Pharmacy students' views and experiences of Turnitin®—an online tool for detecting academic dishonesty

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Abstract

Introduction: Detecting and preventing academic dishonesty (cheating and plagiarism) is an issue for scholars. The aim of this study was to explore pharmacy students' views on the use of Turnitin®, an online plagiarism detection tool.

Methods: All students in Years 3 and 4 of the BPharm course at the School of Pharmacy, the University of Auckland, were asked to complete an anonymous questionnaire looking at a number of issues including their views on using Turnitin® and the penalties for those caught.

Results: A 64% response rate was obtained. The majority indicated that the use of Turnitin® had helped them to reference correctly and write assignments in their own words, but only a minority had gained a more clear understanding of the definition of plagiarism.

Discussion: Students indicated wanting more feedback from tutors on the outcomes of submitting their work to Turnitin®. Feedback from this study will be used to support the way in which Turnitin® is used at the School. Further research is needed into the potential impact on learning outcomes.

Keywords: *Academic dishonesty, attitudes, cheating, detection, plagiarism, Turnitin®*

Introduction

Academic dishonesty or academic misconduct are terms often used to describe activities which comprise cheating or plagiarism. This may include issues such as copying work from another student with or without their permission, cheating during exams, copying text from books or journals and passing them off as one's own, falsifying or inventing laboratory data or getting another person to write an essay.

From the perspective of the university, whether students engage in such activities is a concern. Although not a new issue, (White, 1993; Ashworth Bannister, Thorne, 1997) there has been recent concern that access to the internet may be causing an increase in academic dishonesty (Laird, 2001; Underwood & Szabo, 2003; Scanlon & Newman, 2002).

The extent to which academic dishonesty is reported to occur amongst students varies depending on the definition one is using, the way in which academic dishonesty is measured and who is being studied. Aggarwal, Bates, Davies and Khan (2002) found that 80% of pharmacy students at two schools of pharmacy, admitted to having been involved in at least one such activity. However, with only a 51% response rate, it is likely that this represents under-reported data. With regard to internet plagiarism, Underwood and Szabo (2003) found one in five students surveyed at a UK science faculty indicated they would plagiarise online in order to avoid failing an assignment. In another study of American college and university students, one quarter said they had plagiarised online at least "sometimes" (Scanlon & Neumann, 2002).

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Variation also appears to exist between disciplines. For example, Meade (1992) noted that out of 6000 students at top US universities, business students were more likely to admit to cheating than those in other academic disciplines. In some studies, gender differences also exist. Aggarwal et al. (2002) noted that more males admitted to having cheated than females in their study of undergraduate pharmacy students. Conversely, no gender differences were noted among medical students when asked whether or not they had, or would consider cheating according to 14 different scenarios (Rennie & Rudland, 2003). In a study of cheating and its relationship to e-learning, cheating was found to be more acceptable to males, but also to females who use the Internet extensively (Underwood & Szabo, 2003).

It can be argued that students engage in academic dishonesty either intentionally or unintentionally, the latter being due to a lack of understanding of the "rules" governing issues such as plagiarism, or due to cultural differences in beliefs about what constitutes cheating (Burnett, 2002). Reasons for intentionally cheating vary, and include wanting better grades, a lack of time to complete the work themselves, peer pressure and a lack of deterrence (Park, 2003; Ng et al. 2003). Howard (2002) noted that students cheat when they have negative attitudes about their courses or feel the coursework is either boring or irrelevant, whilst Burnett (2002) noted that there was an association between cheating and beliefs about how closely a paper was marked or read by the teacher.

Students' views on academic dishonesty may also differ from those of academic staff. In particular, Ashworth et al. (1997) noted that plagiarism may be a more significant concept for academic staff. Students also fear being caught plagiarising, even when they have attempted to avoid it, and that "plagiarism can occur by accident" (Ashworth et al. 1997).

Universities and their staff generally place a lot of emphasis on trying to prevent such activities. At an individual level, Howard (2002) has pointed out that ensuring the learning activity is relevant and interesting to students will promote recognition of the value of their own learning and achievement as an important aspect of academic study. However, whilst such endeavours will no doubt help to change the attitudes of students to some extent, many academics are concerned about the impact of greater access to the internet. Concerns in particular relate to the emergence of websites from which one can buy stock essays or have essays written to one's specifications at a cost. The availability of many texts on-line makes it easier for students to engage in cheating (although there seem to be no evidence that the ease of access to such tools necessarily converts an honest student to a dishonest one). Technology has been manipulated to respond to this by developing programmes such as Turnitin®. These programmes are able to scan through online text to see if a submitted piece of coursework contains strings of eight or more words which are identical to those found elsewhere in its database and other web pages. With each submitted piece of work, Turnitin® produces a report with a plagiarism detection rate.

