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Understanding Adolescents' Unethical Online Behaviors:

A Structural Equation Approach

by

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DECLARATION

I hereby declare that this project represents my own work and that it has not been previously

submitted to this University or any other institution in application for admission to a degree,

diploma or other qualifications.

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December 2014

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ABSTRACT

This study employed a revised model of theory of planned behavior (TPB), which synthesized perspective from social cognitive theory, to understand the unethical/risky online behaviors of adolescents. Two forms of unethical online behaviors, namely plagiarism and unauthorized acts were examined. A stratified random sample of 757 Secondary two students in Hong Kong was obtained. Data were analyzed using structural equation modeling. The proposed model was in general consistent with TPB, and it explained 54.8% and 48.0% of the variances in plagiarism and unauthorized acts respectively. It was found that peers' unethical behaviors were the most influential in shaping students' intention to act unethically. General measurements of ICT attitude and ICT literacy were also found to be applicable in the TPB framework, and a strong positive association was observed between these two constructs. Interestingly, plagiarism behavior was neither related to ICT literacy nor unauthorized act's intention, whereas unauthorized acts' intention influenced both forms of unethical behaviors. Implications of the findings for educators are discussed.

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1. INTRODUCTION

As Bandura (2001) says "[t]he revolutionary advances in electronic technologies have transformed the nature, reach, and loci of human influence" (p.17). In fact, there should be no doubt that the advancement/expansion of information and communication technology (ICT) has dramatically transformed many facets of the contemporary society; or in other terminologies information society (Bell, 1973), network society (Castells, 1996), or knowledge society (United Nations Educational, Scientific and Cultural Organization, 2005). More specifically, as Bandura (2011) observes, the revolutionary ICT advancement has transformed human influence so much that in the 21st century, people spend much of their lives on the cyberspace.

This study focuses on the unethical/risky online behaviors [1] of adolescents. Understandably, ICT advancement has brought both opportunities and risks to this group of people. On the one hand, apart from its educational benefits, ICT has become integrated into adolescents' social and entertainment life; that its functions/uses are crucial to adolescents (Hasebrink, Livingstone, Haddon, Donoso, & Lobe, 2008). On the other hand, being more involved in risk-taking behaviors is seen to be a symbolic element of adolescence (Michael & Ben-Zur, 2007). Given that the use of ICT, and specifically World Wide Web, have made unethical behaviors easier (Akbulut et al., 2008), and that digital technologies are contributing to unethical behavior like academic honesty (Stephens, Young, & Calabrese, 2007), it would thus be worthwhile to find out the antecedents of adolescents' unethical online (or broadly

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[1] The terms risky and unethical online behaviors will be used interchangeably and seen as equivalent in this paper. For details, refer to section 4.3.5.

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speaking ICT-related) behaviors. To this end, two forms of unethical behaviors, namely plagiarism and unauthorized acts, are of particular interest of the present study.

Various studies conducted in the college or university context have examined why students plagiarize (Bennett, 2005; Devlin & Gray, 2007; Franklyn-Stokes & Newstead, 1995). In the literature, there are also meta-analysis and systematic review investigating the factors/causes associated with plagiarism/academic dishonesty (Comas-Forgas & Sureda-Negre, 2010; Gallant, 2008; Park, 2003). Particularly, McCabe (2005) demonstrated that Internet plagiarism became more prevalent among students in the last decade. In fact, the advancement of ICT has produced a framework that makes plagiarism easier and faster to commit (Bennett, 2005; McKenzie, 1998). Additionally, given that among the vast amount of information available on the Internet, some are without clear authorship and ownership, it is not surprising to note that some students did not see the need to acknowledge such information properly (Taylor, Usick, & Paterson, 2004).

As for unauthorized acts, they refer to unethical/risky online activities such as computer hacking, Internet piracy, and software piracy. Lau and Yuen (2014b) provided a good summary of the prevalence and severity of these behaviors; such summary is paraphrased below: Recent studies conducted in multiple countries revealed that computer hacking has become more prevalent among adolescents (Hu, Xu, & Yayla, 2013; Xu, Hu, & Zhang, 2013). In fact, an earlier study by DeMarco (2001) involving 47,235 elementary and middle school students revealed that nearly half of these students did not regard hacking as a computer crime. For software piracy, more middle school students were found to accept pirating CD or software from the Internet than those who did not (Teston, 2008). Music

piracy (i.e. downloading music from the Internet without paying) was also found to be popular among middle school students, especially for 11th grade students (Gunter, Higgins, & Gealt, 2010).

As Lau and Yuen (2013, 2014b) pointed out (citing McQuade & Sampat, 2008; The Josephson Institute, 2006), these two forms of unethical behaviors (along with Internet stickiness) are typical and prevalent, yet understudied/underexplored among adolescents As such, further attention is needed to address the literature gap.

In this study, two well-established theories in explaining human behavior, namely social cognitive theory and theory of planned behavior, were synthesized and employed to understand adolescents' unethical online behaviors. In fact, these two theories have been widely applied in the study of ICT-related unethical or risky behaviors within the higher education and workplace context. Details of the two theories and various related studies will be discussed in the next section.

2. Literature Review

2.1   Social Cognitive Theory

Bandura (1986, 1999) states that social cognitive theory (SCT) is a model subscribed to emergent interactive agency, and it is founded on an agentic perspective (Bandura, 2006). SCT explains the functioning of human in terms of triadic reciprocal causation/codetermination (Bandura, 1986). Simply speaking, human functioning is a product of the interplay of environmental forces, intrapersonal influences, as well as the behavior individuals engage in. As shown in Figure 1, within this model, each interacting determinant influences one another bidirectionally. Nonetheless, it should be emphasized that reciprocal causation does not imply different sources of influence are of equal strength, nor does it imply all influences occur simultaneously. It takes time for a causal factor to exert its influence and activate reciprocal influences (Bandura, 1986).
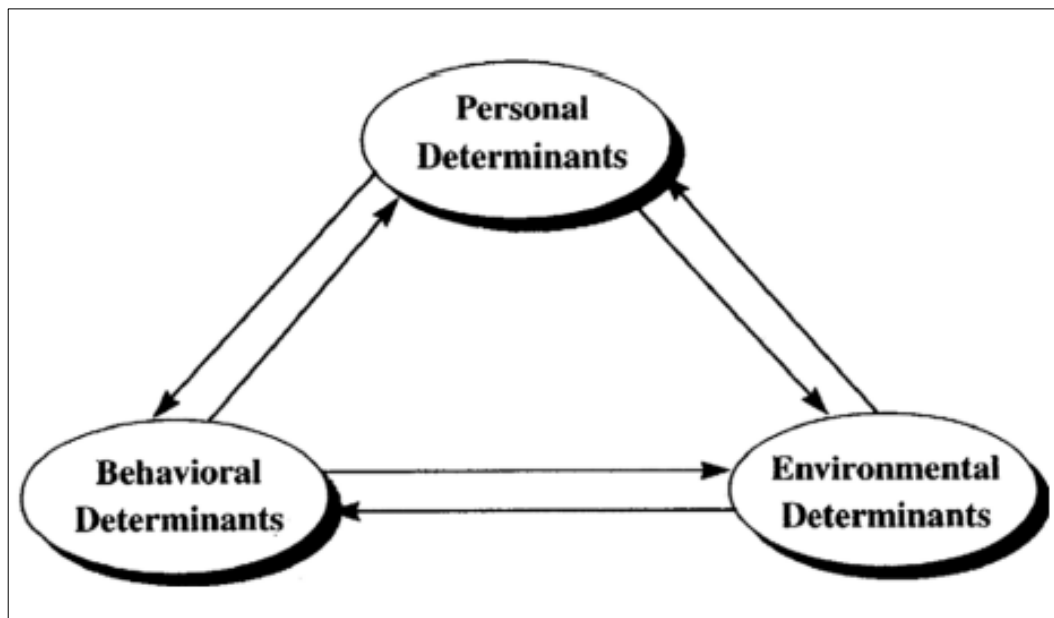
Figure 1 Social cognitive theory (Bandura, 2011, p.12)

Specifically, concerning environment, it is noted that the environment is not a monolithic entity (Bandura, 1997). In fact, Bandura distinguishes three types of environment structures, namely imposed environment, selected environment, and constructed environment. Through modeling, instruction, and social persuasion, the environment conveys information and activates emotional reactions, thus shaping the course of lives individuals choose to take (Bandura, 2011). As for personal factors, they are manifested in the forms of cognition, affect, and biological events (Bandura, 1986). A particular personal factor of interest is self-efficacy, which is a focal determinant since it affects behavior directly, as well as through its influence on the other determinants (Bandura, 2011). The implication of self-efficacy with respect this study will be discussed in the following sub-sections.

