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Turnitin® Use at a Canadian University

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Abstract

While the text-matching tool, Turnitin®, has traditionally been used to deter and detect plagiarism, more recently, instructors have started to use this tool for formative self-assessment. To describe Turnitin®'s use in practice and to explore perceptions of this tool, we surveyed 940 students, teaching assistants, and instructors at a Canadian university. Our findings indicate that Turnitin® was more commonly used for plagiarism detection than for formative self-assessment. The majority of respondents had positive views of Turnitin®, and 70% of students stated that they had no concerns about using this tool. Despite these positive findings, content analysis of open-ended responses indicate that students experience increased anxiety of being falsely accused of plagiarism and have concerns about their work being stored in the Turnitin® database. Our findings lead us to conclude that there is a need for more information and improved communication about Turnitin® for all three groups.

Bien que l'outil Turnitin® de mise en correspondance de texte ait été traditionnellement utilisé pour prévenir et détecter le plagiat, plus récemment, les instructeurs ont commencé à utiliser cet outil pour l'auto-évaluation formative. Afin de décrire l'emploi de Turnitin® dans la pratique et d'explorer les perceptions de cet outil, nous avons réalisé une enquête par sondage d'opinion auprès de 940 étudiants, assistants pédagogiques et instructeurs d'une université canadienne. Nos résultats indiquent que l'outil Turnitin® est davantage utilisé pour détecter le plagiat que pour l'auto-évaluation formative. La majorité des répondants avaient une opinion positive concernant Turnitit® et 70 % des étudiants ont déclaré qu'ils n'avaient aucune inquiétude concernant l'emploi de cet outil. Malgré ces résultats positifs, l'analyse du contenu des réponses aux questions ouvertes indique que les étudiants avaient peur d'être accusés à tort de plagiat et étaient inquiets que leurs travaux soient sauvegardés dans la base de données de Turnitin®. Nos résultats nous conduisent à conclure que pour ces trois groupes, il faudrait avoir davantage d'information et améliorer la communication concernant Turnitin®.

Academic misconduct has been a long-standing concern in post-secondary education and is widely recognized as a complex issue related to individual, institutional, and societal factors (Bernardi et al., 2004; Christensen Hughes & McCabe, 2006; Meadows, 2012; Rettinger & Kramer, 2009; Sendag, Duran, & Fraser, 2012). To address this issue, higher education has traditionally used a "rule compliance approach," which focuses on deterring, policing, and enforcing academic integrity rules (Bertram Gallant, 2008). In keeping with this strategy, text-matching software such as Turnitin® has gained widespread use as an effective tool for deterring and catching plagiarism. Turnitin® is a web-based text-matching tool that compares students' written assignments with a database of pre-existing sources, including over 62 billion web pages, over 734 million student papers, and over 165 million journal articles, periodicals and books (Turnitin®, LLC, 2018). After comparing a submission with its database, Turnitin® generates a similarity index as well as an originality report. The similarity index indicates how much of the student's writing matches writing from previously existing sources, and the originality report highlights and provides links to all phrases that match pre-existing sources (Monash University, 2017).

Turnitin® is considered an effective tool for helping instructors identify plagiarism, and indeed, that is how it has traditionally been used (Bretag & Mahmud, 2009; Dee & Jacobs, 2012; Goddard & Rudzki, 2005). However, merely identifying plagiarism does not help students to understand how to avoid plagiarizing in the future since, in the majority of cases, plagiarism is unintentional (Sutherland-Smith, 2010) and is due to students' inadequately developed writing skills (e.g., patch writing, synonym substitution) (Davis & Carroll, 2009). In addition, the discrepancy between students' and the university's perceptions of what constitutes academic misconduct (Meadows, 2012) suggests that students need more than just plagiarism detection. Although a punitive strategy may be an effective means of instilling fear in students, it does not address these underlying causes for unintentional plagiarism.