Turnitin® is self-described as: "A proprietary system that instantly identifies papers containing unoriginal material and acts as a powerful deterrent to stop student plagiarism before it starts" (Turnitin.com, 2005). However, each report needs to be carefully scrutinised by the teacher as Turnitin® does not distinguish between fully "quoted" and cited test, and text that is not cited. Furthermore, reference lists, sections of assignment instructions and essay titles will all probably appear as being plagiarised from the same assignment and be detected and factored into the report by the programme, therefore not necessarily constituting plagiarism.

A risk with the use of such technologies is that the message to students could be a negative one with regard to the cat and mouse game of detection. It is possible that students may disengage from the process of learning and use their energy to avoid detection and Burnett (2002) discusses the importance of a trusting relationship between students and academics in order to avoid such occurrences. Another potential concern, as Howard (2002) has pointed out, relates to the intellectual property rights of the students, where they are forced to submit their work to the programme's database, which may have legal ramifications depending on the country in which the university is based.

Nonetheless, these programmes are increasingly being implemented in many universities, and at the University of Auckland academic staff are free to choose to use the programme. The University of Auckland School of Pharmacy is involved in the use of Turnitin® at the discretion of individual staff and within the University's Faculty of Medical and Health Sciences, many staff have been using the programme for a number of years. As a result, pharmacy undergraduate students in their 3rd and 4th years, as well as postgraduate students may have been exposed to Turnitin® on a number of occasions. To date, no systematic study has been undertaken of students' or staff experiences using Turnitin®. Whilst apparently providing an additional means of detection and deterrence, as academics it would be useful to find out if the programme also holds educational merit—that is, does the use of such technologies impact on students' approach to their work and their understanding of issues around academic dishonesty? This study was implemented to investigate these issues and to further explore students' perceptions of the seriousness of different levels and types of cheating and plagiarism.

The two main research questions in this study were: (a) do students perceive differences in seriousness

between different types of academic dishonesty and (b) do students who have submitted work through Turnitin® perceive there to be any benefit to them in the context of learning experiences?

The study had a number of key objectives:

1. to explore students' knowledge of the University of Auckland's policy on cheating and plagiarism and their understanding of the purpose of Turnitin®;
2. to describe students' experiences and opinions of Turnitin®;
3. to explore whether students believed that the use of Turnitin® had any impact on the way they undertook their work and their understanding of the issues around academic dishonesty; and
4. to investigate students' views on potential penalties which could be applied to different levels/forms of cheating.

A parallel study of staff experiences and beliefs about the utility of Turnitin® will be published at a later date.

Materials and methods

Cheating and plagiarism are sensitive issues for students and in order to enable students to feel comfortable with being honest in their responses a method was devised that allowed for complete anonymity and confidentiality. This involved no member of the School of Pharmacy research team seeing any of the completed questionnaires. This would assure students that responses would not be able to be identified by staff who might recognise individual handwriting.

Sampling and inclusion criteria

All Year 3 ($N = 98$) and Year 4 students ($N = 74$) undertaking the respective Pharmacy Practice courses of the four year Bachelor of Pharmacy degree were included in the study.

Instrument development and piloting

A self-completion anonymous questionnaire was developed through discussion with those using the programme as part of teaching and in collaboration with the School of Pharmacy Teaching and Learning Committee and members of the Faculty Education Unit (FEU).

The questionnaire was piloted on a group of 3rd year pharmacology students who had experience of using Turnitin®. Students were asked to complete the questionnaire alone, and then as a group to comment on each of the questionnaire items with regard to their understanding of the meaning and purpose of the question, ease of completion and any ambiguities.

Students were further invited to suggest additional areas for inclusion. After piloting a final version was drawn up and the University of Auckland Human Participants Ethics Committee Approval was obtained for the study.

