Designing a rigorous learning activity that may help mitigate student academic dishonesty

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ABSTRACT: Student academic dishonesty has risen significantly around the globe, and especially so during the recent global pandemic which has forced many institutions to offer courses on-line with initially little control over the quality of their assessments or assignments. The purpose of this article is to present a rigorous learning activity that was designed by an academic to try to mitigate academic dishonesty when students were required to provide documented proof of the successful operation of an electronic circuit as part of a practical assignment. Action research is used with the purpose of improving instructional practice. Requirements for the practical assignment were updated or improved, four times in accordance with initial student submissions that helped to reduce subjectivity on the part of the academic when marking further assignments. This also helped to reduce further cases of dishonesty, as students now had more specific guidelines to follow. It is recommended to start marking assignments as soon as they are submitted to be able to identify possible early signs of academic dishonesty for which timely interventions can be applied to help mitigate it.

INTRODUCTION

> *Honesty is for the most part less profitable than dishonesty* [1].

These words, by a Greek philosopher, Plato, point to a key reason why many engage in dishonesty. It relates to profit. Many seek to profit or benefit from their acts of dishonesty, even if it is to the detriment of others. This is also evident in the hallways of higher education.

Academic dishonesty has been defined as any duplicitous action by a student to give them an unwarranted advantage during the completion of an assignment or test [2]. Other definitions include the words fraud, deceptive, deviant, unethical, wrongdoing and unauthorised. Higher educational institutions worldwide face the challenge of maintaining and ensuring honesty in education as plagiarism, contract cheating, copying and submitting past works and other forms of misconduct tend to take place [3]. In this article, academic dishonesty is defined as submitting the practical work of others to benefit oneself.

Measures such as strict punishment and proper invigilation has been suggested for curbing academic dishonesty [4]. However, this can prove challenging with large classes where students need to submit practical assignments on-line. Subsequently, Stephens et al point out that mitigating academic dishonesty is mostly about facilitating the right conditions [5]. In this article, it is applied as setting the right guidelines that students must follow in submitting a practical assignment. These guidelines may either help to mitigate academic dishonesty or help ease the detection thereof.

The purpose of this article is therefore to present a rigorous learning activity that was designed by an academic to try to mitigate academic dishonesty when students were required to provide documented proof of the successful operation of an electronic circuit as part of a practical assignment. It starts with a discussion on why students engage in academic dishonesty and what potential consequences may result therefrom. The study context is then given which focuses on first-year electrical engineering students. The methodology and *cyclical process* used in this research is then described, followed by the conclusions.

ACADEMIC DISHONESTY

Reasons for academic dishonesty may include student learning difficulties (e.g. not knowing what is really expected in an assignment), dissatisfaction with a lecturer or his/her way of teaching (e.g. a lecturer who just reads from a textbook during class time), the financial benefit of passing an assignment, test or course (e.g. not having to redo a course implies that one does not need to pay for it again) and heavy student workloads (e.g. some students may take up to six modules

or subjects within a semester that is time intensive). However, the negative consequences of academic dishonesty far outweigh these reasons, which are noted further in this section.

A study in 2021 by Amzalag et al reported on several reasons raised by students as to why they engage in academic dishonesty [6]. Students reported that they were unwilling to fail and so in cases where they endured learning difficulties they tended to behave dishonestly. Such difficulties were also perceived from a study in 2022 that revealed that a higher level of academic dishonesty was found in a group of students with the lowest grades [7].

Another reason from the 2021 study by Amzalag et al noted that students who experienced dissatisfaction with their lecturers and perceived defective management of their studies also engaged in dishonesty [6]. This dissatisfaction may arise when lecturers are not *clear* in giving lessons, when there is no transparency in giving grades, when lecturers are too disciplined so that it seems excessive or rigid or when their teaching is monotonous [8].

A third reason given in the 2021 study by Amzalag et al is the benefit that students reap from dishonest academic behaviour, which supersedes the risk of being caught [6]. This benefit relates to passing the module, and maybe eventually the qualification, that may lead to possible employment, and income, for the student. Not having to re-register for the module in the future also has immediate financial benefits, and especially for students from poor or disadvantaged backgrounds. An international study of 4,538 schools within 35 nations found that academic dishonesty was significantly influenced by resource limitations and economic conditions of students [9].

A different study from 2021 by Yangdon et al also reported on student feedback regarding dishonest practices [10]. One student stated, *when students experience a heavy workload with less time for completion, they copy works of others*. The influence of heavy workloads on academic dishonesty has been reported in other studies as well [11-12].

