Lessons learned during Covid-19 concerning cheating in e-examinations by university students.

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Abstract

The Covid -19 pandemic and lockdown in many countries has left no option for many universities around the globe but to offer their examinations electronically. This has provided the opportunity for many students to try to defraud the system and cheat. The authors utilize two criminological theories to explain why students cheat and suggest policy implications.

Purpose: The researchers investigate how students can be deterred from cheating, whether legal or ethical policies and procedures are effective and whether there are gender differences.

Design/methodology: Utilising data on students undertaking midterm and final e-examinations as well as a control group of students who were caught cheating in an online mid-semester examination, the authors attempt to answer the research questions.

Findings: No differences were found in cheating in terms of students' gender or whether they were repeating a course or not. However, the study revealed that if there are more internal controls imposed and before the examination students are made to reinforce their academic integrity e-examination cheating is reduced.

Originality: No other published study was carried out with students who were involved in cheating.

Keywords: e-examination, cheating, fraud, Covid-19, academic integrity

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Introduction

One could argue that going to university and obtaining a degree is not about schooling, passing examinations, academic progress and attainment of a qualification, it is about *paideia*. In the culture of ancient Greece and later of the Greco-Roman the term paideia referred to the rearing and education of the ideal member of the *polis* or State. Thus, the focus or the outcome of going to university is the road to Ithaka and one ought not to try to find quick-fix methods by cheating. In fact, Peculea and Peculea (2020) advocate that "universities should have a simultaneous influence on the development of students" through their intellectual development by contributing to the prosperity of society and in addressing their moral competences (p. 30). The Covid-19 pandemic has not only created opportunities for internet fraud (Fei Ma and McKinnon, 2022), romance fraud (Buil-Gi nd Zeng, 2022) and other types of fraud (ACCC, 2021) but has, also, created uncertainty about the status of student learning outcomes (Kinzie, 2020) and, at the same time, opportunities were created for students to cheat the system. Just like fraudsters, students always will try to find ways to cheat. For its part, a university will endeavour to implement controls as in the cases highlighted by Baijnath and Singh (2019) that occurred in Uganda, the Netherlands, Australia and so on. Thus, institutions can use the disruptions caused by the pandemic as an opportunity to improve assessment and find ways to ensure quality when administering e-examinations (Kinzie, 2020).

Cheating has been happening for decades (Bunn et al., 1992) more in some disciplines like business, engineering and humanities than others (Park, 2003; Carpenter et al. 2006). Wu et al. (2020) argue that the proportion of students cheating in examinations is high and, as Lin and Levitt (2019) argue, cheating is a perennial issue. Students do not cheat only through examinations, they may use essay mills and enter into 'contract cheating' (Medway et al. 2018) by paying someone to do their assignment, thesis or homework. Some authors have attempted to argue that the UK Fraud Act 2006 can be used against essay mills because they are committing a criminal offence by entering into contract cheating for financial gain and should not even be allowed to advertise (Draper, and Reid-Hutchings, 2019). Whatever the reasons behind the students wishing to approach essay mills, the issue is that academic integrity is jeopardised and students try to find an easy way to defraud the system by being dishonest (Crook and Nixon, 2021).

The effects of academic dishonesty can be catastrophic. As Awad et al. (2016) highlight, "academic dishonesty not only undermines the purpose of education and the assessment process but also threatens the creditability of the academic records" (753). Once it becomes known that students are cheating in their examinations and the tertiary institution is not doing anything about it, then that institution will lose its good name and the students may well lose the credibility of the employment marker. Researchers from around the globe such

as New Zealand (De Lambert et al. 2005), Norway (Chirumamilla, et al. 2020), Sweden (Trost, 2009), Kuwait (Awad et al. 2016) have been addressing the phenomenon of cheating by students in higher education and secondary education. In this paper we will concentrate on examination cheating in higher education during the covid-19 pandemic.