In order to answer our first question, students' views were explored on penalties which could be put in place when certain activities were detected by Turnitin®. The extent to which students would penalise certain activities was used as proxy measure of views on the level of seriousness of the activity. In order to answer the second question, open and closed questions were used to explore students' views on the educational outcomes of using Turnitin® and any suggestions for improving outcomes in the future.

The questionnaire included questions on:

- Awareness of University policies;
- Purpose of Turnitin®;
- Use of Turnitin®;
- Feedback from tutors;
- Feedback wanted from tutors;
- Students views on Turnitin®;
- Students views on penalties for cheating and plagiarism.

A decision was taken not to include demographics, in particular those relating to age and ethnicity, as with small numbers it may have been possible to identify individual students. Furthermore, conflicting evidence on the issue of gender, led the authors to conclude that inclusion of such data in the questionnaire might not be of particular value. This decision also allowed for the questionnaire to take up only two sides of A4 paper, thus hopefully improving response rates.

Data collection

The questionnaire was distributed at a Pharmacy Practice lecture for each of the two groups. A member of the FEU introduced the purpose of the study and was available to answer any questions. A Participant Information Sheet was provided which outlined the study, the fact that the questionnaire was anonymous and that no member of the School of Pharmacy would see the written responses given by students. Students were given a copy of the questionnaire and an envelope addressed to an FEU staff member, instructed to complete the questionnaire at their leisure, and to submit the sealed envelope containing the completed questionnaire in the School of Pharmacy assignment box outside the School Office.

A message was sent electronically to all students after two weeks reminding non-responders about the study and alerting them to the fact that further copies of the questionnaire and information sheet were available outside the School of Pharmacy office. Students were instructed to seal their responses

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by folding the paper and stapling it shut before submitting it. Those who had already responded were asked not to respond a second time.

Data analysis

Data from the completed questionnaires was entered into a database by an FEU staff member and the questionnaires were stored in a sealed cabinet until the data analysis was completed. The anonymised database was then transferred to the research team at the School of Pharmacy.

Results

Most respondents elected to complete the questionnaire in the lecture theatre and submit it to the FEU staff member in the sealed envelope. Only a small minority took the questionnaire away and submitted it later using the assignment box.

Response rates

Of the 172 students in the two groups, 110 completed the questionnaire representing a 64.0% response rate. Of Year 3 students 58.2% (57/98) responded and for Year 4 71.6% (53/74) responded. It should be noted that not all students attend the lectures and a roll of attendees is not conducted; however, all students would have received the reminder email.

With the exception of the number of assignments submitted to Turnitin®, there were no significant differences in responses between Year 3 and Year 4 students for any of the quantitative data.

Awareness of University policies

Almost 100% (109/110) of the respondents indicated an awareness that the University had a policy on plagiarism and cheating, with one student responding "don't know". Fifty-four percent (59/109) of students had read the policy, 40.6% (45/109) had not and 4.5% (5/109) did not know (data missing in one case).

Over 93% (101/108) students answered "yes" when asked whether they had received any information from tutors or lecturers about plagiarism and cheating (data missing in two cases).

Purpose of Turnitin®

Students were asked to describe in their own words their understanding of what Turnitin® is. All respondents completed this section. Statements provided by students indicated an overall understanding of the purpose of Turnitin®—this was predominantly that Turnitin® was a web-based programme that scanned submitted work to detect, reduce, prevent and "quantify" levels of cheating and plagiarism. No respondents indicated that it might act

Table I. Themes relating to students' understanding of "What is Turnitin"? ($N = 110$ statements).

Theme	Word	Number of times cited
Web/internet programme	Programme	40
	Web	38
	Electronic	21
	Internet	14
	Computer	13
	Scan	9
	Online	6
	Software	4
	Tool	3
Detection	Check	41
	Detect	20
	Compare	12
	Catch	8
	Screen	6
	Pick up	3
	Match	3
Prevent/reduce	Prevent	2
	Reduce	2
	Censorship	1
	Avoid	1
Cheating/plagiarism	Plagiarism/plagiarising	77
	Cheat/ing	14
	Copy/ing	12
	Similar	9
	Cut and paste	3
Quantifying	Assess	5
	Much	5
	Percent	3
	Sentence	2
	Paragraph	2
	Degree	2
	Grade	1
	Level	1

as a teaching/learning aid to explaining cheating and plagiarism. Table I provides a breakdown of the key themes identified and the number of times words in those themes were cited.