In the 1990s, higher education shifted its focus from a rule compliance strategy to an integrity strategy which focuses on fostering moral and ethical values (Garrett, 2011). In 2008, Bertram Gallant (2008) proposed the teaching and learning strategy. This approach further shifts the focus from the student to the teaching and learning environment, and to the goal of helping students develop skills rather than disciplining them for their lack of skill or questioning their moral values (Bertram Gallant, 2008; Owens & White, 2013). With this shift in approach to plagiarism, instructors have been using Turnitin® for educational purposes such as skill development and formative self-assessment. Instead of focusing on checking students' final papers for plagiarism, instructors can provide students with a learning opportunity to run a draft of their paper through Turnitin®. Students are then able to access the Turnitin® originality report, recognize their errors, and make revisions before submitting their final version for grading. A small body of literature is developing based on Turnitin®'s value as an educational tool for formative self-assessment and students' positive view of using the tool for this purpose (e.g., Barrett & Malcolm, 2006; Chew, Lin Ding, & Rowell, 2015; Davis & Carroll, 2009; Rolfe, 2011). Notwithstanding these benefits, students have some concerns about using Turnitin®; namely, issues related to intellectual property, and discomfort with contributing their work to a database used by a for-profit company (Dahl, 2007; Rodriguez, 2011; Savage, 2004). Given these recent shifts and the documented concerns, we were interested in exploring perceptions of Turnitin® and its use in practice at our institution. Our four objectives were to explore:

1) satisfaction with Turnitin® and its features,
2) ways in which instructors use Turnitin® (i.e., plagiarism detection only, or self-assessment and plagiarism detection),
3) students' concerns about using Turnitin®, and
4) use of Turnitin® resources.

First, we aimed to explore general satisfaction with Turnitin® and its features as this software is integrated into the learning management system at our institution. Second, we were interested in determining how Turnitin® is used at our institution (i.e., a rules based approach or integrity approach). Third, we were interested in determining the extent to which students have concerns about using Turnitin®. Our institution requires instructors to provide students with an alternative to using Turnitin®, yet we had no data on students' use of the alternative and no measure of the extent to which students do or do not have concerns about Turnitin®. Fourth, we wanted to determine whether or not instructors, Teaching Assistants (TAs), and students use currently available resources about Turnitin®. This was important to assess so that our plans for creating additional resources would be informed by data on Turnitin® users at our institution. This paper reports findings of a survey of Turnitin® use at our midsized (30,000 undergraduate students), research-focused, comprehensive, Canadian university.

Method

In Spring 2015, we invited a total of 9,782 faculty, teaching assistants, and students who were involved in courses that used Turnitin® the previous term (Fall 2014) to complete an online survey of Turnitin® use. A letter of consent and a hyperlink to the survey were sent to the participant group via email and the survey resided on a secure webpage that was only accessible through university ID authentication. The purpose of the survey was to explore respondents' use of and perceptions of Turnitin®, and to determine how commonly it is being used as an educational tool for formative self-assessment, rather than solely as a plagiarism detection tool. This was defined on the surveys for instructors and TAs by the question "Have you used Turnitin® for educational purposes (i.e., to allow students to run their draft submission through the software so they can view the results before submitting their final paper for grading)? On the survey for students, this question was re-worded as being given "the opportunity to use Turnitin® in a course for educational purposes (i.e., my instructor allowed the class to submit an early draft of the assignment through Turnitin® so we could view the originality report and make changes before submitting the final version of the assignment for grading)." On the TA survey, our questions specified that we were interested in their experience with Turnitin® as a TA.

The survey items included closed response options, such as Likert scales, as well as open-ended response options. All participants were asked about satisfaction and familiarity with Turnitin®, frequency of Turnitin® use, use of Turnitin® as a plagiarism detection tool, use of Turnitin® as an educational tool for formative self-assessment, and use of Turnitin® resources available on and off campus. On-campus Turnitin® resources included website information on Turnitin® provided by the university's teaching support centre and the Office of Academic Integrity. Off-campus resources included the Turnitin® website and any other resources. Students were also asked whether their instructor explained how and why Turnitin® was being used in the course, whether they used the alternative to Turnitin®, and, if so, how satisfied they were with the Turnitin® alternative. We pilot-tested our survey with a few colleagues and students but did not

conduct any formal psychometric testing of the survey. This project received ethics clearance from the university's Office of Research Ethics (ORE # 20499).

All submitted surveys which had completed responses were include in data analysis, even if some items were left blank. Data analysis included descriptive statistics as well as a conventional content analysis (Hsieh & Shannon, 2005) of open-ended responses from instructors, TAs, and students. Descriptive statistics included calculating means, standard deviation, and frequencies. Conventional content analysis involved reading the open-ended responses for each question and developing a coding scheme to identify categories of ideas with similar meaning. This report focuses on respondents' perceptions regarding their experience of using Turnitin® for plagiarism detection and as an educational tool for formative assessment.

