3,975 medical students attending in 31 different schools, Baldwin Jr., Daugherty, Rowley, and Schwarz [9] found out that around 5% of the medical students surveyed reported cheating during the first two years of medical school. The students appeared resigned to the fact that cheating is impossible to eliminate, but they lacked any clear consensus about how to proceed when they became aware of cheating by others. This actually show that the perceived social norms on cheating, on attitudes about cheating, and on knowledge of institutional policy regarding cheating behavior are important factors in determining one's intention to commit academic dishonesty [10]-[11].

In another study regarding the behavior of 220 students (66 psychology majors and 154 business majors) from 3 universities, Bernardi, Metzger, Bruno, Hoogkamp, Reyes, and Barnaby [12] mentioned a highly significant association among students' attitudes on cheating, academic integrity, and academic dishonesty/honesty. In essence, students' attitudes toward cheating provide better explanation of cheating behaviors than background information.

Similarly, in Taiwan, a nationwide study with a sample of 2,068 college students throughout Taiwan was selected and surveyed on the different domains of academic dishonesty, including: cheating on test, cheating on assignment, plagiarism, and falsifying documents. Lin and Wen [13] mentioned that around 61.72% of the surveyed students claimed that they had committed some type of academic dishonesty. More so, the students' attitudes have shown to have significant correlation on all of the different domains of academic dishonesty (cheating on test, cheating on assignment, plagiarism, and falsifying documents).

Although the previous mentioned studies are focused on general classification of students and not in computer science students. Their insights and contribution to the literature have provided the basis within the general concept of academic dishonesty occurrence. Furthermore, early intervention regarding the different factors (constructs) or causes of students' academic dishonesty should be accomplished in order to prevent what Nonis and Swift [14] postulated that "students who engaged in dishonest behavior in their college classes were more likely to engage in dishonest behavior on the job".

B. Multiliteracies and Technology in Education

Many mentioned that the shift of the traditional literacies to the current notion of *multiliteracies* is caused by the rapid evolution and integration of information technology (IT) in an age of increased cultural diversity and global connectedness [15]. In general, the concept of *multiliteracies* originated with the New London Group [2], which refers to two issues regarding the evolution of language today. The first is the variability of meaning making in the different cultural, social or domain-specific contexts whereas the second is the impact of information technologies on the ways people use and interacts with texts. Overall, these issues inevitably affect how people communicate and more importantly influence how education is achieved [16].

Although most studies have shown that ICT in education indeed show promising results [17], however still some researchers have also mentioned that an IT prevalent environment is not entirely successful [18]. In a study regarding the attitudes to, and extent of, self-reported involvement in internet supported academic dishonesty practices. Underwood and Szabo [19] mentioned that internet experience, acceptability of cheating, and the assessment of risk, predicted an individual student's acceptance of acts such as plagiarism as a legitimate way to achieve academic goals.

In other words, internet use can unintentionally promote academic dishonesty. This result is quite disturbing since the use of internet is already an inevitable part of the education today. Furthermore, the concept of cut and paste has also change the way students accomplish their required tasks [20]. ICT in education do indeed provide learners with the increased learning motivation, however, careful consideration should be taken to minimize students' ability to use IT as a source of academic dishonesty. In essence, with the case of computer science students; wherein technology is quite abundant, careful intervention (or guidance) is encouraged to stir the students into the proper usage of IT.

III. Methodology

This research is designed as a *case study*, wherein the primary objective is to investigate a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used [21]. Focus group interviews were used to gathered data for this study. Focus group interviews are among one of the most widely used qualitative research tools in social sciences studies [22].

For the data analyses procedures, data gathered are the qualitative focus group interviews and observations logs by the researcher. These data were analyzed using the Miles and Huberman [23] method for generating meaning. The resulting themes were listed and together formed the implications of the computer science students' notion of

academic dishonesty.

A. Participants

A total of 27 computer science students participated in the various focus group sessions having an average age of 21 years old. The number of male students (15 or 56%) is a little higher than the number of female students (12 or 44%). In addition, most students are in the third year of their university studies (22 or 81%), while the rest are in their second year (5 or 19%). Lastly, in order to get a more diverse perspective on academic dishonesty, international students enrolled in similar program of study are also invited to join the focus group interview sessions. Perspective from three other countries were gathered besides the local Taiwan students (13 or 48%), such as students coming from the Mainland China (5 or 19%), Vietnam (6 or 22%), and the United States (3 or 11%).