Use of Turnitin®

All respondents had previously submitted assignments to Turnitin®. The mean number of assignments was 4.4 (sd = 1.7; mode 3; range 1–8; total 475; $N = 107$ responses). The mean for Year 3 was 3.28 (sd = 0.85) and for Year 4 was 5.66 (sd = 1.5).

Students were asked if they would prepare assignments differently if they knew they had to submit it to Turnitin®. Twenty nine percent (32/110) indicated they would, 66.4% (73/110) indicated they would not and the remaining 4.5% were unsure. Comments made by students were grouped into themes. The first theme and most commonly cited, being around paraphrasing or carefully writing in one's own words,

was described by 19 students. This theme included statements such as:

"Just be more cautious about how to re-word material from other sources"

"Rearrange the words of a paragraph or sentence. Get a lot of sources that support or give the same information and incorporate them together"

The second most commonly cited theme ($n = 7$) related to correctly referencing materials used in an assignment. Quotes included;

"Be more careful with proper references"

"Be so careful about referencing and paraphrasing each paragraph"

A third theme indicated students changing the way they would undertake an assignment to avoid "detection" or "getting caught" ($n = 2$) and included statements such as:

"Word it differently to avoid overlap, use non-technical terms to avoid suspicion"

Another theme related to ensuring that when words were "copied" verbatim, they were enclosed in quotation marks ($n = 2$), for example:

"Make sure that it is referred [sic] absolutely correctly, i.e. direct quotes are in quotation marks and referenced etc"

Feedback from tutors

Students were asked if they had received any feedback from tutors or lecturers about any of their work as a result of submitting it to Turnitin®. Only 18.2% (20/110) stated "yes". When asked what type of feedback students received, the majority indicated it was feedback relating to the proper use of quotation marks, incorrect interpretation of level of plagiarism by tutor (e.g. the 7% "quoted" was due to having submitted the bibliography with the assignment), that Turnitin® had "quantified" the level of copying and that the "quantity" in that case was of concern to the tutor. Of those receiving feedback, 47.4% (9/19) stated it would affect the way they undertook future assignments (data missing in one case). The effect on future work included being extra vigilant with wording and using quotation marks, having a better understanding of what plagiarism is, and being more familiar with Turnitin®. Details of the feedback can be seen in Table II.

Feedback wanted from tutors

All students were asked what type of feedback would be helpful from lecturers and tutors about assignments submitted to Turnitin®. Five main themes were

Table II.   Feedback received by students from lecturers and tutors.

Verbatim quotes from freehand comments made by students
7% was copied, but mainly because I submitted the bibliography too.
Apparently cheating, plagiarism from one of the courses
For 1 assignment—that 5% was highlighted but it was properly referenced so it was OK
How much (%) was plagiarised
I did a management course and some people got zero as a result of Turnitin
I had 4% plagiarism. She gave me a warning—it seemed unfair as most of it was…… hard to rephrase.
I plagiarised my assignment
I was advised not to use information directly from a source without referencing
I was OK
It was that there was 2% detected by Turnitin® which was apparently acceptable for a project of that size
Learn to use speech marks
On Turnitin® you got n% indicating originality of assignment
One of the assignments wasn't well "reworded", or paraphrased properly
Quoting
That my last assignment had 1% of copied stuff as I quoted the title and question of the assignment
That one fully referenced quote came up on Turnitin® in search, so OK. Only had feedback for one assignment
That there are a few paragraphs that need references
Use of quotation marks for direct quotes

detected. The first related to students wanting to see how well they did, how good their efforts were and what was considered to be academic dishonesty, with 56.8% (21/37) of statements indicating this, for example:

"Have I met the requirements to do my assignment"

"I would like a copy of the report on my assignment as this will help me in future to avoid mistakenly plagiarising (unconsciously)"

"What in our individual essays is considered as plagiarism. It would be good if we got a report on our essay to show the bits that were copied, then we would know what was considered plagiarism"

A second theme, closely related to the first, related to statements around receiving a copy of the report Turnitin® produced, without actually indicating why they wanted to see it (13.5%; 5/37), for example:

"Same copy they receive at Turnitin®"

"We should be allowed to see what results we get"

The third theme included statements where there was an indication of a benefit, or a challenge relating to benefit to using Turnitin®, that students had learned something or might do so in the future (10.8%; 4/37), for example:

"Does Turnitin® actually make a difference? Have they detected more plagiarism?"