Participants

A total of 53 instructors, 67 TAs, and 820 students completed the online survey, for an overall response rate of 9% (906/9782). Respondents included students (61% female), teaching assistants (TAs) (69% female), and instructors (47% female). All faculties at the university and all undergraduate years of study were represented in the sample. The majority of instructors (68%, $n = 36$) had been teaching university for seven or more years and almost all of them (96%) had taught undergraduate students. Ninety per cent of the TAs ($n = 60$) had been a TA for 0-3 years.

Results

Eleven per cent of instructors ($n = 6$), 39% of students ($n = 317$), and 63% of TAs ($n = 43$) reported using Turnitin® only once or twice. Eighty-nine per cent of instructors ($n = 47$) had used Turnitin® three or more times, with 51% ($n = 27$) of instructors reporting that they use Turnitin® every term. As noted above, the survey was sent only to participants in courses where the instructor had requested Turnitin® to be activated in the learning management system. Four per cent ($n = 2$) of instructors, 12% ($n = 8$) of TAs, and 24% ($n = 196$) of students reported that they have used Turnitin® but "really don't know much about" it. Sixty-four per cent ($n = 34$) of instructors, 70% of TAs ($n = 47$), and 66% ($n = 542$) of students reported having "a basic understanding" of Turnitin® and 32% ($n = 17$) of instructors, 18% ($n = 12$) of TAs, and 10% ($n = 80$) of students considered themselves "very knowledgeable" about it. In all three groups, higher Turnitin® use was positively correlated with higher familiarity with Turnitin® ($r = 0.40$, $p = .003$ for instructors; $r = 0.42$, $p < .001$ for TAs; and $r = 0.29$, $p < .001$ for students).

Satisfaction with Turnitin®

Instructors and TAs were asked to rate their level of agreement on a five-point scale (1 = Strongly Disagree, 2 = Disagree, 3 = Unsure, 4 = Agree, 5 = Strongly Agree) with seven statements regarding Turnitin®. Eighty-three per cent ($n = 44$) of instructors "agreed" or "strongly agreed" that Turnitin® is an effective text matching tool and was easy to use in the institution's learning management system. Similarly, they felt that the originality report was easy to interpret and provided useful information. A number of instructors and TAs were less sure that Turnitin® identified students' use of "weak" sources (i.e., information sources of low quality). The majority of instructors (87%, $n = 46$) would recommend Turnitin® to a colleague who teaches courses with a written assignment. As one instructor stated, "It has helped me catch many cases of student-to-

student plagiarism that would otherwise have been almost impossible to detect." Table 1 shows the frequencies, mean ratings, and standard deviations for instructors and TAs.

Table 1
Instructors' and TAs Mean and SD Level of Agreement with Statements Regarding Turnitin®.

	Strongly Disagree 1	Disagree 2	Unsure 3	Agree 4	Strongly Agree 5	Total	Mean (SD)
Turnitin® is easy to use in the learning management system.							
Instructors	2	3	3	32	13	53	3.96 (0.94)
TAs	2	6	8	41	10	67	3.76 (0.92)
Turnitin® is an effective text matching tool.							
Instructors	0	1	8	26	18	53	4.15 (0.74)
TAs	1	3	14	34	15	67	3.88 (0.86)
Turnitin® identifies students' use of 'weak' sources.							
Instructors	0	4	26	21	2	53	3.40 (0.69)
TAs	3	10	36	15	3	67	3.07 (0.86)
The Turnitin® originality report is easy to interpret.							
Instructors	0	5	3	30	14	52	3.94 (1.00)
TAs	1	4	14	28	20	67	3.92 (0.94)
The Turnitin® originality report provides useful information.							
Instructors	0	2	4	27	20	53	4.23 (0.75)
TAs	1	3	8	45	10	67	3.90 (0.76)
The GradeMark feature is useful.							
Instructors	0	4	11	7	13	35	3.83 (1.07)
TAs	2	3	11	13	10	39	3.67 (1.11)

Instructors and TAs were asked to state why they would or would not recommend Turnitin® to colleagues. Instructors would recommend Turnitin® as an effective and efficient plagiarism detection tool: "Not only does it make it easy to catch cheaters, even more importantly (because more frequently) it helps me identify which students need help improving citation hygiene." They would also recommend Turnitin® for its GradeMark[1] feature: "The analysis of files is useful but I prefer Turnitin® for the capabilities offered by GradeMark. I find the GradeMark tools to be superior to those offered by LEARN." One TA noted, "It is a great place to start if you have concerns about a student's writing (but not the be all to end all), and the GradeMark feature is a time-saver."

