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Predicting Cheating in Online Proctoring Exams: An Application of the Theory of Planned Behavior

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Abstract:

Institutions of higher education have widely applied remote tests using online proctoring. The classical methods of detecting cheating are no longer successful in inhibiting cheating during online examinations. There is a need to maintain academic integrity through online controlled assessments. The purpose of this paper is to identify the factors that lead to cheating on exams during online proctoring. Using the Theory of Planned Behavior was investigated; the extent to which attitudes, subjective social norms, perceived behavioral control, and moral obligation predicted cheating on an online proctoring exam. Although the model explained a small variation, it was significant. The results showed that moral obligation was an influential factor in predicting cheating.

Keywords: Cheating; Online Exam; Online Proctoring; Saudi Higher Education; Theory of Planned Behavior

التنبؤ بالغش في الاختبارات التي تتم مراقبتها عبر الإنترنت: تطبيق لنظرية السلوك المخطط

المخلص:

قامت مؤسسات التعليم العالي مؤخرا بتطبيق الاختبارات عن بعد على نطاق واسع باستخدام المراقبة عبر الإنترنت. الطرق التقليدية لمنع الغش أثناء الاختبارات لا تصلح لمنعه عندما تكون الاختبارات عن بعد. وتهدف هذه الدراسة إلى تحديد العوامل التي تؤدي إلى الغش في الاختبارات أثناء المراقبة عبر الإنترنت. وتحديدًا، إلى أي مدى يمكن للمواقف والأعراف الاجتماعية الذاتية والتحكم السلوكي الملحوظ والالتزام الأخلاقي التنبؤ بالغش في اختبار المراقبة عبر الإنترنت. على الرغم من أن نموذج الدراسة فسر جزءًا بسيطًا من التفاوت، إلا أنه كان دالًا احصائيًا. أظهرت النتائج أن الالتزام الأخلاقي كان عاملاً مؤثرًا في توقع الغش.

كلمات مفتاحية: الغش؛ الاختبار عبر الإنترنت؛ المراقبة عبر الإنترنت؛ التعليم العالي في السعودية؛ نظرية السلوك

المخطط

Introduction:

Most educational institutions around the world have recently shifted to online courses and e-learning (Bawarith, Basuhail, Fattouh, & Gamalel-Din, 2017; Dendir & Maxwell, 2020). It is important to note that the majority of these universities have tended to conduct online exams. This shifting process needs support such as electronic proctoring or e-proctoring in order to monitor test assessment. The e-proctoring instruments are relevant and noticeable in a manner that encourages this electronic procedure. Gonzalez-Gonzalez, Infante-Moro and Infante-Moro (2020) pointed out that “The e-proctoring (electronic proctoring) is a system formed by electronic tools that allows the monitoring of the remote evaluative process through telematic resources, trying to make the results reliable” (p.1). Although there already are e-proctoring instruments that try to assure the quality of the evaluation procedure without the actual presence of students and their teachers in a particular position, e-proctoring has not been broadly used in educational institutions (Gonzalez-Gonzalez et al., 2020).

Many researchers have confirmed that the old methods upon which higher education relied have not been good enough for 21st Century requirements. In this respect, technology has a noticeable role in making education more accessible involving large educational resources. This fact brings challenges to old methods tackling issues including data institutional credibility, academic assessments, user privacy, and data security (Amigud, Arnedo-Moreno, Daradoumis, & Guerrero-Roldan, 2018).

Additionally, information technology is able to cater to reasonable models of higher education and quality (Carey, 2016; DeMillo, 2011). However, this shift poses a challenge; the way exam integrity must be ensured is highly significant (Woldeab & Brothen, 2019). In their study, Chirumamilla, Sindre & Nguyen-Duc (2020) found that students and teachers believe that cheating is easier in e-exams, which makes academic dishonesty extremely relevant (McCabe, Butterfield, & Trevino, 2012). However, another study conducted by Stuber-McEwen, Wiseley, and Hoggatt (2009) revealed that students were more likely to cheat in face-to-face classes rather than online classes. In empirical research conducted by Grijalva, Nowell, and Kerkvliet (2006), it is important to indicate that the researchers concluded that academic dishonesty in traditional education is no less pervasive than online classes, indicating that in self-reported cheating, there is no difference between online classes and traditional context.