2.2   Theory of Planned Behavior

Ajzen (1991) proposes that people act in accordance with their intentions towards a behavior, as well as their perceived control over the behavior. According to the theory of planned behavior (TPB), one's intention to perform a particular behavior is influenced by his/her attitude toward that behavior, the subjective norm, and also his/her perceptions of behavioral control. The theory postulates that people will realize their intentions when opportunity arises, provided that they have a sufficient degree of actual control over the behavior. Perceived behavioral control is also theorized to be an antecedent of behavior, as one's volitional control can quite often be adversely affected by the difficulties in executing a behavior (Ajzen, 2002). The full TPB model is presented in Figure 2.
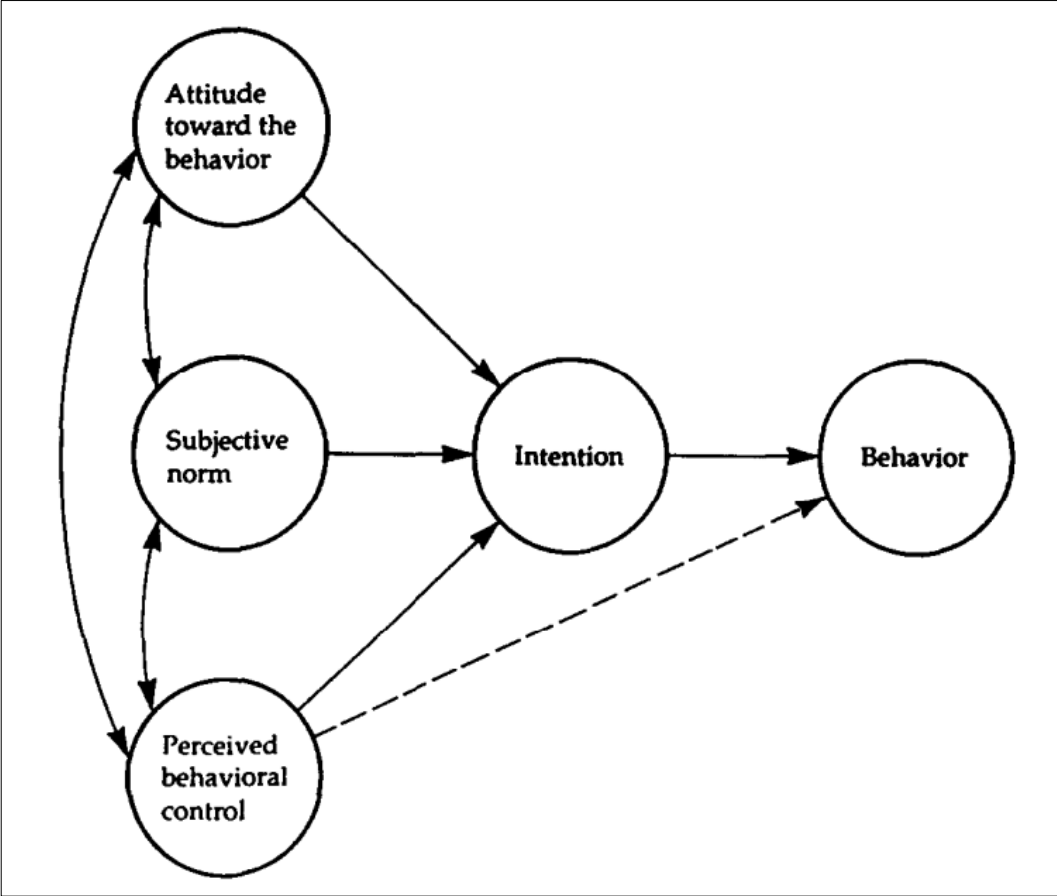
Figure 2 Theory of planned behavior (Ajzen, 1991, p.182)

In another token, the three determinants of intention can be interpreted as behavioral beliefs, normative beliefs, and control beliefs respectively (Ajzen, 2002). Particularly, behavioral beliefs refer to the likely consequences/attributes of a behavior; these beliefs either produce a favorable or unfavorable attitude toward that behavior. For normative beliefs, they are beliefs about others' (especially significant others) normative expectations; which will result in subjective norm or perceived social pressure. As for control beliefs, they refer to the presence of factors that either facilitate or hinder the performance of a behavior; such factors then bring about the perceived ease or difficulty of performing that behavior. It should be stressed that, whilst intention may be determined by additional variables in addition to the

three determinants mentioned here, in a recent review of TPB, Ajzen (2011) contended that the model can actually accommodate some of these additional variables and processes (e.g.: social support, willingness to perform a behavior, etc.).

In the later sub-sections, the particular components of SCT and TPB will be discussed with reference to the study scope. Hypotheses with respect to different constructs will also be set forth. It is hoped that by synthesizing/combining perspectives of SCT and TPB, the proposed research model could more accurately and precisely understand adolescents' unethical online behaviors (see DeSmet et al., 2013 for an example of combining TPB and SCT in studying risky online behaviors).

2.3   Subjective Norm

Ajzen (1991) defines subjective norm as "the perceived social pressure to perform or not to perform the behavior" (p. 188). Simply speaking, people who are important to an individual can influence his/her decision to perform the behavior in question (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). Within the context of secondary school, it can be reasonably assumed that peers are the significant others of adolescents. For instance, applying the social norms theory, Berkowitz (2005) illustrated that peers had an influence on adolescents' involvement in risky behaviors. Likewise, based on the social learning theory (Bandura, 1986), it is posited that humans learn by observing their peers. Empirical research has applied the social learning theory to show the relationship between differential association and unethical behaviors in areas like computer crimes (Skinner & Fream, 1997) and cyber deviance (Holt, Bossler, & May, 2012). In this light, peer influence could be seen as an environmental determinant imposing influence on both personal factors and behaviors.

Concerning TPB, Ajzen (2001) reiterates that attitudes facilitate adaptation to the environment. Past findings revealed that an individual's attitude formation toward a behavior was influenced by his/her peers (Bommer, Gratto, Gravander, & Tuttle, 1987; Chang, 1998; Kreie & Cronan, 1999). Within the TPB, subjective norms were also found to influence an individual's intention to engage in the behavior (Chang, 1998; Shepherd & O'Keefe, 1984; Shimp & Kavas, 1984; Vallerand, Pelletier, Deshaies, Cuerrier, & Mongeau, 1992). Putting the literature in this study's context, the influence of peer pressure/misbehavior on academic dishonesty/misconduct has been extensively documented (Akbulut et al., 2008; Bolin, 2004; Jordan, 2001; McCabe & Trevino, 1997; McCabe, Trevino, & Butterfield, 2001; Park, 2003; Rettinger & Kramer, 2009). Peer norms were also found to influence adolescents' risky online behaviors (Baumgartner, Valkenburg, & Peter, 2010; Phau, Lim, Liang, & Lwin, 2014; Sasson & Mesch, 2014). As such, the following hypotheses were proposed:

H1: Peers' unethical behaviors will have a significant influence on students' ICT attitude.

H2a: Peers' unethical behaviors will have a significant influence on students' intention to plagiarize.

H2b: Peers' unethical behaviors will have a significant influence on students' intention to carry out unauthorized acts.

2.4 Attitude

According to Ajzen (1991), attitude toward a behavior is defined as "the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question" (p. 188). Attitude is closely tied to the beliefs and values one holds towards a

particular action or object (Fishbein, 1963), such that it "represents a summary evaluation of a psychological object captured in such attribute dimensions as good-bad, harmful-beneficial, pleasant-unpleasant, and likable-dislikable" (Ajzen, 2001, p.28).