Students were not asked about ease of use, directly, but they were asked to rate their satisfaction with Turnitin® and were given the opportunity to provide comments on Turnitin®. Approximately half of students (51%, *n* = 424) were either satisfied or very satisfied with being asked to submit an assignment to Turnitin® for plagiarism detection, 30% (*n* = 244) were unsure, and 9% (*n* = 70) of students reported being either dissatisfied or strongly dissatisfied. With regard to being asked to submit an assignment to Turnitin® for educational purposes and providing the opportunity for formative self-assessment, 33% (*n* = 274) of students reported being either satisfied or very satisfied, 16% (*n* = 131) were unsure, and <2% (*n* = 14) were either dissatisfied or strongly

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[1] The GradeMark feature allows instructors to add comments online to the student's submission (i.e., without having to download the submission).

dissatisfied, although 49% (*n* = 401) left the question blank. Students' comments were generally positive; for example one student stated that it was a "very helpful tool that should be used in more courses."

Ways in which Instructors Use Turnitin®

Respondents were asked about their use of Turnitin® for plagiarism detection and for education purposes, which was defined as allowing students to run their draft submission through the software so they can view the results before submitting their final paper for grading. As shown in Figure 1, Turnitin® is more commonly used solely as a plagiarism detection tool rather than combined as an educational and plagiarism detection tool.
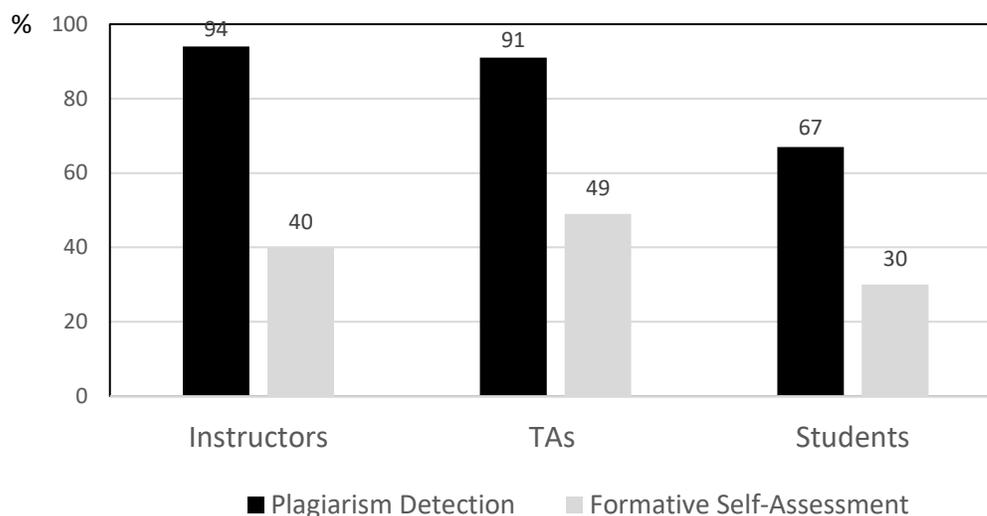

Figure 1. Use of Turnitin® for plagiarism detection versus formative self-assessment.

The majority of instructors reported that using Turnitin® to detect plagiarism was either "somewhat important" (21%, *n* = 11) or "very important" (58%, *n* = 31), whereas only 29% (*n* = 15) reported that using Turnitin® for educational purposes was either "somewhat important" (12%, *n* = 6) or "very important" (17%, *n* = 9). Over half (57%, *n* = 465) of the students would like their instructors to use Turnitin® for educational purposes compared with 19% (n = 152) who would not. One TA supported the use of Turnitin® for formative self-assessment: "It would be better for students if they can get access to Turnitin® all the time" (i.e., meaning Turnitin® use for draft submissions).

Students' Concerns about Turnitin®

We asked instructors and TAs if they thought students had concerns about using Turnitin® and we asked students if they were concerned. Forty-seven per cent (*n* = 25) of instructors and 40% (*n* = 26) of TAs perceived that students have no concerns about using Turnitin®, whereas 70% (*n* = 572) of students reported having no concerns about using Turnitin®. Fourteen per cent (*n* = 117) of students reported having concerns, and 16% (*n* = 131) left the question blank. While 70% of students reported not having any concerns with this tool, 149 students provided comments in the open text field under the question regarding concerns about Turnitin®. Two main themes

regarding concerns emerged from the content analysis of the responses: those surrounding increased stress; and those about privacy, security, and intellectual property.