Throughout the history of education, academic integrity has been of continuous interest to administrators and faculty in higher education. Educational scholars have discussed various issues and behaviors signifying cheating, including copying on from others on exams, irrelevant bibliographic citations, and plagiarism (King, Guyette & Piotrowski, 2009) since cheating on exams can be characterized as a popular phenomenon on a large scale (Bawarith et al., 2017). According to notable estimates of the issue, researchers have found that large numbers of students cheated on exams with respect to college campuses (Rozycki, 2006). In addition, literature confirmed that few studies tackle the issue whether students’ cheating will be facilitated during online tests (Fask, Englander & Wang, 2014).

Some educational institutions have moved into online proctoring. However, this practice requires constant recognition of user's identity during the whole period of the exam session. Constant curbing and monitoring over all students are required as well since cheating can be more widespread and easier with the assistance of technology. The uses of technology "enable new forms of communication, thus, new ways of cheating" (Chirumamilla et al., 2020, p. 954). For instance, during an exam, students may use different wireless devices, such as mobiles and headphones (Syam & Al-Shaikh, 2013). Therefore, the aim of the current paper is twofold. One is to assess students' awareness of behavior that the online proctor considers cheating, the students' confidence that the online proctor will be able to detect such behavior, will be the impact of cheating. The second aim is to evaluate the modified and extended version of the theory of planned behavior (Beck & Ajzen, 1991) in relation to cheating in online proctored exams. Specifically, the extent to which students' attitudes towards academic cheating, subjective social norms, behavioral control, and moral obligation predicted cheating while the use of an online proctor was investigated.

Research Questions

1. Is there a statistically significant difference between the two groups (students who cheat and those who do not) in their awareness of behavior that is considered cheating by the online proctor and their confidence that the online proctor can detect cheating?
2. Can cheating on online proctored exams be predicted from Attitudes Toward Cheating Behavior (ATCB), Moral Obligation (MO), Perceived Behavior Control (PBC), Subjective Norms (SN) and Age?

Literature Review

Online Proctoring

An online proctor is a tool intended to monitor and observe students while they are taking an online exam. It is crucial that students in such an environment are not physically present; but have their exam in a virtual setting (Gonzalez-Gonzalez et al., 2020). During an exam session, the function of the online proctor is to detect and check any cheating activities and the whole online exam process will be recorded. It is significant to note that students must display a clear image of their ID (identification card) to the camera as authentication before starting the online exam. In addition, the online proctor needs an eye tracker, which involves a camera to track the eye movements of the student or the examinee. The camera can detect the exact details concerning the student's pupils and the gazes that he or she has made (Bawarith et al., 2017).

Another approach is the feature of fingerprint authentication. According to Bawarith et al. (2017, p.177), fingerprint identification "refers to the automated method of verifying a match between two human fingerprints." The researchers claimed that this approach is one of the most popular technique due to its consistency and other characteristics such as convenience, non-transferable and uniqueness. It should be noted that all people have different fingerprints. Hence, Bhargava, Bhargava, Narooka, and Cotia (2012) pointed out that this feature permits fingerprints to be utilized in many aspects, involving background checks. Another technique is the mouse movement visualization. Li, Xu, Wang, Wei, and Qu (2021) argued that mouse movements are popularly utilized to analyze user conducts and tackle multiple tasks involving user modeling (Liu

et al., 2015), student performance prediction (Wei, Li, Xia, Wang, & Qu, 2020) and cognitive load evaluation (Grimes & Valacich, 2015). Additionally, head pose estimation is critical issue in research regarding computer vision. In this technique, the rotation of head occurs in three dimensions (Li et al., 2021). Based on the developers, proctoring software have different features. Examples of such features are students can interact with proctors, student can message issues to proctors, pause test/ cancel test, audio recording, and browser lockdown (Hussein, Yusuf, Deb, Fong, & Naidu, 2020).

In order to make class time available to be used as well as to save time grading, many instructors in conventional settings have shifted to online exams (Woldeab & Brothen, 2019). This indicates an urgent need for preserving academic integrity via online proctoring assessments and evaluations. For example, Hylton, Levy and Dringus (2016) pointed out that “deception and dishonesty in online exams are believed to link to their unmonitored nature where users appear to have the opportunity to collaborate or utilize unauthorized resources during these assessments” (p. 53). Similarly, due to the reduction of careful observation, academic dishonesty probably occurs when students find chances to cheat (Faucher & Caves, 2009). Research has found that approximately 80% of the students answering the survey committed academic misconduct. The same students involved in the same survey pointed out that if the chance occurs, misconduct would be involved (Witherspoon, Maldonado, & Lacey, 2012).