Perspectives on cheating in Examinations

Not everybody agrees that cheating in examinations is illegitimate. In contrast to Ranger et al. (2020), Green (2004) maintained that cheating is ignored by moral theorists and asserted that the term is considered as a "morally neutral synonym for non-cooperative behaviour" or a "moral disapprobation" (p.137). In fact, Green argues that cheating is gaining unfair advantage but this does not mean that the act is immoral. The Organisation for Economic Co-operation and Development (OECD, 2011) specified that there are eight broad areas of academic dishonesty which include: obtaining unauthorised aid or information; giving unauthorised aid or information; committing plagiarism from written, electronic or internet sources; misrepresenting facts or data; offering bribes; using the library resources unethically; using computer resources unethically and knowingly assisting in any of the above practices.

Li and Zhu (2019) have argued that cheating in examinations destroys the "fair principle". Peculea and Peculea (2020) cite the International Center's Academic Integrity core values which are: "honesty, trust, fairness, respect, responsibility and courage" and set the baseline of what is acceptable behaviour (Ranger et al., 2020). Some researchers (Ranger, et al. 2020) consider cheating an illegitimate activity. However, there is no consensus on the concept of 'cheating'. Some researchers (Pabian, 2015; Bouville, 2010) defend student cheating by arguing that literature has not proven why cheating is wrong. Makridis and Englander (2020) maintain that where there is a moral value attached to an act considered to be positive but later becomes negative (what they term 'transvaluation'), it creates a 'burden of revisionism'. Thus, as they advocate, we need to re-examine whether the act of cheating is morally acceptable or not. The same authors argue that we need to disentangle the ambiguity surrounding the definition of the word cheating. In doing so one ought to look at the intent to commit the act, whether there are rules with defining prohibitions and if the perpetrator-student is aware of the institution's policies and penalties regarding cheating. Makrides and Englander (2020) have also proposed that institutions need to explicitly state if they consider giving or receiving help during examination or looking thorough personal notes during closed examination as cheating.

Researchers have carried out surveys to determine the state-of-practice of cheating in universities by surveying teacher perceptions of e-examinations and paper examinations (Jamil, et al. 2012), student perceptions (Dermo, 2009) or questionnaire survey using scenarios by investigating the students' attitudes towards different cheating methods (Colnerud and Rosander, 2009). Other studies have investigated cheating and plagiarism in e-assessment during assignment submission (Bretag et al. 2019) but, as far as it has been possible to ascertain, none have surveyed students who actually participated in cheating, as done in the study reported below.

Correlates of the phenomenon

Concerning correlates of cheating in examinations, Kohn (2007) understandably argued that if students are pressured to improve their performance or there is an expectation that one needs to be better than one's peers, then they are driven by "greed, dishonesty, underdeveloped moral compass" (Baijnath and Singh, 2019, p.3) and they may cheat. Also, according to Wu et al. (2020), humans wish to maintain their self-image, have goals they wish to pursue or may wish to maximise their gains at whatever the cost or consequences. Under the self-concept maintenance theory there will always be students who wish to obtain a high mark to maintain a scholarship, to compete for one or even to win an award at whatever cost.

Interestingly enough, a negative relationship has been found between the propensity to cheat and the probability of detection, as well as the severity of penalties (McCabe and Trevino, 1993). Case et. al. (2019) have argued that whilst unethical behaviour of students decreases, there is an increase in e-cheating. They have found that 66% of students perceive it as easy to cheat and 25% do cheat during e-examinations. Similarly, Lodhia (2018) note that there has been 40% increase in the number of student cheating in the Russell Group Universities. Other researchers have reported a link between students who cheat and those who may behave unethically at work (Lawson, 2004; Peculea and Peculea, 2020). Others (Ranger et al. 2020) assert that once cheating is tolerated, a cheating culture is induced thus, other students are also encouraged to cheat. Regarding gender, Case et al. (2019) have found that from 2014 to 2018 there was an increase of males and females that were involved in cheating in e-examinations but there was no statistically significant correlation between cheating in an e-examination and gender. However, they did find that the percentage of females attempting to learn how to cheat online increased from 3% to 10%.