Within the study scope, whilst researchers argued that there was no single, universally accepted definition of computer attitude (Liaw, 2002; Liaw, Chang, Hung, & Huang, 2006), computer attitude scales still attract scholars' attention that the relevance, reliability, and validity of several widely-used scales were evaluated (for details, see Garland & Noyes, 2008). In fact, as Asil, Teo, and Noyes (2014) argued (citing Teo, 2008, 2009), understanding students' attitudes toward technology and computer was crucial for facilitating learning and engagement. Besides, citing Ajzen and Fishbein (1977), these authors also noted that in order to explain and predict people's computer-related behaviors, it is vital to understand their computer attitudes.

Bandura (1997) contends that self-efficacy can be linked to attitudes. Empirically, an individual's computer self-efficacy was found to be related to his/her attitude towards computer (Compeau, Higgins, & Huff, 1999) and information technology (Compeau & Higgins, 1995). Previous research also discussed the association between self-efficacy and attitude of computer and Internet (Durndell & Haag, 2002; Pamuk & Peker, 2009; Torkzadeh, Chang, & Demirhan, 2006; Wu & Tsai, 2006). More specifically, a recent research by Aesaert and van Braak (2014) claimed that ICT attitudes appeared to be related to ICT self-efficacy.

Moreover, according to the theory of reasoned action (TRA) and TPB, the attitude-intention relationship was strong (Ajzen, 1985; Ajzen & Fishbein, 1977). It was suggested that attitude was one of the most important factors in predicting intention (Ajzen, 1991, 2002;

Trafimow & Finlay, 1996). Within this study's context, attitude was found to be associated with the intention to engage in digital/software piracy (Akbulut, 2014; Banerjee, Cronan, & Jones, 1998; Chang, 1998; Cronan & Al-Rafee, 2008; Loch & Conger, 1996; Morton & Koufteros, 2008; Phau et al., 2014; Phau & Ng, 2010), as well as academic dishonesty/plagiarism (Alleyne & Phillips, 2011; Coren, 2012; Harding, Mayhew, Finelli, & Carpenter, 2007; Hsiao, 2014; Hsiao & Yang, 2011; Imran & Nordin, 2013). Summarizing the above literature, the following hypotheses were proposed:

H3: ICT attitude will have a significant influence on ICT literacy.

H4a: ICT attitude will have a significant influence on students' intention to plagiarize.

H4b: ICT attitude will have a significant influence on students' intention to carry out unauthorized acts.

2.5   Perceived Behavioral Control / Self-efficacy

Ajzen (1991) defines perceived behavioral control (PBC) as "the perceived ease or difficulty of performing the behavior" (p. 188). PBC is also "assumed to reflect past experience as well as anticipated impediments and obstacles" (Ajzen, 1991, p.188). According to Ajzen (2002), TBC can predict behavior both indirectly and directly. For indirect prediction, TBC strengthens an individual's intention to perform a behavior. As for direct effect, TBC provides the individual with useful information regarding his/her actual behavioral control within a particular context.

As for self-efficacy, Bandura (1982) sees it as the "judgments of how well one can execute courses of action required to deal with prospective situations" (p. 122). Self-efficacy is concerned with one's beliefs in his/her capabilities to produce given levels of attainments

(Bandura, 1998). Self-efficacy can also affect behavior directly, or indirectly through its influence on the other determinants (Bandura, 2011). In this light, Ajzen (2002) maintains that PBC owes its greatest debt to Bandura's work on self-efficacy. He establishes that PBC and self-efficacy are similar that both deals with one's perceived ability to perform a behavior. Other researchers also added that the two constructs are similar (Baker, Al-Gahtani, & Hubona, 2007; Yoon, 2011).

The conceptualization discussed is relevant to the current study, which adopted Lau and Yuen's (2014a) perceived ICT literacy scale as PBC/self-efficacy in the research model. Specifically, computer self-efficacy can be seen as one's perceived/self-accessed ability in applying computer skills/computing technology to accomplish specific computer-related tasks (Compeau & Higgins, 1995; Shih, 2006). Kuo and Hsu (2001) also remarked that computer proficiency was related to self-efficacy, and can be used as PBC within TPB.

Previous research revealed that PBC had a strong effect on the intention of unethical IT use (Chatterjee, 2008; Chatterjee, Valacich, & Sarker, 2012). In fact, there are numerous studies applying TPB or PBC in understanding the intention of unethical behaviors such as plagiarism (Alleyne & Phillips, 2011; Coren, 2012; Harding et al., 2007; Hsiao, 2014; Hsiao & Yang, 2011; Imran & Nordin, 2013) and piracy (Akbulut, 2014; Chang, 1998; Cronan & Al-Rafee, 2008; Loch & Conger, 1996; Morton & Koufteros, 2008; Nandedkar & Midha, 2012; Phau et al., 2014).

Specifically, concerning the relationship between ICT literacy and plagiarism, Underwood (2007) insisted that "recognition by students that the technologies can give them an edge, i.e. they can cheat" (p. 218). In fact, Eret and Ok (2014) found that students who had

more computer experience tended to engage in Internet plagiarism more than novices users. Besides, Trushell, Byrne, and Simpson (2012) found students with higher ICT capabilities tended to report more cheating behaviors. Selwyn (2008) also found an association between ICT expertise and plagiarism, albeit a small one. Nonetheless, it should be remarked that Stephens et al., (2007) found no association between ICT capability and cheating. Likewise, some studies also suggested ICT capability and cheating behaviors were not related (Byrne & Trushell, 2013; Trushell, Byrne, & Hassan, 2013).

Moreover, as Namlu and Odabasi (2007) proposed, effective factors such as computer skills and self-efficacy should be used to study unethical computer behaviors. Previous research found that one's computer competency, or PBC, could predict piracy behaviors (Chang, 1998; d'Astous, Colbert, & Montpetit, 2005; Gan & Koh, 2006). Additionally, Internet literacy was found to be indirectly associated with online risks (Livingstone & Helsper, 2010) and several Internet-related misbehaviors (Leung & Lee, 2012). Summarizing the above literature, the following hypotheses were proposed:

H5a: ICT literacy will have a significant influence on students' intention to plagiarize.

H5b: ICT literacy will have a significant influence on students' intention to carry out unauthorized acts.

H6a: ICT literacy will have a significant influence on students' plagiarism behavior.

H6b: ICT literacy will have a significant influence on students' unauthorized acts.

2.6   Intention

Fishbein and Ajzen (1975) establish that intention is the subjective probability that one will perform a particular or specified behavior. Within TPB, intention was hypothesized to be

an accurate, and the most influential predictor of behavior (Ajzen, 1991). Bandura (2001) notes that "an intention is a representation of a future course of action to be performed" (p.6). According to Bandura, intention is said to center on plans of action, and is a proactive commitment to bring about future actions. Within TPB, meta-analyses revealed that intention was a significant and strong predictor of actual behaviors (Armitage & Conner, 2001; Randall & Wolff, 1994; Sheeran & Orbell, 1998). In fact, much of the literature discussed in previous sub-sections concerning subjective norm, attitude, and PBC, also touched on the relevance of intention in explaining unethical/risky computer-related behaviors. Within the context of this study, Chan, Yuen, Lau, and Chan's (2014) recent study employed latent class analysis to reveal multiple risky online behaviors occurred simultaneously, where adolescents engaging in one type of risky online behavior would spread to other cyber misbehaviors. In this light, the following hypotheses were proposed:

H7a: Intention to plagiarize will have a significant influence on plagiarism behavior.

H7b: Intention to plagiarize will have a significant influence on unauthorized acts.

H8a: Intention to carry out unauthorized acts will have a significant influence on plagiarism behavior.

H8b: intention to carry out unauthorized acts will have a significant influence on unauthorized acts.