In a study conducted by Karim, Kaminsky and Behrend (2014), the researchers investigated the effectiveness of remote proctoring for Internet-based assessments; they studied its effectiveness in reducing cheating and the unintended impacts on test-taker reactions, selection procedures or performance. Their findings revealed that application of remote proctoring has been linked to reduction of cheating and more negative test-taker reactions. However, test performance has not been precisely influenced by remote proctoring. Remote proctoring has not interacted with individual variances in order to anticipate the reactions of test-takers or test performance.

Society and the educational system require tools trying to assure the quality of the assessment process regardless of the physical presence of the students and their examiner in a particular location (Bawarith et al., 2017). This requirement begets the creation of tools permitting checking of the remote evaluation system via telematic resources (Pathak, 2016); this, interestingly, helps in conducting e-proctoring in online teaching.

In the proctoring system process, particular browsers for e-proctoring forbid the student to leave the test screen and no other program or application may be accessed on that computer during the exam. Systems including e-Proctoring, Remote Proctor NOW, SMOWL or Proctor Exams assure monitoring the computer when the student takes the exam (Gonzalez-Gonzalez et al., 2020). This indicates that the evaluation process can be remotely conducted in a manner that does not require the physical presence of the instructor and student in the same location.

However, a challenge related to academic integrity with online classes is associated with online testing and the compromising of tests. For example, such challenge has been focused because of the undetected cheating, leading to provide unsuitable higher marks (Alessio, Malay, Maurer, Bailer and Rubin, 2017). In their study, the researchers compared tests of several sections of online classes for 147 students; half of them did not receive online proctoring, whereas the other group adopted the software of online proctoring. Relatively, seven points lower were scored by students. They

used small quantity of time to be engaged in online tests in the case of online proctoring (Alessio et al., 2017). The allocation of additional time did not significantly help enhance students' grades in online environment (Samavati, Stumph, & Dilts, 2012). To boost online evaluations outcomes, teachers are highly recommended to think about decreasing the allotted time to nearly 75% of what is permitted for proctored exam comparison in classes (Samavati et al., 2012). Another challenge involved the disintegration rate; it has been found that 7% of the students who experienced non-proctored tests dropped classes, whereas 19% of them who experienced proctored tests dropped classes (Alessio et al., 2017).

All in all, in order to highlight academic integrity, online proctoring is considered a remarkable solution suitable for such environments (Bawarith et al., 2017). Although electronic monitoring will prevail in online learning, few studies have examined its use, especially in relation to academic integrity. This study tries to identify the factors that lead to cheating on exams during the online proctoring presence to maintain academic integrity.

Factors Leading to Academic Dishonesty

Academic dishonesty can be characterized as any conduct meant to falsely express an individual's academic work as original. It can take various shapes, involving plagiarism, collusion, deception, and use of unauthorized resources (Golden & Kohlbeck, 2020; Norris, 2019). It is important to note that there are a number of factors indicating why students are involved in academic dishonesty. Literature has highlighted the issue, providing various reasons behind it. Such reasons encompass pressure to take the test, lack of preparation, misunderstanding the meaning of academic dishonesty (Javed, 2019), vagueness in the exam policy (Baran & Jonason, 2020), and a probable perception related to lack of any serious actions taken if a cheating individual is seen or caught (McCabe, Trevino, & Butterfield, 2002). It should be noted that such factors rely on the kind of academic dishonesty; if it occurs spontaneously, it can be called panic cheating. If it is built on intentional preparation, it can be called planned cheating (Dendir & Maxwell, 2020; Stone et al., 2014).

Furthermore, Kereszturyand -Cser (2013) mentioned some of the most popular reasons students cheat. They involve parental pressure on their children to perform well, vague instructional aims, wanting a good mark, fear of failure, facilitated access to online information, no time to study, no punishment if caught cheating, and little opportunity of being caught or seen. It should be noted that online cheating occurs when students admitted cheating on online examinations; an individual can admit cheating through the internet. However, large numbers of students still practice traditional ways of cheating (Bawarith et al., 2017).

Significantly, it has been found that situations that lack such obvious rules as unspecified sanctions, anticipations, penalties and enforcement on academic integrity probably foster academic dishonesty (Englander, Fask, & Wang, 2011; Finchilescu & Cooper, 2018). In this respect, faculty members and efforts by institutions to increase students' awareness of academic integrity guidelines as well as honor code regulations play a crucial role in decreasing such events and an attitude of academic misconduct has been well documented (Tatum & Schwartz, 2017).