Paper vs e-examinations

During the lockdown period caused by the pandemic Covid-19, most universities around the globe have opted to conduct their classes and assessment virtually. A practice, as pointed out by Fluck (2019), that is likely to remain for many universities as they wish to move away from the traditional pen and paper examination to electronic examinations (e-examinations). Comparing the ease of cheating in paper and in e-examinations, Chirumamilla, et al. (2020) have reported that both students and teachers believe cheating is easier in e-examinations.

Cheating methods and countermeasures

The issue of cheating, and obtaining a degree via fraud or corruption has been acknowledged to have taken place in some countries and or universities well before alternative methods of examination were introduced. In the view of Baijnath and Singh (2019), because the returns of cheating have increased so has the complexity of the methods and techniques used. Some authors have identified a number of cheating methods. Chirumamilla et al. (2020) and other authors have identified six categories of cheating which are applicable for both types of examinations, varying only in the way they are administered. These are:

1. Someone else other than the registered student sits the examination i.e., impersonation (Apamp et al. 2010).

2. Using documents or tools which are not permitted to be used during the examination i.e. forbidden aids such as social media, phones (Lancaster and Clark, 2017; Peculea and Peculea, 2020).
3. Looking at the answers of other students (Trost, 2009) or hacking the system to find the answers (Peculea and Peculea, 2020).
4. Students collaborating rather than doing the examination on their own, i.e. peer collaboration (Trost, 2009).
5. Illegitimate help from outsiders is received during the examination i.e. outsider assistance (Lancester and Clark, 2017).
6. Illegitimate assistance from a university employee during the examination i.e. student-staff assistance (Trost, 2009).

In an effort to combat criminal acts or fraud many entities implement internal controls or countermeasures. A number of countermeasures to examination cheating have been put forward by various authors. Some of these measures are possible in physical examinations and/or virtual examinations. These are:

1. Humans are used to invigilate during the examination (Apampa et al. 2010).
2. Biometrics such as fingerprints, keystroke dynamics, face or voice recognition are used to identify if the student sitting the examination cheats (Vegendla and Sindre, 2019).
3. Mingling sitting arrangements to minimize cheating through peeking or whispering (Thelwall, 2000).
4. Shuffling questions, thus students receive in theory the same multiple choice questions but the alternatives and the number of the questions are shuffled (Thelwall, 2000).
5. Random drawing of questions from a large database of questions so that students sitting the same examination receive different questions (de Sande, 2015).
6. Allowing the students to answer questions sequentially by blocking backtracking (Stack, 2015).
7. If students are expected to sign a moral code then they are reminded of the existence of such a code (Shu et al. 2012) and will wish to maintain their positive self-concept rather than act in an untrustworthy manner (Mazar et al. 2008). This is an argument however, opposed by Wu et al. (2020) who argue that students are not inspired by the concept of honesty and they are less likely to act unethically. The same authors also maintain that priming legal consequences do not appear to affect cheating by students (Wu et al. 2020) either.
8. Whilst for a number of years now it has been acknowledged that the digital age has provided more opportunities for cheating, universities have attempted to mitigate the opportunities created by technology by introducing a number of controls or additional procedures. Some have gone as far as introducing technology jammers to prevent information sharing, metal detectors to prevent students from taking into examination devices that may assist them, others banned wristwatches.

Chirumamilla et al. (2020:956) have concluded that even utilizing more sophisticated countermeasures against cheating "especially enabled by digitalization, it is by no means obvious that e-examinations will be less secure" than paper examinations. A number of researchers (Wesolowsky, 2000; Lin and Levitt, 2019) have developed methods of identifying cheating, and have asserted that "interventions that make cheating more difficult dramatically reduce cheating" (Lin and Levitte, 2019,p.899). Some have used algorithms (Lin and Levitte, 2019) whilst others have used Neural Networks (Li et al. 2019) because detecting manually is no longer possible (Nishchal et al. 2020). Nishchal et al. have developed a model by incorporating both posture and emotion analysis through the use of CCTV cameras a model that would not be accepted by many universities nowadays due to the EU Council Directive (2016) on GDPR.