B. Research Process

The study started during the fall semester of school year 2010-2011. Participants' for the focus group sessions are gathered using the volunteer and snowball sampling method; wherein the student participants are volunteers and where asked to recruit other students to participate in the focus group interview sessions. In cases where access is difficult, the researcher may have to rely on volunteers, for example, in the current study, a small number of local and international students where first contacted and informed of the intended interview. Sometimes this is inevitable [24], as it is the only kind of sampling that is possible, and it may be better to have this kind of sampling than no research at all. While, the snowball sampling method is used to assist in identifying the participants who have the characteristics in which this research is interested with [25]. Similar questions regarding the students' perception on academic dishonesty were asked then collected and analyzed.

IV. Results and Discussions

A. The Level of Students' Academic Dishonesty in the Science and Technology University

In order to determine the level of academic dishonesty in the university, questions regarding the perceived prevalence of such issues were asked. The questions were separated into the three types of examination, such as: *take home type tasks* (e.g. reports, reflection papers, homework), *normal day to day quizzes* (e.g. seatwork, class work), and *periodic or unit examinations*. Result shows that the respondents perceived that students at the university are slightly engaged in academic dishonesty activities.

Further analysis of the results also shows that student respondents tends to ranked their perceived academic dishonesty **lower** than the rest of the students. During the focus group interviews, students mentioned that they only attempt to cheat, if their classmates cheat. Such results indicate that the prevalence of academic dishonesty is quite dependent on the campus or school culture. In addition, the easy availability of technology for computer science students were actually not mentioned as a major cause of dishonesty.

> *Of course, everybody cheat once in a while. I think as long as you're a student, you can't help it, furthermore, that is what my classmates are doing. So I just follow them.* (FGT 1, Local student's response)

During the focus group sessions, prevalence of academic dishonesty is asked among the students of different countries. Surprisingly, students from Mainland China, the United States, and Vietnam, all mentioned that they rarely or don't rely on cheating to pass their examinations. Such results, indicates that academic dishonesty is also dependent on the type of students' ethnicity or country of origin.

> *I can't say for the other students in the United States, but for me, studying is to prepare myself for the future. So I believed that one should be responsible for his or her own learning. (FGT 4, International student's response)*
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> *Examination is a way to test what you have learnt. Studying is not only done to pass the examinations, but it is for your own improvement. (FGT 2, International student's response)*

B. The Factors that Influence the Students' Academic Dishonesty

The various factors that influence the academic dishonesty of were separated into three categories, namely: *personal*, *teacher and examination*, and *school policy*. For the personal dimensions; the factor *Sense of Positive Character* (**SPC**) is ranked as the highest. Items include '*schooling is the process of bettering ourselves*' and '*any means of cheating whether in quizzes or exams should be discouraged*'. Results also show that students with high positive character will tend to placed higher values on examination and knows the consequences of being dishonest. Naturally, students with high positive character will tend to have lesser tendency to possess negative character and would not pass the responsibility of preventing academic dishonesty to the school.

Besides SPC, the factor *Presence of Honor Code* (**PHC**) is also considered as an important factor in discouraging academic dishonesty. Items include '*it is my responsibility to prevent cheating*' and '*some students just don't cheat*' are two positive perceptions of students with regards to the campus climate. Results also indicate that PHC is quite important, this actually denotes to the perceived positive in-school (or campus) atmosphere, which is the major factor affecting the students' and teachers' sense of value towards learning and the concept of examination. Furthermore, for students who have a part-time job; students who spends less time at school, tends to have lesser sense of positive in-school atmosphere and places (or passes) the responsibility of preventing academic dishonesty to the institution.

For the teacher and examination dimension, factor such as *Teaching Style* (**TS**) which indicate that students are greatly affected by the teachers' teaching style (Items such as '*teaching style is nice*' and '*I like my teacher's teaching style*'). This is then followed by the positive factor *Content and Coverage of the Examination* (**CCE**). Such results clearly indicate that besides the teachers' teaching style, the

type of examination also determines the prevalence of academic dishonesty among the students (Items such as '*not interested in the exam content' and 'too many exams'*). The third factor (negative factor), *Teacher's Policy towards Academic Dishonesty* (**TPAD**) is also quite relevant. Results indicate that students are quite observant and are easily affected by the teachers' attitude or policy towards academic dishonesty.