Furthermore, students with extrinsic motivation cheat more than students with intrinsic motivation [13]. Extrinsic motivation relates to the pursuit of benefits from outside sources or the avoidance of negative consequences (e.g. failing the module and having to re-register for it again), whereas intrinsic motivation refers to participation in an activity for its intrinsic fulfilment and personal delight [14]. This tends to suggest that students do not engage in academic dishonesty because they delight in it, but rather as a means to an end, as a way to complete their studies and enter the workforce.

It is important to note some of the negative consequences of academic dishonesty. It can reduce the quality of the learning experience for students, and reduce the validity and trust in on-line assessments [15]. It can also result in loss of opportunity and future (e.g. not being able to complete a qualification if found guilty), discrimination, low self-esteem, loss of respect, public insecurity and legal consequences [16].

STUDY CONTEXT

The study context focuses on a compulsory first-year module in the Department of Electrical, Electronic and Computer Engineering, called Electronic Fundamentals 1 (ELE1). This department is one of 21 departments at the Central University of Technology (CUT), Bloemfontein, Free State, South Africa, that offers qualifications from certificates to doctoral degrees [17]. The module ELE1 forms part of a 2-year diploma, where 534 students registered for it during the first semester of 2023. This diploma is a NQF (National Qualifications Framework) Level 6 qualification that requires students to obtain a minimum of 240 credits for it (this equates to 2,400 notional hours). Many modules in this diploma have a credit value of 14 requiring students to spend a minimum of 140 hours engaging with the various aspects of the module (class time, study time, test time, etc). The syllabus covers theory relating to the oscilloscope, electrical basics, Kirchhoff's laws, resistors, capacitors, diodes, transistors, the design of a power supply and amplifier and basic digital logic.

The module comprises a mix of both theory and practical instruction. The theory contributes 65% to the course mark where students are required to engage in many self-assessments. The practical contributes 35% to the course mark and requires students to submit four practical assignments on-line via eThuto (the learning management system of the university built on BlackBoard™). The final mark of a student is calculated using 50% of this course mark and 50% of a final summative assessment which is scheduled at the end of the 14-week semester. The results of this article focus on one of the four assignments where students had to construct a working electronic circuit on a cardboard or a breadboard.

METHODOLOGY

Action research is used in this qualitative study. Action research is a cyclical research process that may be used to improve instructional practice, assessment tools and student outcomes [18]. The goal of action research is not to add to a general body of knowledge but, rather, to inform local practice, engage in professional learning, build a community practice, solve a problem or understand a process or phenomenon within a particular context or empower participants to generate self-knowledge [19]. In both these published articles, the terms *improve instructional practice* or *inform local practice* refers to evaluating the results of a specific action, modifying it to enhance its effectiveness and then re-evaluating the results or consequences of the adjustment. This needs to be an iterative or repetitive process, which is further discerned by the term *cyclical research*.

In this study, the author evaluated the initial practical submissions of students to determine if academic dishonesty exists in terms of students copying from others. This was done during the first semester of 2023 and equates to qualitative data as a measure of subjectiveness is required in evaluating the submissions. A submission deadline was given, but many students submitted their assignments before the given date, and these were then used for the initial evaluation. Before new submissions were received, the author modified the guidelines for the practical assignment which were posted on eThuto. This was easy to implement, as the guidelines are changed on-line.

Students who still had to submit their assignment were then immediately exposed to more specific guidelines, which they had to follow in their submissions. The author repeated this process several times in accordance with new submissions received from students. Students were informed that the updates on the LMS always took precedence over the guidelines contained in the practical study guide, which was only updated at the end of the semester. In this way, the practical study guide was also improved for future students.

Students who had engaged in academic dishonesty were informed that they needed to visit the lecturer in his office to discuss the assignment. Students guilty of this did so where they voluntarily confessed to their mistake. A second opportunity was granted to them to redo the practical assignment where their own independent work was now submitted, which would also be based on the updated guidelines.