Other researchers (Wu et al. 2020) argue that priming legal consequences as well as reinforcing the concept of honesty would reduce cheating. An idea also put forward by Peculea and Peculea (2020) who argue that universities ought to (a) establish strong and clear policies regarding cheating, (b) inform the students and (c) apply the policy regardless of consequences in an effort to "develop more responsible students and ultimately more responsible citizens" (MCabe, 2005:29).

Theoretical Frameworks

Fraud Triangle

Two theories are used in this research, the Fraud Triangle by Cressey (1953) and Deterrence Theory (Canton, 2017). Let us first consider Cressey's fraud triangle. According to Cressey, the three elements of the Fraud Triangle are: *Opportunity*, *Pressure* (also known as motivation) and *Rationalization* (i.e. justification or attitude). In her work on profiling fraud offenders Krambia-Kapardis (2001) also found that some offenders may not have had a financial problem to resolve through fraud but wanted to challenge the system and see if they could find loopholes within the system. Krambia-Kapardis (2001) proposed the ROP model according to which fraud offenders may also offend if under the opportunity component there is a culture that encourages dishonesty/fraud and/or there is a perception that there is lack of capable guardians.

For Peculean and Peculea (2020:31), "cheating can be described as an act of evasion, thus influencing the result by fraudulent means". Hence, one can argue that cheating by students is an act of fraud as they are attempting to obtain a gain and later on financial gain as they will use the gained qualification to earn income. Nishchal et al. (2020) advocated that the reason students cheat in examinations is because they are afraid of failure or want to improve their mark so they can win a scholarship, or they are pressured to excel, or improve their grade (Awad et al. 2016) or be better than their peers (Makrides and Englander, 2020); this provides them with the pressure stated in Cressey's triangle. Because their chances of being caught are small, the punishment is not a severe one (Peculea and Peculea, 2020) or when there are no specific instructions of what is allowed (Makrides and Eglander, 2020), one can argue these are the opportunities provided to the offender/student. Finally, as far as the third component of the triangle 'rationalization. Is concerned, students have been justifying their

actions in the belief that everybody is doing it (Conti and Caroland, 2011) or ''I did not have enough time to study'' (Peculea and Peculea, 2020). Utilising Cressey's fraud triangle theory, therefore, there are many similarities between committing fraud and student cheating in examinations since deception is involved in both and the culprits justifying it to themselves.

Deterrence theory

Jeremy Bentham argued in 1789 in his book «Principles of Morals and Legislation» that man is a rational being and, also, that penalties must be justified in terms of their deterrent effect. According to Marsh, et al. (2004), deterrence focuses on frightening people so as not to commit offences and is thus directly linked with harsher penalties[1]. According to Pikis (2007), deterrence theory rests on a number of propositions, namely that the potential offender: (a) knows what penalty/ negative consequences will be imposed on his/her if he/she offends; (b) that he/she considers the penalty that will be imposed severe enough if he commits a specific crime; and (c) believes there is a significant probability to be arrested, convicted and punished severely enough for his/her offence. A distinction is made between *individual deterrence* (aimed at an individual offender) and *general deterrence* (aimed also at other potential offenders through publicising the penalty imposed.

The idea of deterrence, especially that of general deterrence, is generally popular amongst the public, the judiciary and politicians who favour retribution as a way of dealing with offenders (Kapardis and Stephanou, 2020). Drawing on the existing literature on the effectiveness of penalties (Ashworth, 2015), it becomes clear that what deters potential offenders is what they subjectively believe about the probability of getting arrested rather than the severity of the penalty. At the same time, however, it should be noted in this context that criminologists know very little about offenders' beliefs and decision making generally or how well informed they are about the likelihood of getting arrested or what penalty will be imposed on them upon conviction. In addition, another factor that negates a proper evaluation of deterrents is the fact that offenders' decision whether or not to commit a crime is also influenced by such other factors as their own moral code, social stigma and how they believe their family members and friends shall be affected.