3. RESEARCH AIM

This study aims at evaluating the explanatory power of a revised model of theory of planned behavior, which synthesized social cognitive theory in constructing the model paths (Figure 3), on a representative sample of adolescents (Secondary two students). To this end, this study attempts to examine the relationship among seven constructs, namely peers' unethical behaviors, ICT attitude, ICT literacy, intention to perform unethical behaviors, and actual unethical behaviors performed.
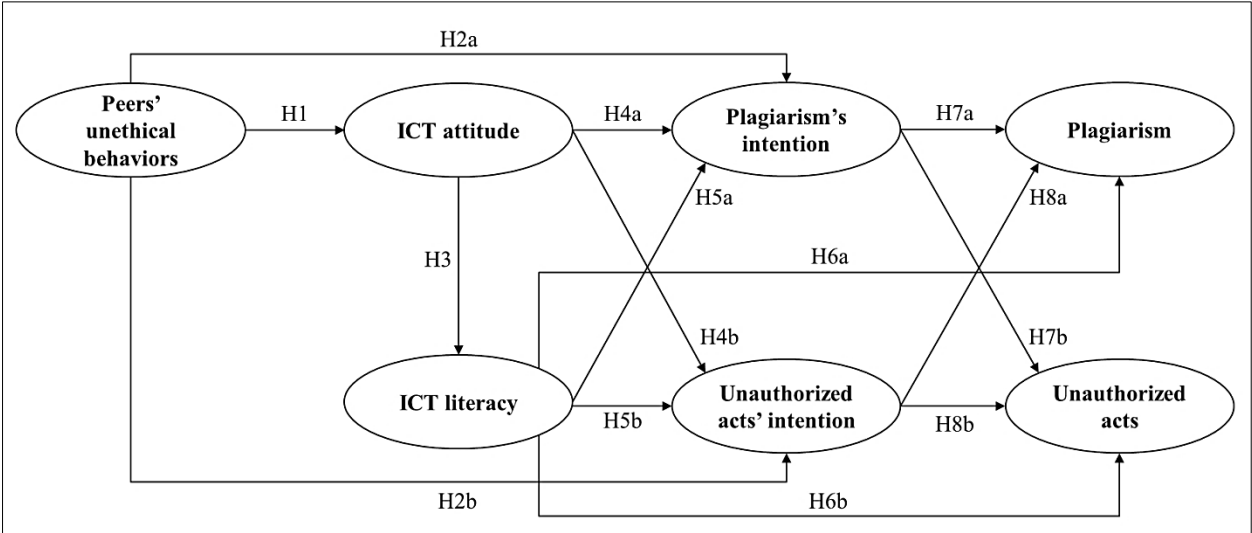
Figure 3 Research model

Whilst the literature reviewed in the previous section has already illustrated the applicability and relevance of TPB/SCT in studying plagiarism and unauthorized acts, this study has the potential to contribute to existing literature by framing the research context involving adolescents. It should be noted that, much of the studies discussed concerning various paths were conducted in the higher education or workplace setting. Moreover, very few studies of the concerned topic had adopted a sampling procedure as rigorous as the

present study. As such, the current study should fill the research gap by applying a revised TPB model in understanding adolescents' unethical online behaviors, and by examining whether structural relationships of similar research conducted in different contexts can be rectified in a random sample of middle school students. Additionally, unlike previous studies that focused on the specific context of attitude and PBC/self-efficacy of unethical behaviors, this study employed two general measurements of attitude and PBC/self-efficacy, namely ICT attitude and ICT literacy (details of measurements will be covered in the next section) as its components. To these ends, the following research questions were set:

1. To what extent does the revised TPB model explain adolescents' unethical online behaviors?

2. What are the significant influences on adolescents' intention to carry out, and act of, unethical online behaviors?

3. Are general scales of ICT attitude and ICT literacy applicable in understanding the relationship of model constructs?

4. METHODS

4.1 Participants

This study used the research data of the project "Educational Inequality and ICT Use in Schools: Bridging the Digital Divide" (HKU7025-PPR-10) of the Research Grants Council of the Hong Kong Special Administrative Region Government.

The target population of this study was Hong Kong Secondary 2 (Grade 8) students in the 2011/12 academic year. Lau and Yuen (2014a, 2014b) provided a clear description of the sampling procedure. Regarding the sampling frame, it contained the school identity number, school size for the target grade, and the overall student ability levels. A total of 36 secondary schools were targeted. In order to provide a representative sample that sufficiently reflected the profiles of all students in the territory, stratified random sampling was used, where a single strata concerning the overall student ability level (high, middle, low) was adopted. Two replacement schools were selected for each sample school, such that a matching school would be available in case any sample school failed to participate or chose to withdraw from the study. In each of the sample school, one intact Secondary 2 class was randomly selected.

The original sample consisted of 825 students. After deleting invalid responses and outliers, this study only retained a sample of 757 students. Among the 757 students, 47.3% were male whereas 52.7% were female. The mean age was 13.15 (SD = 0.75).

4.2 Data Collection

Each class of students was invited to attend a briefing session. The session explained the data collection procedures in detail, and the students were asked to respond to an online

survey. The survey was a self-reported questionnaire concerning students' ICT use and other ICT related issues. The questionnaire was originally designed in English, and was translated to Chinese language for data collection purpose. All responses were anonymous, and each participant spent around 60 minutes in class to complete the questionnaire.

4.3 Measurements

The survey questionnaire used in this study consisted of various different questions related to students' use of ICT inside and outside school. In total, the research model was made up of 13 constructs comprising 57 items; of which two constructs were second-order factors consisted of three first-order factors. Participants were asked to respond to each item based on a five-point Likert scale (1: strongly disagree to 5: strongly agree);[2] merits of using a five-point Likert scale within this study's particular context were discussed by Lau and Yuen (2014a). Details of different latent constructs are presented below (for the full set of items, refer to Appendix):

4.3.1 Peers' Unethical Behaviors

This construct was measured by 5 indicators. It concerned how frequent the respondent encountered peers carried out plagiarism and unauthorized acts.

4.3.2 ICT Attitude

ICT attitude was operationalized as a second-order factor, with three first-order factors Internet attitude (4 items), attitude on web based learning (7 items), and attitude on educational use of ICT (4 items). Measurement of Internet attitude and attitude on web based learning were adopted and modified from Commission on Youth (2001) and Tsai (2009)

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[2] For variables measuring behaviors/acts, the scale adopted was 1=never to 5=always.

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respectively. As for measuring attitude on educational use of ICT, the works by Compeau and Higgins (1999); Davis (1989); Fishbein and Ajzen (1975); Yuen and Ma (2008) were consulted.

The ICT attitude construct was conceptualized in similar vein to Lau and Yuen's (2014a) development of a second-order, perceived ICT literacy scale. The construct underwent both exploratory factor analysis (principal component extraction and a promax rotation) and confirmatory factor analysis (maximum likelihood estimation). Results from these analyses found the three first-order factors were correlated, and could be represented by a unitary, second-order factor. Chen, Sousa, and West (2005) have precisely explained the potential advantages of conceptualizing a second-order factor over using first-order factors, such as parsimony, more accurate estimation, and simpler interpretation of model structure.

4.3.3   ICT Literacy

A perceived ICT literacy scale was adopted from Lau and Yuen (2014a). The scale consisted of three first-order factors, namely computer literacy (5 items), Internet literacy (5 items), and information literacy (7 items). The scale was empirically tested for its reliability and validity. In addition, the scale is particular relevant to this study as it was designated for measuring adolescents' perceived competence in ICT; and its interpretation of literacy is consistent with the concept of PBC/self-efficacy.

4.3.4   Intention

Students' intentions to plagiarize and to perform unauthorized acts were measured by 5 items and 7 items respectively. Plagiarism's intention referred to the intention to use technology to adopt materials from sources without proper acknowledgements. Unauthorized

act's intention referred to the intention to carry out risky online activities such as software piracy and computer hacking.

4.3.5 *Unethical / Risky Online Behaviors*

The two constructs measuring plagiarism behavior (4 items) and unauthorized acts (4 items) were both adopted from Lau and Yuen (2013, 2014b). While Lau and Yuen (2013) regarded plagiarism and unauthorized acts as risky online behaviors, Lau and Yuen (2014b) studied the two constructs within the context of unethical behaviors. As such, in this study the term 'risky online behaviors' was seen as equivalent to 'unethical behaviors'.