SUBMISSIONS USED TO UPDATE THE PRACTICAL GUIDELINE

The main learning outcome of the third practical assignment (PA) (called P3) was to visualise the effect of different resistances on the operation of a LED using either a crude breadboard (cardboard) or a commercially available one. A secondary outcome was to observe the effect that a capacitor has on the LED when the power is disconnected. The initial guideline for this PA was contained in the practical study guide that was specific in terms of how to build the circuit on cardboard. It noted:

1. Students had to visit a local electronic supplier and purchase a list of predefined components that would cost around $4. The list was e-mailed to the supplier who then created kits for the students to purchase.
2. They would then need to secure a piece of cardboard which needed to be cut into a rectangular shape with a size of 8 x 12 cm.
3. The circuit shown in Figure 1 needed to be sketched by hand on the cardboard. All the resistors had the same value of 1,000 Ohms and only one capacitor was required (680 μF). Two red colour LEDs served to visually illustrate the operation of the circuit.
4. Instructions on how to connect the components together to ensure continuity with no short-circuits present was included in the guideline.
5. Students had to then complete a specific table with instructions on connecting and disconnecting a 9V battery, while observing the LEDs.

A photo of the cardboard, student card and a completed table had to be taken and then converted into a PDF document which students could then upload to the LMS of the university. The file name of the PDF was specified as YEAR_ELE115_P3_StudentNumber.

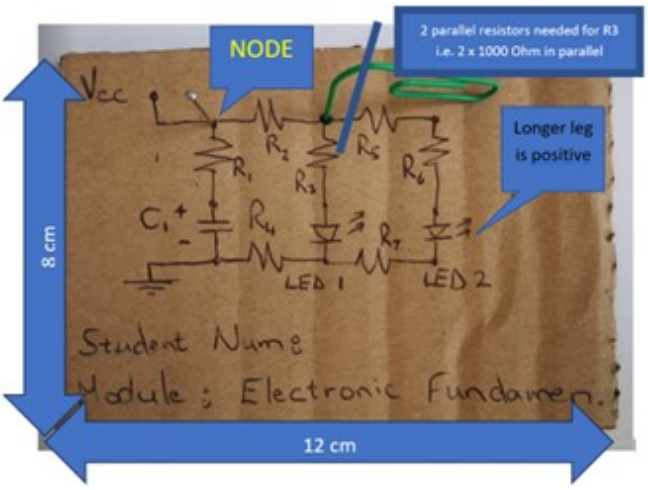

Figure 1: The circuit diagram, sketched on cardboard that students needed to construct that was contained in the practical study guide at the start of the semester.

Figure 2 shows an example of an initial submission that was evaluated by the author. Trying to erase or replace previous written text (even with a pencil) on a cardboard clearly leaves a distinctive mark that is easily discernible, as shown with the student number that has been partially blanked out for this article. This reinforced the need for students to

write, by hand and with pen, their student number on the cardboard. The guideline on the LMS was then updated to emphasise that the student number had to be written by hand with a pen, or permanent marker.

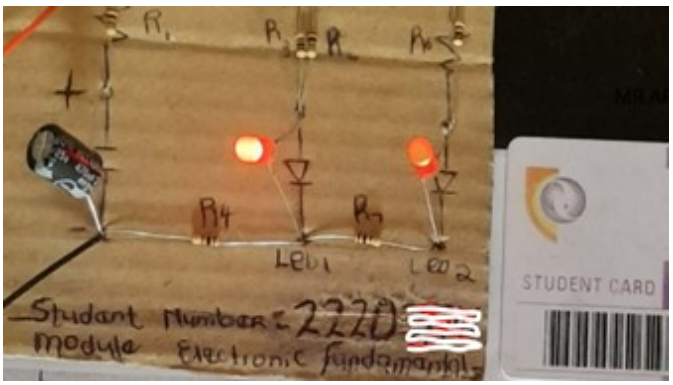

Figure 2: An example of a student submission - number 1.

Figure 3 presents examples of two more initial submissions that were evaluated by the author well before the deadline of the assignment (three students copied this circuit). Comparing the two figures reveals that the circuit is identical, with the capacitor even leaning to the same left-hand side. The only difference was the student card showing a different student number for the same circuit. Again, no student number written by hand in pen is visible on the cardboard, as the students placed their student card over the written text of the student who initially built the circuit. The guideline on the LMS was then updated to emphasise that student cards were not allowed to be placed on the cardboard, but rather beside it.

Figure 3: Further examples of student submissions - number 2 (left) and number 3 (right).

Figure 4 shows two further submissions that were identical in nature, except for the student card (four students used this circuit). Closely analysing the two figures reveals that the students had pasted a small piece of paper on the top left-hand side of the cardboard which contained their handwritten student number with pen. However, in this case, they simply pasted the paper over that which was originally written by the student who initially built this circuit. The guideline on the LMS was then updated to emphasise that nothing was allowed to be pasted on the cardboard surface.