Trang and Brendel (2019) have argued that deterrence theory better "predicts deviant behaviour in malicious contexts, in cultures with a degree of power distance and uncertainty avoidance" (1265). Ehrlich (1996) argues that people often engage in certain illegal acts after evaluating the incentives and consequences because they fear punishment or legal consequences. In this theory it is argued that the rational actor, in this case the student, avoids challenging a deterrer (the university or the professor setting the assessment) if the costs are greater than the benefits. The student will initially assess his/her capabilities to cheat, the chance or probability that there will be costs imposed and finally the ability and willingness of the University to carry the threats or punishment. Lupovici (2019) advocates that one important determinant for deterrence to be effective is the need of credibility i.e.

[1] For a detailed discussion of deterrence see Canton, R. (2017). Why Punish? An Introduction to the Philosophy of Punishment. London: Palgrave Macmillan and M. Tonry (2009), Crime and Justice: A Review of Research, vol. xxxviii. New York: Oxford University Press

"that defenders can convince the putative challengers that they will retaliate if the putative challenger does not follow the deterrent threat" (178). Thus, one cannot threaten students that they will be punished if they cheat but not carry through the threats.

In support of deterrence theory, Awad et al. (2016) found that the determinants for students to cheat are: the detection probability and the penalties imposed. Eziechina et al. (2017) have found that if during the examination the students are aware they are being watched by cameras then they will not want to be caught cheating and students are more likely to repeat an academic offence if previous attempts did not have any negative consequences for them. Like offenders, students who are likely to cheat are aware of the potential penalties. As Awad et al. note, a "student will cheat in a given period if and only if the grade gain is greater than the expected penalty" (557). Like common criminals, students who cheat develop their cheating skills with "each academic violation they commit" (Awad et al. 2016: 557).

Research Methodology

Cognizant of the fact that students would be reluctant to respond to questionnaires on e-examination cheating as experienced by Ranger et al. (2020) concerning the use of field experiments, the present authors decided to use data from one of the public universities in Cyprus.

Due to the lockdown created by the Covid-19 pandemic, tertiary education students in Cyprus, like their counterparts around the globe, were asked to complete their mid-term and final examinations online for three semesters, starting Spring 2020 semester. To maintain anonymity and in order not to breach any of the GDPR provisions, the authors state that all the students in the present study were from the same University, completing the same subject but were from different departments.

The e-examination was administered as follows: A database of hundreds of questions was created whereby the system would randomly select questions per topic covered. Once the questions were shuffled, the examination was available to each and every student registered in the subject. Thus, each student had a different set of questions and was not allowed to go back to a question. Once the midterm e-examination was completed and marks were posted, information was received regarding specific students who had cheated. The university authorities were notified and the university decided to allow the use of cameras being opened during the final examination if the professor in charge so wished.

Given the European Directive (EU Parliament, 2016) on GDPR, students who were asked to have their cameras open had to provide their written consent. Those who did not wish to do so did not sit the e-examination. The academic responsible decided to: (a) ask the students to submit their written consent to have their cameras open during the final e-examination; (b) send students via email a reminder the final examination day was approaching and that some students had not yet signed the authorization; and, finally, (c) to block the students who did not grant authorization. In addition, in an attempt to prime the students positively, the professor responsible for the subject in question during the last lecture and before the final e-examination spoke to the students about academic integrity, honesty and appealed to their moral values by informing them that cheating in the long run does not pay off. Finally,

students were also informed that before the final e-examination would be open, each student would need to confirm in writing that the work being completed was theirs alone. During the midterm, students were not virtually watched during the e-exam, were not made aware of the consequences of cheating if caught and their academic integrity was not reinforced in any way.