5. RESULTS

5.1   Data Analysis

This study employed structural equation modeling (SEM) to analyze adolescents' unethical/risky online behaviors. Summarizing the works of Bollen (1989); Byrne (2010); Hair, Black, Babin, and Anderson (2010); Hoyle (2011); In'nami and Koizumi (2013); Teo, Tsai, and Yang (2013), the advantages of SEM are:

i)   modeling of complex, multivariate relationships or indirect effects simultaneously

ii)   analyzing relationships between both unobserved (i.e. latent) and observed variables

iii)   measuring unobserved variables using multiple indicators, and testing hypotheses at the construct rather than item level

iv)   explicit modeling of random errors, which provides more precise and unbiased estimates

With respect to data analysis, SPSS Amos 22.0 was used with the maximum likelihood option to estimate the model parameters.

5.2   Test of Measurement Model

This study adopted the two-step SEM approach recommended by Anderson and Gerbing (1988) and Williams and Hazer (1986): the test of measurement model (confirmatory factor analysis, CFA) as first step, and the test of structural model (path analysis) as second step.

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To ensure sufficient sample size for SEM analysis, Hoelter's (1983) critical N was examined. At the alpha level of 0.05, the Hoelter's critical N for the proposed model was 294, which is smaller than the study's sample size of 757. Thus, SEM is considered to be an appropriate technique for analysis.

Besides, maximum likelihood estimation requires data to be multivariate normally distributed. In terms of univariate normality, since the values of skewness and kurtosis of all variables were within Kline's (2011) recommended cutoffs of $|3.0|$ and $|8.0|$, the data were treated as univariate normally distributed. As for multivariate normality, it was tested using Mardia's coefficient (Mardia, 1970). The coefficient obtained was 1013.722, which is smaller than the recommended value of $p(p+2) = 57(59) = 3363$, where p is the total number of observed variables (Raykov & Marcoulides, 2008). Therefore, multivariate normality of data was also assumed.

Regarding convergent and discriminant validity, composite reliability (CR) and average variance extracted (AVE) were examined. For convergent validity, according to Fornell and Larcker (1981), CR should be at least 0.7 for 'modest' reliability while AVE should be greater than 0.5; whereas Bagozzi and Yi (1988) proposed that the general threshold values for CR and AVE were 0.6 and 0.5 respectively. Additionally, Hair et al. (2010) maintained that items with standardized factor loadings (SFL) greater than 0.5 were regarded as significant. As shown in Table 1, except the AVE of peers' unethical behaviors was .499, the CR, AVE and SFL of other variables all exceeded the recommended values noted above. Thus, convergent validity was confirmed.

Table 1 Standardized factor loadings, composite reliability, and average variance extracted

Construct	Item	SFL	*t* value	CR	AVE
Peers' unethical behaviors (PEER)	PEER1	.669	-	.832	.499
	PEER2	.799	18.384		
	PEER3	.734	16.638		
	PEER4	.593	14.019		
	PEER5	.721	16.529		
ICT attitude (ICTA)	INTA	.645	-	.831	.625
	WBLA	.903	14.329		
	ICTE	.802	13.347		
Internet attitude (INTA)	INTA1	.771	-	.907	.711
	INTA2	.897	26.954		
	INTA3	.922	27.452		
	INTA4	.772	22.612		
Attitude on web based learning (WBLA)	WBLA1	.842	-	.942	.681
	WBLA2	.819	28.024		
	WBLA3	.852	29.879		
	WBLA4	.876	31.556		
	WBLA5	.866	30.607		
	WBLA6	.798	26.674		
	WBLA7	.797	26.596		
Attitude on educational use of ICT (ICTE)	ICTE1	.768	-	.909	.713
	ICTE2	.858	25.410		
	ICTE3	.884	26.077		
	ICTE4	.864	25.183		
ICT literacy (ICTL)	COML	.759	-	.820	.603
	INTL	.746	14.509		
	INFL	.822	14.520		
Computer literacy (COML)	COML1	.861	-	.867	.573
	COML2	.841	28.277		
	COML3	.818	27.116		
	COML4	.674	20.339		
	COML5	.539	15.477		
Internet literacy (INTL)	INTL1	.745	-	.897	.635
	INTL2	.875	24.380		
	INTL3	.806	22.257		
	INTL4	.732	19.912		
	INTL5	.819	22.589		
Information literacy (INFL)	INFL1	.740	-	.905	.559
	INFL2	.802	22.413		
	INFL3	.859	23.834		
	INFL4	.760	20.878		

	INFL5	.640	17.327		
	INFL6	.780	21.345		
	INFL7	.724	19.728		
Plagiarism's intention (PLAI)	PLAI1	.679	-	.916	.689
	PLAI2	.690	29.129		
	PLAI3	.926	22.945		
	PLAI4	.923	22.804		
	PLAI5	.894	22.337		
Unauthorized acts' intention (UNAI)	UNAI1	.689	-	.923	.615
	UNAI2	.602	16.038		
	UNAI3	.942	24.084		
	UNAI4	.929	23.699		
	UNAI5	.924	23.636		
	UNAI6	.718	18.835		
	UNAI7	.704	18.483		
Plagiarism (PLAG)	PLAG1	.811	-	.875	.636
	PLAG2	.811	24.656		
	PLAG3	.742	21.999		
	PLAG4	.823	24.434		
Unauthorized acts (UNAC)	UNAC1	.965	-	.905	.709
	UNAC2	.963	62.690		
	UNAC3	.739	28.096		
	UNAC4	.657	22.736		

Note: - denotes value fixed at 1 for model identification purpose.

SFL = Standardized factor loadings; CR = Composite reliability; AVE = Average variance extracted

As for discriminant validity, this study used the approach proposed by Fornell and Larcker (1981) and Hair et al. (2010) that the AVE of a construct should be greater than the variance shared between the construct and other constructs in the model. As shown in Table 2, the square roots of the AVE of constructs in the diagonals were all greater than their correlations with other constructs in the off diagonals. As a result, adequate discriminant validity was assumed.

Table 2 Comparison of (square-rooted) average variance extracted and correlation

	PEER	INTA	WBLA	ICTE	COML	INTL	INFL	PLAI	UNAI	PLAG	UNAC
PEER	.707										
INTA	.069	.843									
WBLA	.051	.449***	.825								
ICTE	.054	.547***	.685***	.845							
COML	.051	.313***	.394***	.442***	.757						
INTL	.043	.360***	.375***	.428***	.551***	.797					
INFL	.039	.439***	.507***	.569***	.545***	.526***	.748				
PLAI	.435***	-.110**	-.155***	-.198***	-.162***	-.095**	-.160***	.830			
UNAI	.447***	-.161***	-.126***	-.216***	-.173***	-.186***	-.147***	.743***	.784		
PLAG	.489***	-.107**	-.131***	-.154***	-.108**	-.065	-.137***	.670***	.637***	.797	
UNAC	.447***	-.203***	-.137***	-.203***	-.148***	-.183***	-.154***	.517***	.736***	.678***	.842

Note: ** $p<.01$; *** $p<.001$.

PEER = Peers' unethical behaviors; INTA = Internet attitude; WBLA = Attitude on web based learning; ICTE = Attitude on educational use of ICT; COML = Computer literacy; INTL = Internet literacy; INFL = Information literacy; PLAI = Plagiarism's intention; UNAI = Unauthorized acts' intention; PLAG = Plagiarism; UNAC = Unauthorized acts

Understanding adolescents' unethical online behaviors: A structural equation approach

To test the model fit, a number of indices were examined, which included both absolute fit indices χ^2 (chi-square), χ^2/df (chi-square to its degree of freedom), standardized root mean square residual (SRMR), root mean square error of approximation (RMSEA) and incremental fit indices Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) (also called non-normed fit index, NNFI) (Kline, 2011). Overall, the fix indices suggested a good fit of the measurement model: χ^2 = 4118.575; χ^2/df = 2.729; CFI = .925; TLI = .921; RMSEA = .048 (90% CI: .046, .050); SRMR = .057. It should be noted that caution should be taken in interpreting the χ^2 value, as it has been shown to be too sensitive to sample size increases, such that its probability level tends to be significant even the model may be a close fit to the data (Teo, 2013). The respective recommended values of various fit indices are summarized in Table 3.