Students' concerns regarding accuracy increase stress. Several students (n = 54) expressed concerns of being falsely accused of plagiarism. These concerns are accompanied by increased stress and the fear of accidentally plagiarizing. As one student explained, "For submissions that are very similar due to grading requirements, Turnitin® (sic) will throw huges (sic) spikes in percent matched even though students were forced to have a submission based on particular guidelines." Even students who do their best not to plagiarize fear serious consequences of accidentally plagiarizing:

> I do my best to never plagarize (sic), but sometimes if turn it in (sic) says I plagiarized (sic), I'm afraid it may be a black mark on my record for something not actually my fault, but rather a sensetivity (sic) error.

Another student commented, "although I am confident I don't plygerise (sic) from websites, it makes me nervous that I may mistakenly include something in a paper that would affect my degree or be unable to finish the course." Some students linked fear of accidental plagiarism with the inability to see their originality report: "I'm always afraid I am accidentally plagarising (sic). If teachers are expecting us to use this software we should be able to see our work first."

Few students ($n = 4$) commented that instructors' use of Turnitin® solely for plagiarism detection indicates a lack of trust and respect for students. For example, one student stated:

> instead of using this as a tool to encourage students to correctly format their work and educating students on correct citing/paraphrasing/research, professors present this tool in a negative light and often publicize it in a threatening way. It's discouraging and disrespectful…

Concerns about privacy, security, third party use and intellectual property. All three groups mentioned students' concerns about their intellectual property and security (n = 39). As one TA commented, "Turnitin® gains value from having students submit to it, while the students frequently do not benefit from submitting to Turnitin®." TAs also expressed concerns that student work become the property of Turnitin®: "Privacy implications, particularly for courses where we may argue certain points of view, and do not need it quote-unquote leaking years down the road." According to instructors, few students voice concerns to them about Turnitin®: "I have only ever heard one complaint. It had to do with retention of intellectual rights. The student was a PhD student interested in publishing the work." Students expressed several concerns related to privacy and security: "I am glad that academic integrity is being upheld at the University, but I do not like the idea of my work (and often my student number) being stored in a third-party database somewhere," "My thoughts and opinions are sent to a 3rd party company not based in Canada. I have no control over how the information will be used," and "I don't like my intellectual property being used for a for-profit company." These concerns were echoed in other open-ended survey question around satisfaction with, and additional comments about, Turnitin®.

Use of Turnitin® Resources

Respondents were asked if they had used any resources on Turnitin® such as web-based teaching tip sheets on Turnitin® from the university's Centre for Teaching Excellence (CTE); Turnitin® guidelines; a Turnitin® FAQ webpage; resources on the University's Office of Academic Integrity webpage; the Turnitin® website; or other, unspecified resources. As Figure 2 indicates, use of Turnitin® resources was low for all participants. Some examples of "other" include the university's information technology services, other universities' webpages, and the Internet.
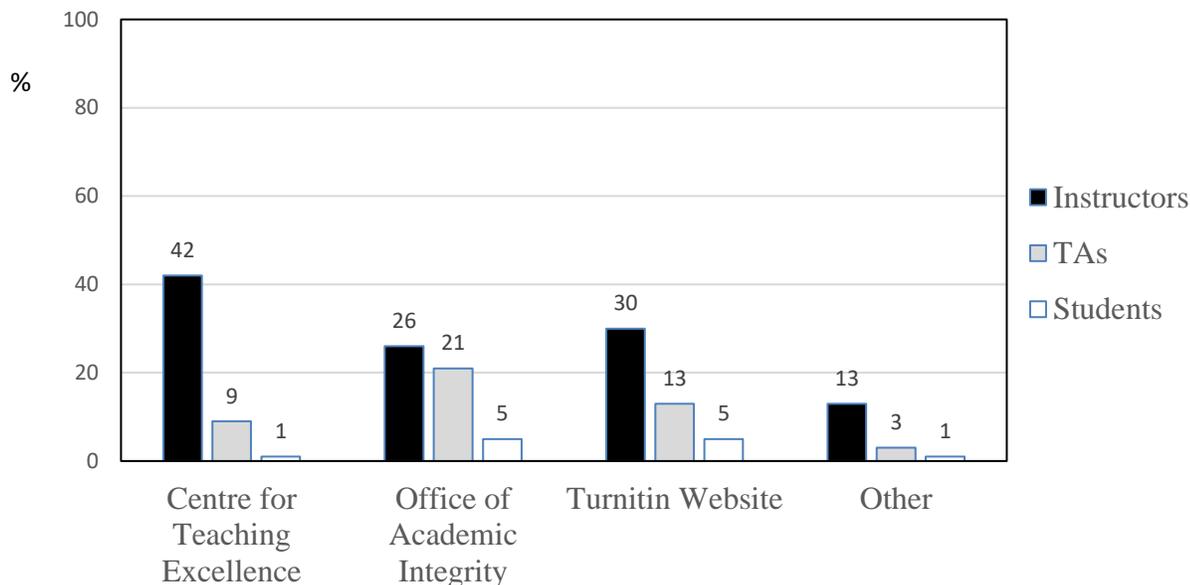