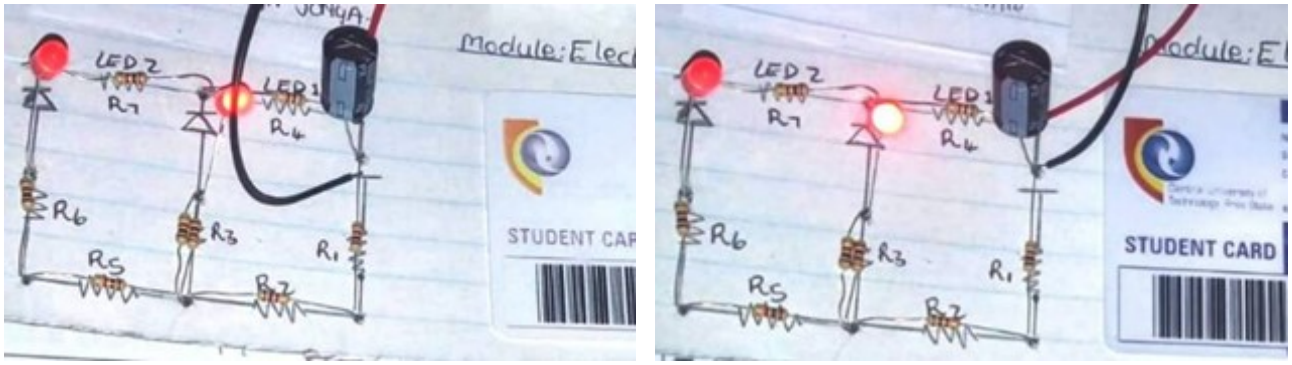

Figure 4: Further examples of student submissions - number 4 (left) and number 5 (right).

Table 1 highlights the revisions made to the guideline posted on the LMS of the institution which took precedence over the guidelines listed in the practical guide of the students. These revisions were based on the initial submissions of practical assignments by first-year students in an electrical engineering module. It has been noted that academic

dishonesty is more likely to occur among freshman students, and that it tends to wane as they progress in their programmes [20]. This emphasises the need to create awareness of this concern among first-year students, as this may also help to mitigate it in other modules that form part of the curriculum.

Furthermore, assessing initial or early submissions of students, rather than waiting for the deadline to arrive, may enable an academic to identify possible early signs of dishonesty. In safety management, early warning signs must be treated as a potentially significant event and a likely systemic failure [21]. Failing to address these early warning signs among a few students can lead to even more students engaging in academic dishonesty. An ancient sacred proverb states *a little leaven ferments the whole lump*.

Table 1: Revisions made to the guidelines posted on the LMS.

No.	Revision
1	Your student number must be written by HAND and with a PEN at the bottom of the circuit on the cardboard AND your parallel resistor combination must be clearly visible.
2	If you use a breadboard, then you need to write the last 4 numbers of your student number on the breadboard using a permanent marker.
3	The student card may NOT be placed on the cardboard or on the breadboard.
4	Nothing is allowed to be pasted on the cardboard using any type of tape, paper or other material.

CONCLUSIONS

The purpose of this article was to present a rigorous learning activity that was designed by an academic to try to mitigate academic dishonesty when students were required to provide documented proof of the successful operation of an electronic circuit as part of a practical assignment. This was in response to nine initial submissions of the practical assignment that were found to contain signs of academic dishonesty. Requirements for the practical assignment were updated four times in accordance with these student submissions. This helped to mitigate academic dishonesty in at least three ways:

1. The updated guideline could help reduce subjectivity on the part of the academic in terms of identifying academic dishonesty when marking further submissions. Evidence of it would now be more easily visible.
2. The nine students who engaged in academic dishonesty visited the lecturer voluntarily in his office where they discussed the implications of their actions. All were resolved to never engage in it again in the future.
3. Future submissions would be improved, as students would not be able to easily repeat the deliberate mistakes of the nine students as more specific guidelines now exist for them to follow. This reduces room for possible loopholes that students can exploit in their submissions.

Results further indicated that recycled material can be used to capture handwritten details that are unique to each student, thereby helping to mitigate dishonesty. The use of specific electronic components with this material can further help students demonstrate the ability to construct a working electronic project that represents their own independent work.

The study was limited to one first-year module in electrical engineering. However, insights gained from using action research in this study lead to two key recommendations. Firstly, create awareness among first-year students about the meaning and implications of academic dishonesty. Secondly, start marking assignments as soon as they are submitted by students, to be able to identify possible early signs of academic dishonesty for which timely interventions can be applied. In this way, honesty can, for the most part, be made to be more profitable than dishonesty.