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The fourth theme related to seeing exactly how Turnitin® worked and how the assignment was assessed based on this (8.1%; 3/37), for example:

"If cheating has been detected, what form this took, would like to know the kind of reports and info generated by Turnitin® for tutors"

The fifth theme related to students overtly indicating that they wanted to see the results in order to assess how well they had "avoided" detection or how close they came to being "detected" (2.7%;1/37), for example:

"Whether we are close to being 'cheaters'. A score or something to show how much we are considered as copying".

Other statements included "I think it is stupid that we have to submit. If they think we have plagiarised, they can submit it." and "don't know".

Students views on Turnitin®

Students' views of Turnitin® were explored by asking students to rate their opinion on a number of statements using a five point Likert scale from "Strongly agree" to "Strongly disagree". Around two fifths (41.6%) of respondents agreed that submitting assignments to Turnitin® helped them to have a clearer understanding of what plagiarism is. Sixty-six percent agreed that they would reference work more carefully when submitting an assignment to Turnitin®, and 54.6% suggested that it had helped to write assignments using their own words. However, only 18.5% indicated that they learned more from doing assignments submitted to Turnitin® than from those that were not (54.6% indicated this was not the case).

Eighty seven percent thought submitting assignments to Turnitin® was a good idea as it helped to "catch out" those who were cheating, and only 34.3% (1/3) thought it showed the University did not trust students (Table III).

Students views on penalties for cheating and plagiarism

Finally, students were asked for their views on appropriate penalties for various levels of cheating and plagiarism. Options provided were: nothing; 20% deducted from assignment; 50% deducted from assignment; no marks at all for assignment; fails the course outright (Table IV). Overall, students seemed to view copying from another student, getting another student to write their work, and paying a professional service to write their work more seriously than using unreferenced text belonging to another person. Indeed, results indicated that very few felt that even significant amounts of plagiarism (i.e a complete paragraph) warranted being awarded no marks for the assignment.

Discussion

This study explored the views of Year 3 and 4 pharmacy undergraduate students (of a four year degree) with regard to the use of an anti-plagiarism technology, Turnitin®, and students' views on penalties for academic dishonesty. Overall, students had a clear understanding of the purpose of Turnitin® and indicated that, at least when submitting work to Turnitin®, they would employ strategies to ensure correct referencing and not to plagiarise deliberately. Furthermore, results also indicate that for at least some students, the use of Turnitin® helped them have a clearer understanding of cheating and plagiarism issues. However, no baseline measure existed regarding their understanding of these issues; therefore we do not know whether those students who did not indicate that Turnitin® was helpful already had a clear understanding of these issues. Over 2/3 of students indicated that using Turnitin® had improved their approach to referencing whilst 55% had gained help with paraphrasing reference material. However, with regard to students' views on "learning more" from assignments submitted to Turnitin®, only a minority (around 1/5) indicated this to be the case.

Table III.   Student attitudes towards Turnitin® ($N = 108$; data missing on 2 cases).

	Strongly agree		Agree		Unsure		Disagree		Strongly disagree	
	n	%	n	%	n	%	n	%	n	%
Submitting to Turnitin® helped me to have a clearer understanding of what plagiarism is	5	4.6	40	37	27	25	23	21.3	13	12
I am more likely to carefully reference work when I know submitted to Turnitin	24	22.2	48	44.4	13	12.0	16	14.8	7	6.5
Submitting to Turnitin® is good idea as picks up students who cheat by copying another student	25	23.1	69	63.9	9	8.3	2	1.9	3	2.8
Use of Turnitin® suggests university does not trust students	11	10.2	26	24.1	32	29.6	34	31.5	5	4.6
Submitting through Turnitin® has helped me write info from reference sources in my own words	17	15.7	42	38.9	25	23.1	20	18.5	4	3.7
I learn more from doing assignments submitted through Turnitin® than those which are not	5	4.6	15	13.9	29	26.9	35	32.4	24	22.2

Table IV.   Students' views on penalties for cheating and plagiarism.