Table 3 Model fit

Fit Index	Proposed model	Recommended level	Reference
χ^2	4118.575, significant	Non-significant	Hair et al. (2010)
χ^2/df	2.729	$\leq$3	Carmines and McIver (1981)
CFI	.925	$\geq$.90	Hair et al. (2010)
TLI	.921	$\geq$.90	Hair et al. (2010)
RMSEA (90% CI)	.048 (.046 , .050)	$\leq$.06	Hu and Bentler (1999)
SRMR	.057	$\leq$.08	Hu and Bentler (1999)

It should also be remarked that, in this study, uniqueness (ε) of a few indicators were set as correlated since their question wordings were very similar,[3] which meant they conveyed very similar implication/meaning. Additionally, errors (ζ) of the two intention constructs were set as correlated, as were the two behavior constructs. This should be acceptable as Chan,

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[3] Pairs of uniqueness set as correlated were: PLAG1 & PLAG2, UNAI6 & UNAI7, and UNAC3 & UNAC4.

Yuen, Lau, and Chan (2014) found that adolescents engaging in one type of risky online behavior would spread to other cyber misbehaviors. In this light, it might be argued that the two risky online behaviors concerned could be represented by one second-order factor. Nonetheless, Kline (2011) recommended that there must be at least three first-order factors in order to identify a hierarchical CFA model; otherwise the model could be underidentified. Since there were only two factors for intentions and behaviors respectively, for better identification and theoretical representation, their respective error terms were set as correlated.

5.3 Test of Structural Model

As for the structural model, the hypothesized model fit the data well, χ^2 = 4202.075; χ^2/df = 2.775; CFI = .923; TLI = .919; RMSEA = .048 (90% CI: .047, .050); SRMR = .060. The hypotheses testing results are presented in Table 4 and Figure 4.

Table 4 Hypotheses testing results

Hypo-thesis	Path			Path coefficient	t value	Result
H1	Peers' unethical behaviors	→	ICT attitude	.050	1.161	Not supported
H2a	Peers' unethical behaviors	→	Plagiarism's intention	.456	9.92***	Supported
H2b	Peers' unethical behaviors	→	Unauthorized acts' intention	.442	9.884***	Supported
H3	ICT attitude	→	ICT literacy	.770	12.157***	Supported
H4a	ICT attitude	→	Plagiarism's intention	-.175	-2.411*	Supported
H4b	ICT attitude	→	Unauthorized acts' intention	-.141	-1.981*	Supported
H5a	ICT literacy	→	Plagiarism's intention	-.074	-1.012	Not supported
H5b	ICT literacy	→	Unauthorized acts' intention	-.171	-2.341*	Supported
H6a	ICT literacy	→	Plagiarism	.002	0.07	Not supported
H6b	ICT literacy	→	Unauthorized acts	-.139	-4.249***	Supported
H7a	Plagiarism's intention	→	Plagiarism	.535	9.831***	Supported
H7b	Plagiarism's intention	→	Unauthorized acts	-.047	-1.033	Not supported
H8a	Unauthorized acts' intention	→	Plagiarism	.253	5.226***	Supported
H8b	Unauthorized acts' intention	→	Unauthorized acts	.677	13.016***	Supported

Note: * $p<.05$; *** $p<.001$.
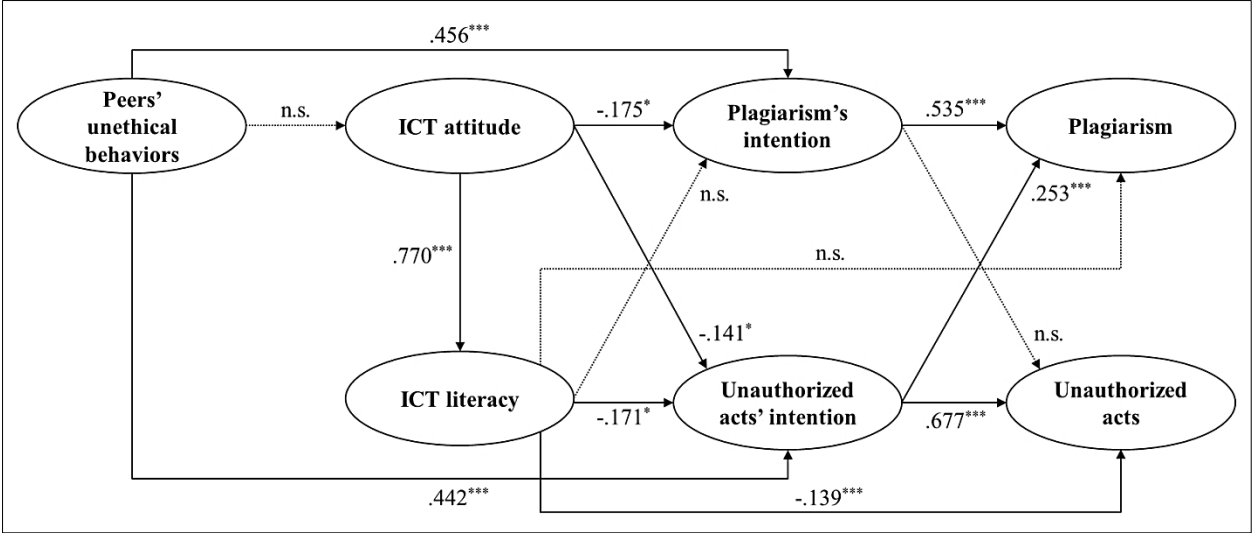
Note: * *p*<.05; *** *p*<.001; *n.s. = not significant.*

Figure 4 Path diagram of hypotheses testing results

Among the eight pairs of hypotheses proposed, one of them (H1) was not supported, three pairs (H5, H6, H7) were partially supported, and four pairs (H2, H3, H4, H8) were fully supported.

For H1, the data did not support the hypothesized relationship between peers' unethical behaviors and students' ICT attitude (t = 1.161). Besides, concerning H5 and H6, it is interesting to note that students' ICT literacy was neither associated with their plagiarism's intention (t = -1.012) nor their plagiarism behavior (t = 0.07), whereas ICT literacy had a significant negative influence on their unauthorized acts' intention (β = -.171, t = 2.341) and unauthorized acts (β = -.139, t = -4.249). For H7, though students' plagiarism's intention had a significant positive effect on their plagiarism behavior (β = .535, t = 9.831), such intention was not associated with their unauthorized acts (t = -1.033).

As for the other four pairs fully supported hypotheses, H2 was supported that peers' unethical behaviors had a significant positive effect on students' intention to plagiarize (γ = .456, t = 9.92) and also unauthorized acts' intention (γ = .442, t = 9.884). Also, the relationship between ICT attitude and ICT literacy was positive and statistically significant (β = .770, t = 12.157), supporting H3. For H4, unlike ICT literacy, ICT attitude was found to be negatively associated with both plagiarism's intention (β = -.175, t = -2.411) and unauthorized acts' intention (β = -.141, t = -1.981). Finally, concerning H8, students' unauthorized acts' intention had positive and statistically significant effect on both plagiarism behavior (β = .253, t = 5.226) and unauthorized acts (β = .677, t = 13.016).

As shown in the research model (Figure 4), six endogenous constructs were tested. Regarding ICT attitude, since H1 was not supported, its squared multiple correlations, or R^2, was minimal (.002). Also, it was hypothesized that ICT literacy was determined by ICT attitude; the relationship was significant which resulted in a R^2 of .593. Additionally, it is worthwhile to note that whilst the R^2 of plagiarism's intention and unauthorized acts' intention were only .269 and .254 respectively, the variances in plagiarism behavior and unauthorized acts were moderately explained by various endogenous constructs. To be exact, the model was able to explain 54.8% of the variance in plagiarism, and 48.0% of the variation in unauthorized acts.

6. Discussion

This study aims to assess how well the proposed model explains adolescents' unethical online behaviors. From the results, the model explanatory power was moderate and acceptable, as it could explain 54.8% of the variance in plagiarism, and 48.0% of the variation in unauthorized acts. As Ajzen (2001) underlined, the reasonable expectation of correlations of constructs in a well-measured TPB model are about .60. In this light, intention to plagiarize was considered to be a moderate-strong predictor (β = .535, t = 9.831) of plagiarism behavior, whereas intention to engage in unauthorized acts was a strong predictor (β = .677, t = 13.016) of unauthorized acts.