It should be noted that during the entirety of the students' education, it is anticipated that they will have their learning outcomes in different methods since each level of education needs particular assessments (Woldeab & Brothen, 2019).

Additionally, Becker, Connolly, Lentz, and Morrison (2006) identified academic dishonesty as academic fraud. A conceptual perception of the reasons for academic dishonesty investigates the inclinations of cheating students, contextual factors, and necessary motivations (Dendir & Maxwell, 2020). It is interesting that Becker et al. (2006) adopted the fraud triangle framework to examine sources of false conduct in business. This model involved three elements: pressure/incentive, opportunity (if the situation allows cheating to happen), and rationalization (based on one's attitude). To be more specific, the incentive or pressure factor relies on gaining a good mark. As for opportunity, it is highlighted in a situation when cheating opportunities are available, i.e. nobody is watching the examinee. The attitude becomes common and allowable, particularly when examinees believe that everybody is doing it (King et al., 2009). Similarly, motivational views can be employed from different theories including achievement goals, self-efficacy, intrinsic motivation and expectancy value to form an incorporated framework of academic dishonesty (Murdock & Anderman, 2006). Recently, the Theory of Planned Behavior could be utilized to anticipate and understand academic dishonesty (Chudzicka-Czapala et al., 2016).

Moreover, Amigud and Lancaster (2019) investigated the causes students offer for the sake of looking for improper levels of help with their academic task completion. The causes were arranged into five parts, including perseverance, self-discipline, academic aptitude, competing objectives and personal issues. Data were taken from ten contract cheating and involved 5,000 messages posted on the social media, Twitter, were analyzed.

In a very recent study, Curtis, Clare, Vieira, Selby, and Jonason (2022) argued that in higher education contract cheating is a serious rising threat to academic integrity. The researchers investigated 459 students' intentions to take part in contract cheating. They employed an extended Theory of Reasoned Action model. In that model, they included Machiavellianism and Psychopathy as indicators of subjective norms and attitudes. They found that Machiavellianism and psychopathy did not immediately predict the intentions of contract cheating. However, Machiavellianism and Psychopathy predicted the intentions of contract cheating through serial mediation paths.

Theoretical Framework

This study was based on the theoretical framework of the Theory of Planned Behavior which has recently been used to predict and understand academic dishonesty (Cronan, Mullins, & Douglas, 2018; Chudzicka-Czapala et al., 2016). Based on this theory, the intention creates the actual behavior, represented by three variations (attitude toward the behavior, subjective norms, and perceived behavioral control). The attitude toward the behavior describes the cognitive and emotional evaluation regarding a certain behavior. In relation to cheating as a behavior, for example, the attitudes toward cheating may eminently be different from one culture to another (Chudzicka-Czapala et al., 2016). Subjective norms describe the normative social expectations concerning the behavior. As for perceived behavioral control, it describes individuals' perceptions of the difficulty or ease with which the behavior can be performed (Beck & Ajzen, 1991; Hendy & Montargot, 2019; Yang, Choi, & Lee, 2018).

Utilizing an extended model of the Theory of Planned Behavior that added moral obligation as a fourth construct, intentions to cheat have been analyzed by Chudzicka-Czapala et al. (2016) among university students in seven countries. The researchers determined that in all of the samples' moral obligation, that is associated with emotions of shame and guilt, was characterized as being an

influential predictor of academic dishonesty. Other researchers revealed that moral obligation has been a noticeable predictor of students' intentions in committing academic dishonesty represented by lying and cheating (Alleyne & Phillips, 2011). Additionally, it should be noted that various empirical studies investigated the probable relationship between students' characteristics, demographics, and conduct on one hand and academic dishonesty on the other. The massive amount of the evidence suggested that male students and freshmen (younger students) are more likely to cheat (Hensley, Kirkpatrick, & Burgoon, 2013; Lento, Sayed, & Bujaki, 2018; Wray, Jones, Schuhmann, & Burrus, 2016; Yu, Glanzer, Sriram, Johnson, & Moore, 2017). Regarding the effect of age and gender, some research highlighted opposite or insignificant influences for these effects (Yang, Huang, & Chen, 2013). All in all, it is important that academic dishonesty can be better predicted by the Theory of Planned Behavior. In addition, this theory is one of the most significant psychological theories in the prediction of behavior. However, few studies have tackled its use in the prediction of academic dishonesty (Hendy & Montargot, 2019).