	Nothing		20% deducted from assignment		50% deducted from assignment		No marks at all for assignment		Fails the course outright	
	n	%	n	%	n	%	n	%	n	%
A student is found to have copied from another student's work (N = 107)	7	6.5	30	28.0	26	24.3	40	37.4	4	3.7
A student is found to have copied *a sentence* word-for-word from a book or journal without referencing it and without putting in quotation marks (N = 108)	60	55.6	36	33.3	7	6.5	4	3.7	1	0.9
A student is found to have copied *a paragraph* word-for-word from a book or journal without referencing it and without putting in quotation marks (N = 109)	8	7.3	64	58.7	25	22.9	11	10.1	1	0.9
A student is found to have copied *a sentence* word-for-word from the internet without referencing it and without putting in quotation marks (N = 109)	60	55.0	37	33.9	8	7.3	4	3.7	0	0.0
A student is found to have copied *a paragraph* word-for-word from the internet without referencing it and without putting in quotation marks (N = 109)	10	9.2	64	58.7	22	20.2	12	11.0	1	0.9
A student is found to have got another student to write their assignment for them	4	3.7	5	4.6	7	6.4	68	62.4	25	22.9
A student has paid a professional essay-writing service to write their assignment for them (N = 109)	3	2.8	2	1.8	4	3.7	57	52.3	43	29.4

In respect of the students' views of the use of Turnitin® as a detection tool, the majority of respondents indicated they believed detecting students who cheated was fair. However, one third indicated that using Turnitin® showed a lack of trust on the part of the University towards students. The extent to which such lack of trust can have an impact on the way students produce assignments has not been explored, and requires further study. Other researchers have discussed different ways of enhancing students' attitudes towards academic dishonesty. For example, Howard (2002) stated that there is a need to ensure that assignments are seen as relevant and interesting, and that this should reduce academic dishonesty whereas Ashworth et al. (1997) commented that students can become alienated from the course and this may lead to more cheating.

Students' views on appropriate penalties for cheating and plagiarism point to two different types of academic dishonesty. The first, in which an individual, or groups of individual students known to them are disadvantaged by cheating, for example by copying another student's work or by getting another person to write an essay for them. The second type refers to the situation whereby an anonymous person's work is copied verbatim and is not referenced. Ashworth et al. (1997) found that students' opinions on academic dishonesty were related to their feelings about friendships and interpersonal trust. This may well explain to some extent why students identify more strongly with the notion of cheating by using a fellow student's work without permission and have thus assigned a higher penalty.

Respondents assigned lower penalties to examples of plagiarism involving the use of another published written work belonging to another person. Again, Ashworth et al. (1997) explored this issue in their qualitative study and concluded that "the notion of plagiarism was regarded as extremely unclear" and that the nature of scholarly activity was not fully appreciated by students. The present study also noted, however, from some of the qualitative comments, that students do fear being accused of plagiarism which has occurred "by accident"—where they have followed what they believe to be the process to avoid this. As academics, we have a duty to explain to students that from an academic dishonesty perspective, successful completion of an assignment involves more than just avoiding detection or simply going through a "process". With an emphasis on process, engendered by the use of technologies such as Turnitin®, it may be that academics are actually failing to imbue their students with the concepts and philosophies which underpin these aspects of academic integrity.

The limitations to this study include the small sample size and the data presented being based on a snapshot of two concurrent years of pharmacy students. Furthermore, there exists the problem of

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non-responder bias; the nature of the study design meant that it was not possible to contact non-responders to assess the impact of this. Although extreme measures were taken to protect the anonymity of respondents, there may still remain a fear of detection and which may have compromised the information students decided to divulge. That noted, students were not asked to reveal their own involvement in academic dishonesty.

No attempt in this study has been to explore cause and effect—that is to say, we have not tested the impact of Turnitin® on the quality of students' assignments or manner of preparing their work.

In summary, this research has identified a number of important issues. The majority of students indicated that the use of Turnitin® helped them have a clearer understanding of plagiarism, encouraged them to more carefully reference their work, and helped them to paraphrase information. However, overall they did not indicate the process helped them to learn more from assignments submitted in this way. Thus the limitation of the programme needs to be acknowledged. That a third of students felt the use of the programme indicated a distrust of students by the University is of concern, and the impact this might have on academic dishonesty needs further investigation.

Students also indicated they would like further feedback from tutors and lecturers. However, feedback from teaching staff was not canvassed for this study, and their views need to be explored.

Ideally, future research would explore objectively the impact of the use of electronic plagiarism detection and prevention tools on assignment quality and academic dishonesty. However, designing such a study, without using deception remains a challenge.

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