Besides, though the model could only explain a little more than 25% of the variance concerning students' intention to engage in risky online behaviors, this should be acceptable as this study adopted two general measurements of ICT attitude and ICT literacy, instead of specifically measuring these constructs within the context of unethical behaviors. In fact, it should be encouraging to note that these general measurements were generally applicable in explaining the endogenous intention and behavioral factors, though their path coefficients were small (ranged from |.13| to |.17|).

In addition, consistent with previous findings, subjective norm (peers' unethical behaviors) had a significant and moderate influence (β around .45) on students' intention to engage in unethical behaviors. Within the SCT context, people learn by observing their peers (Bandura, 1986). In another token, by projecting their behaviors to their friends, adolescents can normalize their own behaviors (Bauman & Ennett, 1996; Gerrard, Gibbons, Benthin, &

Hessling, 1996). Thus, if their peers consider unethical behaviors to be normal/acceptable, these adolescents will likely be prompted to engage in the same behavior. Simply put, peers' influence plays a crucial part in shaping adolescents' intention to engage in risky online behaviors.

Moreover, it was revealed that peers' unethical behaviors had no influence on students' ICT attitude. One possible reason is that the two constructs dealt with two different contexts. Whilst the former construct focused specifically in the context of unethical behaviors, the latter was a general measure taking various ICT-related dimensions into account. As such, this contextual difference may contribute to the non-significant relationship. Within the SCT context (Bandura, 1986), it could also be argued that it takes time for the environmental determinant (peer influence) to exert its influence on the personal factor (attitude), in which such influence cannot be reflected by the current cross-sectional study.

Another possible reason is that the ICT attitude held by these students were moderate-strong (INTA: M = 3.73, SD = 0.79; WBLA: M = 3.49, SD = 0.69; ICTE: M = 3.62, SD = 0.67) as compared with the somewhat low frequency of their peers engaging in unethical behaviors (PEER: M = 2.44, SD = 0.80). Generally speaking, strong attitudes are more stable over time and across situations, and can be resistant to persuasion; whereas weak attitudes are more susceptible to context effects/influences (Ajzen, 2001; Bohner & Dickel, 2010). Nevertheless, the intensity of attitude is a complex subject, therefore this explanation should be interpreted with sufficient caution and further investigation is deemed necessary.

Furthermore, as mentioned above, the proposed model illustrated that the two general measurements ICT attitude and ICT literacy were in general applicable in explaining

adolescents' intent to, and act of, unethical behaviors. Specifically, consistent with previous findings discussed in section 2.4, especially a recent study by Aesaert and van Braak (2014), ICT attitude was positively and strongly associated with ICT literacy (or ICT self-efficacy) (β = .770, t = 12.157). Such finding also echoed a group of computer experts' view that attitude is an important aspect of digital competence (Janssen et al., 2013). Interestingly, whilst ICT attitude exerted negative influences on both intentions to plagiarize and carry out unauthorized acts, ICT literacy influenced only the intent to, and acts of, unauthorized acts but not plagiarism.[4] Such discrepancy is actually consistent with previous findings that ICT capability was unrelated to cheating/plagiarism (Byrne & Trushell, 2013; Stephens et al., 2007; Trushell et al., 2013). A possible reason is that while being Internet proficient (INTL: M = 4.40, SD = 0.71) might open up more opportunities to plagiarize via the web easily, such effect might be neutralized by students' proficient information literacy (INFL: M = 3.63, SD = 0.61). Students with good information skills are more able to define their information needs, retrieve the relevant information, and evaluate the usefulness of different sources, thus lowering their intent to, and act of plagiarism.

In addition, another possible reason is that given the ease to cut-and-paste using the Internet; some students may see plagiarism as justifiable (Hansen, 2003), or acceptable (Lathrop & Foss, 2000). In this regard, students may consider the perceived risks of plagiarism to be lower than that of unauthorized acts. Empirical research by Lau, Yuen, and Park (2013) on a group of eight-graders showed that perceived risks of these students only mildly

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[4] Although there was an indirect effect of ICT literacy influencing plagiarism via unauthorized act's intention, the effect was very small (β = -.04).

influenced their plagiarism behavior (path coefficient = .139, $p<.05$). Additionally, these authors held the view that students may fail to recognize the harmful impact of plagiarism to others, thus seeing plagiarism as a nonmoral, personal decision. Another point worth noting is that these adolescents were only 13.15 years old on average; therefore they might be more alert of unethical behaviors compared with those who were undergraduate students or working adults in other studies. In a similar token, students being more ICT competent might be more able to realize the severity and risk of offences like hacking and piracy than that of plagiarism, thus negating their intent to, and act of, carry out these activities. Nonetheless, as this study employed two special measurements of attitude and PBC/self-efficacy, and since the study context of adolescents' engagement in risky online behaviors is under-researched, further investigation is needed to explore the underlying reasons of the aforementioned structural relationships, in particular the connection between ICT attitude, ICT literacy, and moral/ethical standards.

Finally, consistent with the TPB, intention to carry out unethical behaviors was a significant predictor of the actual unethical behaviors. However, only unauthorized acts' intention exerted positive and significant effect on both risky online behaviors, whereas intention to plagiarize was unrelated to unauthorized acts. Such discrepancy could also be explained by students' perceiving the two constructs of unethical behaviors differently; with plagiarism being regarded as less severe and risky, more acceptable, and more personally-related than unauthorized acts. As such, students tended to plagiarize may not carry out the more risky and more harmful unauthorized acts, which contrasted with those who intended to carry out unauthorized acts. In fact, based on the descriptive statistics, students had stronger

intention to plagiarize (PLAI: M = 2.30, SD = 0.86) than that of unauthorized acts (UNAI: M = 2.03, SD = 0.85), and they engaged in plagiarism (PLAG: M = 2.16, SD = 0.85) more frequently than unauthorized acts (UNAC: M = 1.67, SD = 0.88). These results might suggest the special nature of plagiarism as a unique form of unethical/risky online behavior. To this end, a qualitative investigation could be useful in examining the differences of these two behavioral constructs in-depth.

In sum, although some pairs of hypotheses of the proposed model were only partially supported, which might be due to contextual constraint in the measurements adopted, the proposed model was in general consistent with the SCT/TPB framework. Besides, though the context of this study is notably different from much of the literature discussed, it is still able to adequately test various structural relationships documented in the literature.

As for the implications of this study, based on the above findings, it is important for educators to take note of the strong influence of peers' norm in shaping students' intention to act unethically, so as to safeguard students' from performing risky online behaviors. To this end, reinforcement strategies and pedagogical enhancement might be needed. Additionally, by helping students develop positive ICT attitude, their intent to plagiarize and carry out unauthorized acts can be eased. Whilst enhancing students' ICT literacy altogether may not be effective in combating plagiarism, Ercegovac and Richardson's (2004) recommendations on information literacy might be applicable and relevant. Drawing on Kohlberg's (1976) stages of development in moral reasoning, these authors put forth an agenda in dealing with cyber-plagiarism (Figure 5). With all these in mind, it is hoped that students will comprehend the

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underlying reasoning to act ethically, and acknowledge the potential harm and risk of

plagiarism and unauthorized acts.

Research Agenda: Studying Plagiarism in the Digital Age	
Educational Levels	**Putting Research to Practice**
Secondary school students: Middle school (grades 6–8); student ages are about 10–13. High school (grades 9–12); ages are about 14/15–18.	Contributions of Kohlberg on different phases of moral reasoning need to be mapped to pedagogical tools and strategies in the context of information literacy (IL) standards, especially in the context of cyber-plagiarism. *Recommendation*: Develop climate based on trust, respect, and caring; pilot teaching units on academic honesty to be practiced consistently across all classes; teach teachers plagiarism prevention techniques; ensure that students are ready for college-level learning.