Methodology

Setting and participants

In the second semester of the 2021 academic year the university implemented final exams remotely with the use of online proctoring that monitors a student's computer's desktop along with webcam video and audio. The data recorded by the proctoring software can be reviewed to ensure validity. There are different behaviors that are considered as cheating by the proctor. If the proctor detected them, it placed a flag at the time they appeared. A total of 4401 students (males and females) who registered in a Computer Essential Course took the final exam remotely. The online proctoring detected 787 students as conducted one of the prohibited behaviors. The recorded videos were reviewed by faculty to ensure the validity of whether what was detected as cheating or not. Table 1 shows the distributions of participants by the two groups. Table 2 shows the demographic data of the respondents, broken down by groups

Table 1 Distribution of participants by the two groups

Groups	Number of students who were classified in this group.	Number of students who participated in the study form each group.
A (did not cheat)	3614	229
B (cheated)	787	144
Total	4401	373

Table 2 Frequency for demographic data of the participants

Variable	<i>n</i>	%
Age		
18 to 20	70	18.77
Older than 25(Make this the last line, below 21 to 25)	185	49.60
21 to 25	118	31.64

Gender		
Female	230	61.66
Male	143	38.34
Academic Majors		
E-commerce	37	9.92
Accounting	33	8.85
Law	29	7.77
Public Health	13	3.49
Management	67	17.96
Information Technology	33	8.85
Not specified	64	17.16
Finance	34	9.12
English & Translation	9	2.41
Digital Media	25	6.70
Health Informatics	20	5.36
Computer Science	9	2.41
Branches		
Dammam	65	17.43
Jeddah	55	14.75
Riyadh	161	43.16
Abha	24	6.43
Madina	23	6.17
Ahsa	17	4.56
Jazan	7	1.88
Qasim	4	1.07
Tabuk	1	0.27
Not specified	16	4.29

Instrument

After careful analysis of the literature, a questionnaire was developed to collect information about the variables of the study. The questionnaire had three main parts: The first to collect demographic data such as gender, age and specialization. The second dealt with the two variables.

- Awareness refers to the extent the students know of the behaviors the online proctor classifies as cheating of which there are 11 elements.
- Confidence measures how sure the student is that the online proctor can detect cheating behaviors, of which there are 9 elements.

The third part of the questionnaire assessed the components of the Theory of Planned Behavior: The questions were developed in line with Ajzen's manual (2002) for constructing a TPB and questions were worded to reflect the target behavior, defined as *Cheating on an online proctoring exam*. To ensure the validity of the instrument, five SEU faculty members reviewed the questionnaire. Based on their comments and insights, several items were modified and others were

deleted. A Cronbach alpha coefficient was calculated for the scale. Table 3 shows the Cronbach alpha values for the constructs. The questionnaire was prepared in the students' native language (Arabic).

The Cronbach's alpha coefficient was evaluated using the guidelines suggested by George and Mallery (2018) where all values were greater than seven and were considered acceptable.

Table 3 Reliability table for questionnaire's construct				
Scale	No. of Items	α	Lower Bound	Upper Bound
ATCB	4	0.68	0.52	0.63
MO	4	0.88	0.87	0.90
PBC	4	0.67	0.55	0.66
SN	4	0.75	0.72	0.79

Note. The lower and upper bounds of Cronbach's α were calculated using a 95% confidence

Data Collection and Analysis

After obtaining approval of the university's Research Ethics Committee to conduct the study, two copies of the same online questionnaire were sent to the students' emails. One was sent to students who were monitored as not cheating (Group A: 3614 students) and the second was sent to students who were flagged by e-proctor (Group B: 787 students) and they did not know if they were flagged when they filled out the survey. Students' emails and their status (cheated or did not cheat) were obtained from the course's coordinator based on the approval of the IRP.

Frequencies and percentages of the variables were calculated. Cronbach's alpha coefficient was calculated for the constructs. MANOVA was run to investigate whether awareness of and confidence that cheating could be detected by the online proctor were different between the two groups. Furthermore, a binary logistic regression was conducted to examine whether the study's variables had a significant effect on the chances of cheating occurring.