Lastly, for the school policy dimension, results indicate that students are very clear about the consequences of being caught or punishment of college cheating. However, students somehow also realized the school's sanctions towards academic dishonesty are quite light. Hence, results indicate that such failures in policy implementation have greatly affected the teachers' attitude towards academic dishonesty, similarly, towards the students' sense of positive values with regards to test taking.

C. The Role of Technology in the Prevalence of Academic Dishonesty

Upon investigation of the role of technology in the prevalence of academic dishonesty of students, respondents during the stage one focus group interviews concluded that *technology is mostly used for reference purposes only rather than depending entirely on it*.

> *Technology is only a tool, sometime I am tempted to just cut and paste from the internet, however, I know for certain that my teacher knows my capabilities, surely I will get caught doing so. Therefore, I would only use the internet for reference only. (FGT 5, Local student's response)*
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> *In the US, the use of technology should be very careful, since schools have software that can check the students work. For me, just as I had mentioned before, studying is for oneself, one should be responsible for it and not depend on technology or anything else. (FGT4, International student's response)*

Such results is actually quite encouraging, computer science students whether local or international, all agrees that technology is only a tool and studying is for benefitting and developing a person's knowledge. This result signifies that the course of study (whether IT related or not) does not affect the students' notion of cheating.

D. Effective Strategies that Can Preempt or Minimize the Students' Academic Dishonesty

Results from the focus group discussions have shown that students are quite affected by three factors, namely: ***school's policy implementation***, ***teacher's attitude towards academic dishonesty***, and ***campus climate***. Such campus climate actually involves all the other factors such as peers, classmates, and the school atmosphere towards academic dishonesty itself. When the students were asked regarding some suggestions that could benefit the school towards the preemptive and preventive measures of academic dishonesty. Many suggested that the school should keep on reiterating the consequences of academic dishonesty. Students believe that through a strong campus wide campaign students will know the severity of such actions, hence, be held responsible for their own studies and avoid unscrupulous behaviors.

> *In my school, I am always reminded of the consequences of being caught when cheating. I think this is quite effective. (FGT3, International student's response)*

Another suggestion from the students is the variety of examination types, students mentioned that teachers can opt to choose exams that are essay type or more open-ended questions, as against the normal multiple choices type exams. In such cases, students have no choice but to study, since answering these types of questions involves higher ordered thinking skills and cheating is not an option. However, in cases for computer science students, wherein examinations are mostly programming, various more open-minded criteria should be included during evaluations; such that students are able to use their imagination and ingenuity in their designs and outcomes.

V. Conclusions

Recently, much concern regarding the increase frequency of college cheating or academic dishonesty in tertiary school students was observed. Such phenomenon is actually not limited to higher education institutions in Taiwan alone, but likewise in countries overseas, wherein the problem of increased prevalence rate of academic dishonesty among tertiary school students are severe. With the concern that academic dishonesty while studying leads to future unethical behaviors in the workplace. This study uses a qualitative research paradigm in an attempt to describe the factors that affect the level of computer science students' academic dishonesty.

Results indicate that with regards to the level of engineering students' academic dishonesty; students mentioned that they are slightly engaged in academic dishonesty activities. Further analysis of the results also shows that student respondents tends to ranked their perceived academic dishonesty lower than the rest of the students. Furthermore, academic dishonesty is affected by three major factors such as **personal factors**, **teacher and examination factors**, and **school policy factors**. More importantly, each major factor consists of both positive and negative contribution to the overall prevalence of academic dishonesty. Results also indicate that the school's policy implementation towards academic dishonesty tends to influence both the teachers' and students' attitudes and values toward test taking itself. Similarly, such issues tend to overspill and affect the entire campus climate, hence, create a negative atmosphere. As for the effective strategies that can preempt or minimize the students' academic dishonesty, continuous school wide campaign and variation in examination type are the most common suggestions given by the students themselves.

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