Figure 2. Use of Turnitin® resources.

Students' Resource Needs

Students were asked the question "What do you feel your instructors could have better explained regarding the expectations for written assignments? Their responses indicated a need for clear expectations regarding the assignment and the expectations for citation style. Students also stated that they need rubrics that explain how it is graded, examples of previous assignments, and where to go for help with writing and citing sources. In addition, they need information on how Turnitin® works, how to understand Turnitin® results, and where to go for help if accused of plagiarizing. One student commented, "it'd be helpful if instructors provided a complete sample paper with title page, references/works cited, and a bibliography." Another one commented that the instructor "could have better explained where to go for writing help, what to do if Turnitin® says you plagiarized when you didn't, etc."

Other comments related to the need for more information on how to use Turnitin® ($n = 9$) as well as a desire to be able to use Turnitin® for formative self-assessment ($n = 5$). With regard to Turnitin® use, students gave fervent comments such as "Educate students more on it!" and "Please discuss this with students. I find I do not know nearly as much as I should EVERY term. This is a very consistent result." Their desire to use Turnitin® as a learning tool was evident by comments such as "I feel i (sic) can learn to write better if I can actually see the results/grade I

got" and "It would be helpful if students had the option to check their work on Turnitin® before submitting it to the professor." Students need more information on how Turnitin® works: "How long is my written info stored? Do others have access to it?" "Is the entire process automatic? Is it securely stored? Where is it stored? How long is the information stored for? Who is liable in the case of a security breach?"

Students commented that instructors do not allow them to see their reports, and they do not explain how Turnitin® works or why it was used. Half of students (51%, $n = 422$) reported that their instructor explained Turnitin® and why it was being used in class and 43% ($n = 352$) reported that their instructor did not explain Turnitin® and why it was being used in that class. As illustrated in the following quotes, students need more information and transparency around the use of Turnitin®, from their instructor: "I don't actually know what it does, how long it stores my paper, or what that means for me." "It's not very transparent/seems like a black box," "I was never shown how to properly use Turnitin® (sic), and I felt that I was unable to use it to full effectiveness." "what level is acceptable? If it is in blue and green I thought it was ok. But apparently not." and

> I honestly never know which of my reports or labs are even used in conjunction with Turnitin®. Additionally, we aren't told the results of such a plagiarism scan. It is hard to judge if something is useful if I don't even know what is actually occurring behind the scenes with admin.

One instructor echoed the need to provide students with more information on Turnitin®:

> I explain what Turnitin® is and that they can opt out of it and what would need to be set in place if they opt out. I also explain why some students may wish to opt out. Students do not have enough information given to them about Turnitin®.

Students also expressed dissatisfaction with the alternative to Turnitin®. One student commented, "The 'alternative' to Turnitin® is a Hobson's choice, no student willingly will do more work in this busy environment so they opt to surrender their work to Turnitin® for for-profit use," and another stated "It was practically forced upon us to use turn it in (sic), the alternative options are tedious and not worth the effort."

Discussion

In this study, we set out to explore four primary objectives: 1) satisfaction with Turnitin® and its features, 2) ways in which instructors use Turnitin®, 3) students' concerns about using Turnitin®, and 4) the extent to which participants use existing Turnitin® resources. The majority of our participants had used Turnitin® at least once or twice and Turnitin® use was moderately correlated with self-reported familiarity with Turnitin® ($r = 0.40$, $p = .003$ for instructors; $r = 0.42$, $p < .001$ for TAs; and $r = 0.29$, $p < .001$ for students), indicating that those who use it more often have a better understanding of this tool. Although it is possible that instructors who are not very familiar with Turnitin® are less likely to use it in the first place, this would not be true for TAs or students, since only instructors (not TAs or students) are in the position of making decisions about whether or not to use Turnitin®.