Results:

To answer the first question: Is there a statistically significant difference between the means of students' awareness of behavior that is considered cheating by the online proctor and the students' confidence that cheating could be detected by the online proctor between the two groups (students who cheated and those who did not)? A multivariate analysis of variance (MANOVA) was conducted to assess if there were significant differences in the linear combination of awareness of and confidence cheating behavior could be detected by the online proctor between the levels of groups. The main effect for groups was not significant, $F(2, 370) = 0.36, p = .699, \eta_p^2 = 0.00$, suggesting the linear combination of awareness of and confidence in cheating behavior's detectability was similar for each level of groups. The MANOVA results are presented in Table 4.

Table 4 MANOVA results for awareness and confidence by groups						
Variable	Pillai	F	df	Residual df	p	η_p^2
class	0.00	0.36	2	370	.699	0.00

To answer the second research question, can cheating on online proctoring exams be predicted from Attitudes Toward Cheating Behavior (ATCB), Moral Obligation (MO), Perceived Behavior Control (PBC), Subjective Norms (SN) and Age? a binary logistic regression was conducted to examine whether ATCB, MO, PBC, and SN had a significant effect on the odds of observing the B category of groups. The reference category for groups was A. The assumption of absence of multicollinearity was examined. Variance Inflation Factors (VIFs) were calculated to detect the presence of multicollinearity between predictors. High VIFs indicate increased effects of multicollinearity in the model. VIFs greater than 5 are cause for concern, whereas VIFs of 10 should be considered the maximum upper limit (Menard, 2009). All predictors in the regression model have VIFs less than 10. Table 5 presents the VIF for each predictor in the mode.

Table 5 Variance Inflation Factors (VIFs)for ATCB, MO, PBC, and SN	
Variable	VIF
gender	1.04
ATCB	1.09
MO	1.06
PBC	1.71
SN	1.69

The model was evaluated based on an alpha of 0.05. The overall model was significant, $\chi^2(5) = 17.49, p = .004$, suggesting that gender, ATCB, MO, PBC, and SN had a significant effect on the odds of observing the b category, the cheating category of groups. McFadden's R-squared was calculated to examine the model fit, where values greater than .2 are indicative of models with excellent fit (Louviere, Hensher, & Swait, 2000). The McFadden R-squared value calculated for this model was 0.04. The regression coefficient for genderMale was significant, $B = -0.66, OR = 0.52, p = .006$, indicating that for a one unit increase in genderMale, the odds of observing the b category of groups would increase by approximately 48%. The regression coefficient for ATCB was not significant, $B = -0.19, OR = 0.82, p = .499$, indicating that ATCB did not have a significant effect on the odds of observing the b category of groups. The regression coefficient for MO was significant, $B = 0.52, OR = 1.68, p = .015$, indicating that for a one unit decrease in MO, the odds of observing the b category of groups would increase by approximately 68%. The regression coefficient for PBC was not significant, $B = -0.15, OR = 0.86, p = .592$, indicating that PBC did not have a significant effect on the odds of observing the b category of groups. The regression coefficient for SN was not significant, $B = -0.05, OR = 0.96, p = .871$, indicating that SN did not have a significant effect on the odds of observing the b category of groups. Table 6 summarizes the results of the regression model while Table 7 presents means and standard deviation for both groups.

Table 6 Logistic regression results with gender, ATCB, MO, PBC, and SN predicting groups						
Variable	B	SE	χ^2	p	OR	95% CI

Table 6 Logistic regression results with gender, ATCB, MO, PBC, and SN predicting groups

Variable	B	SE	χ^2	p	OR	95% CI
(Intercept)	-0.97	0.84	1.32	.250	-	-
genderMale	0.66	0.24	7.57	.006	0.52	[0.33, 0.83]
ATCB	0.19	0.29	0.46	.499	0.82	[0.47, 1.45]
MO	-0.52	0.21	5.89	.015	1.68	[1.11, 2.56]
PBC	0.15	0.27	0.29	.592	0.86	[0.51, 1.48]
SN	0.05	0.28	0.03	.871	0.96	[0.55, 1.66]
Note. $\chi^2(5) = 17.49$, $p = .004$, McFadden $R^2 = 0.04$.						