REFERENCES

1. Brainy Quote (2001-2024). 14 February 2024, http://www.brainyquote.com/quotes/
2. Bleeker, K.C., *To be Honest: Championing Academic Integrity in Community Colleges*. Rowman & Littlefield (2007).
3. Richardson, M. and Healy, M., Examining the ethical environment in higher education. *British Educational Research J.*, 45, **6**, 1089-1104 (2019).
4. Orok, E., Adeniyi, F., Williams, T., Dosunmu, O., Ikpe, F., Orakwe, C. and Kukoyi, O., Causes and mitigation of academic dishonesty among healthcare students in a Nigerian university. *Inter. J. for Educational Integrity,* 19, **1**, 1-16 (2023).
5. Stephens, J.M., Watson, P.W.S.J., Alansari, M., Lee, G. and Turnbull, S.M., Can online academic integrity instruction affect university students' perceptions of and engagement in academic dishonesty? Results from a natural experiment in New Zealand. *Frontiers in Psychology,* 12, 569133 (2021).
6. Amzalag, M., Shapira, N. and Dolev, N., Two sides of the coin: lack of academic integrity in exams during the corona pandemic, students' and lecturers' perceptions. *J. of Academic Ethics,* 20, 1-21 (2021).

7. Dannhoferová, J., Foltýnek, T., Dlabolová, D. and Fishman, T., Cutting the vicious circle: addressing the inconsistency in teachers' approaches to academic integrity breaches. *J. on Efficiency and Responsibility in Educ. and Science*, 15, **1**, 10-22 (2022).
8. Setiadi, M.A., Reskyani, R. and Sahril, S., Students' problems and motivations to continuing study at the English education of magister program in Makassar. *Exposure: Jurnal Pendidikan Bahasa Inggris,* 11, **2**, 403-416 (2022).
9. Ampuni, S., Kautsari, N., Maharani, M., Kuswardani, S. and Buwono, S.B.S., Academic dishonesty in Indonesian college students: an investigation from a moral psychology perspective. *J. of Academic Ethics,* 18, **4**, 395-417 (2020).
10. Yangdon, K., Sherab, K., Choezom, P., Passang, S. and Deki, S., Well-being and academic workload: perceptions of science and technology students. *Educational Research and Reviews,* 16, **11**, 418-427 (2021).
11. Ghaffar, S.A. and Akram, S.T., Reasons for usage of unfair means during examination among the secondary school students: a case study of Lasbela, Baluchistan. *Annals of Human and Social Sciences,* 3, **2**, 638-646 (2022).
12. Liao, A.Y., Hsieh, Y.-Y., Yang, C.-Y. and Hwang, M.-S., Research on the trusted online examination systems. *Inter. J. of Network Security,* 24, **3**, 541-550 (2022).
13. Barbaranelli, C., Farnese, M.L., Tramontano, C., Fida, R., Ghezzi, V., Paciello, M. and Long, P., Machiavellian ways to academic cheating: a mediational and interactional model. *Frontiers in Psychology,* 9, 695 (2018).
14. Kajendran, V., Supian, K., Abd Rashid, N. and Khazani, M.Z., Extrinsic motivation for continuous engagement of independent workers in the gig economy platform. *Selangor Business Review,* 8, **1**, 51-67 (2023).
15. Costley, J., Student perceptions of academic dishonesty at a cyber-university in South Korea. *J. of Academic Ethics,* 17, **2**, 205-217 (2019).
16. Asgher, S., Social factors behind academic dishonesty as perceived by the postgraduate students. *Inter. J. of Social Studies,* 2, **2**, 49-53 (2022).
17. Swart, A.J., Citation analysis of master dissertations at the Central University of Technology, South Africa. *African J. of Library, Archives and Infor. Sciences,* 29, **2**, 115-129 (2019).
18. Lari, P., Rose, A., Ernst, J.V., Kelly, D.P. and DeLuca, V.W., Action research. *Technol. and Engng. Teacher,* 79, **2**, 23-27 (2019).
19. Johnson, E.S., *Action Research*. In: Oxford Research Encyclopedia of Education (2020).
20. de Lima, J.Á., Sousa, Á., Medeiros, A., Misturada, B. and Novo, C., Understanding undergraduate plagiarism in the context of students' academic experience. *J. of Academic Ethics,* 20, 1-22 (2021).
21. Biedermann, M., Safety management in air navigation service providers. *Air Traffic Management,* ed: Routledge, 84-103 (2023).