The low uptake of Turnitin® as an educational tool might reflect instructors' preference; however, it is also possible that instructors simply need more information on how to use Turnitin® in this way. Efforts to increase the number of instructors who use Turnitin® as an educational tool include improving messaging and information for instructors.

Satisfaction with Turnitin®

In general, most participants were satisfied with Turnitin® and had positive views of Turnitin®. This finding is consistent with Buckley and Cowap (2013) who found that instructors consider Turnitin® to be a useful tool for detecting plagiarism as well as for online marking through the GradeMark tool. The areas of dissatisfaction among instructors concerned the user interface. It is difficult to know if we captured an accurate picture of students' satisfaction with Turnitin® because almost half (49%) of the students in our sample left this question blank. The fact that many students were unaware that they were using Turnitin® is a major limitation of our study, and this is described in greater detail, below.

Ways in which Instructors use Turnitin®

Our survey showed low use of Turnitin® as an educational tool, for formative self-assessment. For example, in addition to having students submit only their final paper to Turnitin® for plagiarism detection, instructors can provide students with a learning opportunity to run a draft of their paper through Turnitin®, access the originality report, and then make revisions before submitting their final version for grading. Instructors can also incorporate the originality report itself into an assignment that asks students to reflect on the originality report and comment on the changes that they made as a result of reviewing it. However, simply giving students access to Turnitin® for drafts is insufficient and could lead to patchwriting and attempts to game the system (Pecorari, 2013). Instead, Turnitin® should be used as part of a more comprehensive intervention in which students receive guidance and instruction on citation and paraphrasing (Emerson, Rees, & MacKay, 2005; Lofstrum & Kupila, 2013; Pecorari, 2013). The need for instruction is further supported by Rolfe (2011) who found that students need more than just the opportunity to review their originality report and make changes. Although our institution uses an integrity approach to academic integrity, our de-centralized model of administration means that instructors have freedom to decide how they want to use Turnitin®.

It should be noted that, at the time of our survey, Turnitin® was described on course outlines as "plagiarism detection" software along with a statement that students could opt out of Turnitin® and use an alternative. We should also note that we assumed that instructors who used Turnitin® as an educational tool were also using it as a plagiarism detection tool.

As evident in our survey, in many cases, the opt-out alternative is considered to be onerous and unreasonable, leaving students with the feeling that they have little choice but to use Turnitin®. As a result, the Office of Academic Integrity proposed to change the official description of Turnitin® from a "plagiarism detection" product to a "text matching" tool, which the University adopted the term after our survey was conducted.

Students' Concerns about Turnitin®

Our finding that 70% (*n* = 572) of students had no concerns regarding Turnitin® is consistent with Chew and colleagues' (2015) work that Turnitin® did not engender feelings of mistrust in students. It should be noted, however, that 18% (*n* = 146) of students in our sample used the open-ended response option to express concerns. This is consistent with Green and colleagues' (2005) finding that many students have two main concerns about using Turnitin®: increased anxiety of being falsely accused of plagiarism, and concerns about their work contributing to the database in a for profit company. The concern expressed by some of our students about privacy has been reported by Savage (2004). Because of this concern, and the fact that our students' papers are stored on a server in the United States, our institution mandates that instructors must provide students with an alternative to Turnitin®. Some students considered the alternative to be problematic because it was an onerous task. In the future, when instructors inform students that Turnitin® will be used in the course, they can address students' common concerns by referring to our findings and the work of Green and colleagues (2005) and Savage (2004). In addition, better alternatives to using Turnitin® could be developed for students, and additional information could be provided to instructors on how to develop comparable alternatives.