Table 7 Mean and standard deviation for both groups for awareness and confidence

awareness of the behavior that the online proctor considers cheating	Mean		SD	
Are you aware that the following is considered cheating by the online proctor?	A	B	A	B
Having a sound near you	2.78	2.76	0.56	0.53
Using of headphones	2.93	2.89	0.26	0.32
Photographing questions	2.93	2.96	0.26	0.20
Opening e-chat on your device	2.07	2.01	0.50	0.08
Opening a page other than the test page on your browser	2.89	2.86	0.31	0.37
Talking to others	2.95	2.91	0.21	0.31
Reading the question out loud	2.38	2.35	0.79	0.86
Connecting your device to another screen or your mobile phone	2.76	2.74	0.59	0.62
Opening the book or notes	2.97	2.94	0.17	0.26
Having someone else near you	2.92	2.87	0.29	0.36
Looking outside the screen	2.62	2.62	0.67	0.72
Confidence to detect behavior by the online proctor which is considered cheating	Mean		SD	
Are you confident that the online proctor can detect that following?	A	B	A	B
Match your photo at the time of the test with the photo of your ID that you show at the beginning of the test	2.62	2.66	0.61	0.63
Hearing your voice when you talk to someone else	2.76	2.68	2.68	0.60
Hear your voice when you read the question out loud	2.69	2.69	0.58	0.58
Hear the voices of others near you	2.71	2.69	0.58	0.63
The presence of people next to you at the time of the test	2.64	2.67	0.65	0.61
Open a page other than the test page in your browser at the time of the test	2.86	2.83	0.36	0.38
Looking at a place other than your screen to receive help whether from others or your mobile phone	2.70	2.65	0.60	0.66
Set another monitor connected to your device	2.67	2.65	0.64	0.66

Use of the headphone	2.74	2.69	0.59	0.63
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Table 8 Means and standard deviation for both groups		
Variable	M	SD
Attitudes toward cheating behavior		
A	1.44	0.43
B	1.37	0.38
Moral obligation		
A	2.69	0.55
B	2.51	0.62
Perceived behavior control		
A	1.97	0.54
B	1.95	0.54
Subjective norms		
A	1.98	0.53
B	1.98	0.55

Discussion

It may be believed that students may underestimate the ability of the online proctor to detect what a human observer can monitor, and it may be possible for students to cheat in ways that are not discovered by an online proctor. However, the results showed this belief is a mistake. The knowledge of the students who cheated in regard to the things that are considered cheating did not differ from the knowledge of the students who did not cheat. Their confidence in the online proctor's ability to monitor them is the same as that of the other students. This may indicate high confidence of the new generations in the capabilities of artificial intelligence, which they have inevitably dealt with in various fields. This means that neither awareness nor confidence affects the cheating.

The Theory of Planned Behavior (extended versions) was investigated. The gender variable also was added to the model. In this study, actual cheating was used, rather than asking participants about their intention and their behavior which might raise the validity of this variable because students usually will not truthfully answer questions about their intention to cheat or their actual cheating. The model R^2 was about .04, although the model was significant. It only explains 4% of the variation. The result found Moral Obligation has been characterized as an influential predictor of academic dishonesty which is reliable with previous studies (Chudzicka-Czupala et al., 2016; Alleyne & Phillips, 2011)

Results also showed that males cheat more than females, and this is consistent with previous studies that suggested that male students are more likely to cheat (Alleyne & Phillips, 2011; Hensley et al., 2013; Lento et al., 2018; Wray et al., 2016; Yu et al., 2017). As for Attitudes, Social Considerations and Behavior Control, they were not influential in predicting cheating during online

proctor exams. Subjective norms could be related to the culture as Chudzicka-Czapala et al. (2016) found this variable was not a significant predictor of cheating for all their samples which were from different countries. Both groups had very low Behavior Control in online proctored exams as they were under very acute observation that was recorded. This might be the reason that this variable was not significant in predicting cheating.

Conclusion

The shift to online education is a continuous trend. It is expected that more universities and educational institutions will turn to this pattern. Evaluation in online education is one of the important issues of concern to educators. The use of artificial intelligence may be a solution to such a concern. Despite the use of the online proctor at the university, a number of cheating cases were monitored, and this study came to explore factors that predict the occurrence of cheating on online proctoring exams through the Theory of Planned Behavior.

Results showed that Moral Obligation was a significant predictor of academic dishonesty while Attitudes, Social Considerations and Behavior Control were not. This should help in expanding our understanding of factors that lead to prevent cheating while using online proctor. Working on developing the moral side of students should be given more attention in their university journey. Providing students with an ethical and moral framework is important to prevent academic dishonesty (Moten et al., 2013).

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