There was a total of 152 students in the study. The students were divided into two groups Group 1 (non-cheaters) and Group 2 (11 students who were caught cheating).

Research Questions

Based on the literature review a number of research questions were developed to be tested. These are:

1. Students completing an e-examination with their cameras in operation perceive that the risk of being caught cheating is higher than if there are no cameras.
2. Students would be less likely to cheat in an online examination if they are informed of disciplinary consequences if caught cheating.
3. If students are given a talk on academic integrity and honesty before the examination, they would be less likely to cheat.
4. There are no gender differences in e-examination cheating.
5. Students who have higher university entrance requirement or are of higher academic caliber would be less likely to cheat than students of lower academic caliber.
6. Students repeating a course would be more likely to cheat.

Thus, on the basis of research questions (1)-(3) and on the basis of the components of Cressey's (1953) fraud triangle, the ROP model (Krambia-Kapardis, 2001) as well as deterrence theory (Canton 2017), students would be less likely to cheat due to the effect of additional internal controls imposed and the presence of capable guardians. Also, if students are not aware of the consequences they are likely to face if caught cheating (deterrence theory), and their ethical and academic integrity is not being reinforced, they will be able to rationalize their actions (fraud triangle) and to justify them on the basis that 'the end justifies the means' (e.g., in terms of getting a higher grade to safeguard a better job opportunity or a scholarship).

Findings

It was found that students' marks (cheaters and non-cheaters) in the midterm were higher than in the final e-examination. Cheaters (those students who cheated in the midterm) performed better than the rest of the students in the midterm with a mean score of 70% as opposed to the non- cheaters' mean of 52%. Using a Wilcoxon signed-rank test, the difference found was statistically significant at 5% confirming the statistically significant difference in performance between midterm and final online examination for the group of 11 cheaters.

In support of researchers elsewhere, the cheaters were reluctant or at least less willing to consent to having their cameras active during the administration of the final e-examination. Even though the relationship between being a cheater and delaying granting consent to having one's computer camera in operation during the final examination is not statistically

significant, it is of interest because it was also found that cheaters did not respond as quickly as the rest of the students in signing the consent from. As illustrated below, 10% of those who did not cheat needed a reminder to submit the consent form as opposed to 27% of cheaters. This difference illustrates perhaps that they had to think and consider their options as well as repercussions if they did not sign the form.

In support of earlier research (Case et al. 2019), a student's gender was not related to cheating in examination. χ^2 =2.283, p=0.131) .

No relationship was found between a student's calibre and whether they cheated in the midterm or the final examination as no p is >.05, [χ^2(163)=0.16, p=.92]. In support of that finding, students repeating a subject were no more likely to cheat in the e-examinations [χ^2(163)=1.14, p=.28], no p value is >.05.

Conclusions

Given the increase in the use of e-examinations and the increase in financial crime and corruption due to lockdowns caused by the Covid-19 pandemic, this paper investigated how students can be encouraged not to be dishonest and cheat in examinations. It was found that the students who cheated in the midterm did not cheat in the final because: (a) they were all asked to sign a consent that they would have their cameras in operation for the duration of the examination, (b) a number of students would be selected randomly for an oral examination in addition to the final examination; and (c) before starting the final examination they were asked to confirm that the work being completed was theirs and nobody else's.

The study also found that, regardless of their academic caliber or gender, students were more likely to attempt to cheat if there were no oversights such as the use of cameras or an honour code enforced. Also, the students' moral fibre is reinforced if they are informed that before they would start an e-examination that they will need to confirm in writing the work is their own as well as if they are given an academic integrity talk.

The limitations of the current study are that it was carried out only in one public university and the sample of those students believed to have cheated is small. Nevertheless, it is a good approximation and it does support other researchers who have investigated e-examination cheating.

On the basis of the findings obtained and the available literature, universities would be well advised to have a student honour code, thus creating peer pressure for self-policing, a practice already in place in some universities. Finally, future research should aim to replicate the findings with a large sample of students who have cheated in an e-examination.

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