Use of Turnitin® Resources

Overall use of Turnitin® resources was low for all three groups: below 50% among instructors, below 25% among TAs, and 5% or lower among students. It is interesting to note that more instructors reported seeking Turnitin® resources at the CTE than at the Office of Academic Integrity or the Turnitin® website (42%, versus 26% and 30% respectively). This finding may reflect the model of support provided by the CTE in that instructors at our institution typically can turn to their Faculty Liaison for questions related to teaching and educational technologies. By contrast, more TAs reported seeking Turnitin® resources from the Office of Academic Integrity compared to CTE or the Turnitin® website (21% versus 9% and 13% respectively). This could indicate that TAs are less aware that they, too, can turn to CTE for this type of support. The finding that 1% of students sought Turnitin® resources on the CTE website is not surprising, as we would not expect students to turn to a support unit that is primarily focused on teaching support. However, considering the confusion that students expressed in their open-ended comments, it is concerning that only 5% looked for resources on the Office of Academic Integrity or the Turnitin® website. These findings suggest that the need for improved communications about Turnitin® with all three groups. After completing this study, we revised our Turnitin® guidelines for instructors and we created new guidelines for students. We also created a new process map called the Turnitin® Quick Guide (one version for instructors and one for students) which summarizes what Turnitin® it and how it works. In addition, since some of the more invasive provisions in the PATRIOT ACT have recently been repealed, our university no longer quotes the Act in its boilerplate text that appears in course syllabi, although text concerning student privacy and security was retained.

One unanticipated finding was students' need for more information from their instructors. Further work is needed to explain Turnitin® to students as many of them did not realize that they are using Turnitin®. Instructors could remedy this by being more explicit – rather than relying on the statement on the syllabus, instructors could talk about what Turnitin® is, how they are using it in the course, and how to interpret the similarity index and originality report. Many instructors would benefit from having this information readily available. Therefore, since the completion of

our study, we have prepared Turnitin® Quick Guides for instructors, TAs, and students. With regard to the Turnitin® alternative, we feel that additional information would help instructors understand the rationale for providing students with an alternative as well as information on what a reasonable alternative looks like.

Limitations

On the student surveys, the high number of blank responses and comments such as "I have no idea how to use it, do you not have to pay?" suggest that some survey questions may have been confusing to participants. It is surprising that only 67% ($n = 549$) of students reported being in a course where the instructor used Turnitin® for plagiarism detection purposes because our survey targeted only courses in which instructors requested that Turnitin® be enabled. It may be that the software was available to the instructor, but they did not actually use it in their course. This suggests that students were confused by what was meant by "educational tool" even though that was defined in the survey. It might also be that some students do not realize that they are "using" Turnitin® when they submit to a dropbox, especially if their high school experience with Turnitin® involved submitting their assignment directly to a Turnitin® website. We believe a number of students do not recognize that they are submitted their assignment to Turnitin® because they might have missed seeing the Turnitin® icon on the dropbox in the learning management system and may not have read the course syllabus closely enough to notice the Turnitin® statement. Several students made comments such as "How do we know if our teacher used it or not?" and "I couldn't figure out how to use it." "On [the learning management system] I see no proof of Turnitin® software and it would be helpful to actually see the Turnitin® results of my paper [I] submit. As one TA commented, "Some students do not understand that [the learning management system] DropBox is Turnitin®." For this reason, students' qualitative responses may be more representative of their actual experience with using Turnitin® than the quantitative data.

Conclusions

Our main conclusion, based on both quantitative results and content analysis of our open-ended questions, is that there is a need for improvements in communication and messaging about Turnitin® at our institution. This appears to be the case for all three groups, regardless of how Turnitin® is used. Our findings suggest that including a written statement about Turnitin® on the course syllabus is insufficient means of communicating to students that the instructor is using this tool in the course. As was evident in the comments, students, instructors, and TAs all need more information about Turnitin®.

In addition to improving the message that informs students that Turnitin® is being used in the course, instructors might benefit from improving our messaging regarding the possibility of using Turnitin® as an educational tool for self-assessment along as well as what constitutes a reasonable alternative to provide students who opt out of using Turnitin®. For TAs, information about Turnitin® could be incorporated into formal TA training sessions that TAs receive at the beginning of the term. Additional information on Turnitin® can be delivered to students through the learning management system, on the course syllabus, verbally from the instructor and/or TA in class, and informally at office visits with the instructor or TA. Improving the messaging for instructors is challenging because Turnitin® training is not mandatory for instructors. If instructors feel that they already have a good understanding of Turnitin®, they might not feel the need to

attend to information or utilize new resources. Conversely, if instructors have never learned about Turnitin®, they might just opt not to explore the tool at all.

Perhaps raising awareness and providing more effective messaging would lead to increased use of the available resources on Turnitin® that are provided on the University's website. Future work on the best ways of communicating information to students is also warranted. It is perhaps more challenging to address communication issues with instructors because they are an independent group and Turnitin® is not mandatory. Since students reported finding value in being able to see their originality report and make changes before submitting their final assignment for grading, we conclude that use of Turnitin® for formative self-assessment should be further explored.

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