Figure 5 Studying plagiarism in the digital age (Ercegovac & Richardson, 2004, p.313)

7. CONCLUSION

Based on Ajzen's theory of planned behavior and Bandura's social cognitive theory, this study used a revised TPB model to understand adolescents' unethical/risky online behaviors. As stated in the above sections, previous studies examining unethical behaviors using TPB were mostly conducted in the higher education or workplace context. Thus, this study adopted a structural equation approach to test if previous findings were replicable in the adolescence domain. Drawing on a random sample of 757 secondary two students in Hong Kong, the proposed model was able to moderately explain the variances of students' plagiarism and unauthorized acts. Besides, this study revealed that peer's unethical behaviors was the most influential factor in shaping students' intention to act unethically; whereas having positive ICT attitude and being more ICT literate tended to ease students' intention to carry out unethical behaviors. Also, whilst unauthorized acts' intention influenced both plagiarism behavior and unauthorized acts, plagiarism's intention was only related to plagiarism behavior. The current study contributes to the literature that general measurements of attitude and PBC/self-efficacy were found to be applicable in the TPB framework. Nonetheless, further investigation is needed to explore the underlying reasons of various structural relationships, as the research area of adolescents' engagement in unethical/risky online behaviors is currently understudied.

The findings of this study imply that if teachers could help students develop positive attitude towards ICT and equip them with proficient ICT literacy (in particular information literacy when dealing with plagiarism), these should to a certain extent safeguard them from acting unethically. Reinforcement (positive and/or negative) strategies, as well as pedagogical

enhancement may also be needed to neutralize the adverse peer influence on students' intention to perform risky online behaviors.

7.1   Limitations

Several limitations of this study should be noted. First, this study was a cross-sectional study, thus caution must be taken in the interpretation of causality among various constructs. In fact, within the SEM context, it is possible to have many equivalent models with different paths among constructs, but having the same model fit as the proposed model (Kline, 2011).

Second, the subjective norm construct of this study was limited to peers only; it did not account for the perceptions of other significant others of adolescents (e.g.: teachers and parents) in influencing their intention to act unethically. As a result, parents and teachers influence on students' intent to plagiarize and perform unauthorized acts should be further explored.

Third, whilst this study demonstrated that general scales of ICT attitude and ICT literacy were applicable within TPB; such measurements had certain contextual constraints in understanding the underlying reasons of students' intent to, and/or act of acting unethically. As such, to gain more in-depth understanding of the research topic, a qualitative approach should be employed in future studies.

Fourth, the present study did not look into the gender differences of the subject matter; yet previous studies found gender differences concerning risk-taking/unethical behaviors in an online environment (Jackson et al., 2008; Jensen, Arnett, Feldman, & Cauffman, 2002; Lau & Yuen, 2013, 2014b; Notten & Nikken, 2014; Sasson & Mesch, 2014; The Josephson Institute, 2006). Therefore, a multiple group SEM approach should be adopted to investigate such

gender differences, or even extend further to examine multi-group differences of other demographic variables, and examine their moderating effects as appropriate.

Fifth, this study only examined two forms of unethical behaviors, i.e. plagiarism and unauthorized acts, future studies should also examine other unethical online behaviors such as cyberbullying, pornography, Internet stickiness, etc. so as to obtain a more complete picture of adolescents' engagement in unethical/risky online behaviors.

Finally, the proposed model only moderately explained the variances of plagiarism and unauthorized acts, whereas its explanatory power on intention was weak. As such, future studies may refine the TPB model by adding additional predictors to the model. However, such proposal must only be done after careful deliberation and empirical exploration, and should fit the criteria proposed by Fishbein and Ajzen (2010), namely compatibility, conceivability, conceptual independency, applicability, and consistency.

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Construct	Item	
Peers' unethical behaviors (PEER)	PEER1	My classmates extract others' articles or photos in their emails or blogs without stating the sources or authors
	PEER2	My classmates directly print out articles from the Internet, and hand in as their own reports
	PEER3	My classmates post others' personal information (such as name, phone number, photos, etc ...) on the Internet
	PEER4	My classmates install pirated software
	PEER5	My classmates use ICT to copy assignments
Internet attitude (INTA)	INTA1	The Internet is lessening many tedious jobs for humans
	INTA2	The use of the Internet is enhancing our standard of living
	INTA3	Life will be easier and swifter with the Internet
	INTA4	Information from the Internet provides significant impact on humans
Attitude on web based learning (WBLA)	WBLA1	Web-based learning makes me know more information and knowledge, which can assist me in enlarging the bound of my knowledge
	WBLA2	Web-based learning involves more applications of knowledge, not just some theoretical knowledge listed in the textbooks
	WBLA3	I believe the content of online learning connects more theoretical knowledge to real life. We can use this knowledge effectively in practical situation. We can even use the knowledge to generate products to enhance living standard
	WBLA4	By web-based learning, I can acquire knowledge of great breadth and depth. Then, I get better understandings of it
	WBLA5	In web-based learning environments, I can explore a learning theme from different sources, and then I can acquire a more complete understanding
	WBLA6	By web-based learning, we can know more about various points of views, and then it will let me adapted to living environment more easily
	WBLA7	I think the unity of life and knowing is the ultimate goal of learning, and I think web-based learning can effectively help in achieving this goal

Attitude on educational use of ICT (ICTE)	ICTE1	Using ICT improves my academic performance
	ICTE2	Using ICT enables me to accomplish tasks more quickly
	ICTE3	Using ICT enhances my effectiveness on study
	ICTE4	I think that ICT is very useful in my study
Computer literacy (COML)		*I am able to…*
	COML1	set header / footer in a word processor software (e.g. Microsoft Word)
	COML2	plot a graph and chart using a spreadsheet software (e.g. Microsoft Excel)
	COML3	insert an animation in presentation software (e.g. Microsoft PowerPoint)
	COML4	edit a photo using image processing software (e.g. Photo Editor, Photo Impact, PhotoShop)
	COML5	set up a printer (e.g. replace ink cartridge)
Internet literacy (INTL)		*I am able to…*
	INTL1	set a homepage for an Internet browser
	INTL2	search for information on the Internet using a search engine (e.g. Yahoo, Google, Baidu)
	INTL3	use email to communicate
	INTL4	use instant messaging software (e.g. MSN, QQ) to chat with friends
	INTL5	download files from the Internet
Information literacy (INFL)		*I am able to…*
	INFL1	identify appropriately the needed information from question
	INFL2	collect / retrieve information in digital environments
	INFL3	use ICT to appropriately process the obtained information
	INFL4	interpret and represent information, such as by using ICT to synthesise, summarise, compare and contrast information from multiple sources
	INFL5	use ICT to design or create new information from information already acquired
	INFL6	use ICT to convey correct information to appropriate targets
	INFL7	judge the degree to which information is practical or satisfies the needs of the task, including determining authority, bias and timeliness of materials

Plagiarism's intention (PLAI)	PLAI1	Plagiarism is very effective, it helps achieving best result with minimum time
	PLAI2	Many classmates copy their assignments; I will be very stupid if I do not copy
	PLAI3	If time is insufficient, it is alright to plagiarise assignments from the Internet
	PLAI4	If time is in sufficient, it is possible to borrow other classmates' assignment for copying
	PLAI5	If (my) classmates get a good grade by copying others' assignment, I will also imitate
Unauthorized acts' intention (UNAI)	UNAI1	It should be no problem to hack into classmates' computers without causing any loss
	UNAI2	Using pirated software can enhance my abilities in using various software
	UNAI3	If I have the ability to break into others' system, I will try to prove my ability
	UNAI4	If the behavior of hacking computers is difficult to be detected, I will try to hack into others' computers
	UNAI5	If someone offended me, I will try to break into his / her computer
	UNAI6	In order to save money, it is alright to use pirated software
	UNAI7	In situation where no one knows, I will use pirated software
Plagiarism (PLAG)		*Is it frequent that you have done the following behaviours?*
	PLAG1	Copy assignments from other students and then submit to teachers
	PLAG2	Submit assignments with contents or pictures copied from the Internet without acknowledgment
	PLAG3	Submit assignments with the translated results using an online translator
	PLAG4	Paste others' article in discussion forum on the Internet without acknowledgment
Unauthorized acts (UNAC)		*Is it frequent that you have done the following behaviours?*
	UNAC1	Search for some methods to break into others' computer
	UNAC2	Try to break into others' computer
	UNAC3	Use an unauthorised password to install software
	UNAC4	Use pirated software