

THE ROLE OF THE INTERNET IN ACADEMIC HONESTY: A COMPARISON OF ENGINEERING AND BUSINESS STUDENTS

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Abstract: This paper explores students' attitudes towards and engagement in plagiarism arising from the use of printed and internet sources, comparing students from engineering and business courses and taking into account the gender variable. A questionnaire was administered to a sample of 708 undergraduate university students at an Irish institution. Concurring with much of the existing literature; analysis of the data show that females report less engagement in plagiarism and hold stronger ethical views about it than males. The discipline variable was not found to be associated with students' ethical views regarding plagiarist behaviours, but business students declared to engage in plagiarism to a lesser extent than engineering students particularly when it involved the internet. Findings also suggest that engineering students are more likely than business students to use the internet as a source for un-referenced text. Overall students think that using the internet to plagiarise is less wrong than copying from other sources. The results are discussed in the context of existing literature.

Keywords: plagiarism, academic honesty, engineering education, internet sources, gender differences.

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1. INTRODUCTION

Although academic dishonesty is not a new phenomenon, it has been brought to the forefront in recent decades, especially in the light of the ease of access to information that the Internet has made possible. Much of the literature on academic honesty has been built upon students' own reports of their perceptions and behaviour, mainly in relation to perceptions of peer behaviour (Franklyn-Stokes and Newstead, 1995; McCabe and Trevino, 1997; McCabe et al., 2001, 2002; Vandehey, Diekhoff, and LaBeff, 2007; Whitley, 1998; Williams and Janosik, 2007); ethical views (Chaky and Diekhoff, 2002; Franklyn-Stokes and Newstead, 1995; McCabe and Trevino, 1993; McCabe et al., 2002; Scanlon and Neumann, 2002); and gender (Elzubeir and Rizk, 2003; Franklyn-Stokes and Newstead, 1995; Genereux and McLeod, 1995; Hendershott et al., 1999; Koul et al., 2009; Selwyn, 2008a, 2008b; Tibbetts, 1997, 1999; Underwood and Szabo, 2003; Whitley, 2001; Whitley et al., 1999). However few studies have explored students' views according to discipline and almost none have approached differences across different

disciplines. This study addresses this gap in the existing literature by comparing reported engagement in plagiarism and ethical views about plagiarism in a sample of business and engineering students, taking into account gender and internet use. The aim of the study is to understand the impact of discipline and gender on attitudes towards and engagement in plagiarism. Additionally, the impact of the internet on plagiarism is examined. To this end the following three questions are posed:

- Question 1: Are there differences between students' engagement in and ethical views of plagiarism based on discipline?
- Question 2: Are there differences between students' engagement in and ethical views of plagiarism based on gender?
- Question 3: Are there differences between students' engagement in and ethical views of internet based and non-internet based plagiarism?

2. METHOD

2.1 Data Collection

A structured questionnaire was administered to a convenience sample of business and engineering, students at the University of Limerick using independent researchers¹. The students were all in either their first year or second year of study and were all subject to the same policies and procedures with regard to plagiarism. The questionnaires were administered in class settings, thus reducing the self-selection bias that electronic questionnaires usually introduce. The anonymity and confidentiality of the responses was guaranteed in writing at the beginning of the questionnaire.

2.2 Research Instrument

The questionnaire was an adaptation of Scanlon and Neumann's (2002) research measures exploring ethical attitudes towards plagiarism and self-reported engagement in plagiarism. Students were presented with the six scenarios, the first three based on non-internet plagiarism and second three based on internet enabled plagiarism:

1. Copying text and inserting it in a paper without citation
2. Copying an entire paper without citation
3. Asking someone for (or buying) a paper and submitting it as your own
4. Using the Internet to copy text and insert it in your paper without citation
5. Using the Internet to copy an entire paper without citation and submitting it as your own
6. Using the Internet to ask for (or purchasing) a paper and submitting it as your own.

Students were asked to indicate how often they engaged in the above activities and also whether they considered it wrong to engage in these activities. Responses were recorded using a five point Likert-type scale ranging from 1 (*never*) to 5 (*very frequently*) and from 1 (*strongly agree*) to 5 (*strongly disagree*) as appropriate. Newstead et al. (1996) noted the paradox of requiring survey participants to provide honest reports of their own dishonesty. This study sought to minimise the effect of this paradox by approaching the exploration of plagiarism using self-reports in combination with applied measures of students' understanding of the issue.

¹ The authors would like to thank the following University of Limerick academics for providing access to their classes; Dr Walter Stanley and Dr Michael Walsh (Faculty of Science and Engineering), and Dr Elaine Berkery (Kemmy Business School)

Data were analysed using Statistical Package for Social Sciences (SPSS) to identify significant differences between the students' responses based on their discipline and gender. Because of the ordinal nature of the data collected a non-parametric alternative to the *t*-test, the Mann-Whitney *U* test (Norusis, 2008) is used to test for significant differences between the groups studied. However, mean rather than median values of the students' responses are presented in Table 1 to provide a more meaningful insight into the different attitudes based on discipline and gender.

3. RESULTS

3.1 Overview of Data

Seven hundred and eight students participated in the study. The gender ratio of the overall sample was 39% female (N = 278) and 61% male (N = 429), with 37% (N = 266) studying engineering and 63% (N = 442) studying business. The majority of female students (87%) were taking business while the majority of male students (53%) were taking engineering.

How often do you engage in....¹	All	Male Engineers	Female Engineers	Male Business	Female Business	<i>p</i>-value
Copying text and inserting it in a paper without citation.	1.66	1.78	1.86	1.67	1.52	.007*
Copying an entire paper without citation.	1.15	1.21	1.22	1.16	1.07	.029*
Asking someone for (or buying) a paper and submitting it as your own.	1.20	1.26	1.17	1.24	1.11	.050*
Using the Internet to copy text and insert it in your paper without citation.	1.63	1.84	1.78	1.62	1.43	.000*
Using the Internet to copy an entire paper without citation and submitting it as your own.	1.13	1.20	1.22	1.12	1.06	.008*
Using the Internet to ask for (or purchasing) a paper and submitting it as your own.	1.10	1.18	1.19	1.05	1.06	.004*
You consider it wrong to engage in....²	All	Male Engineers	Female Engineers	Male Business	Female Business	<i>p</i>-value
Copying text and inserting it in a paper without citation.	1.80	1.90	1.72	1.84	1.68	.127
Copying an entire paper without citation.	1.44	1.55	1.28	1.47	1.32	.077
Asking someone for (or buying) a paper and submitting it as your own.	1.45	1.52	1.42	1.47	1.35	.296
Using the Internet to copy text and insert it in your paper without citation.	1.76	1.85	1.69	1.84	1.63	.104
Using the Internet to copy an entire paper without citation and submitting it as your own.	1.36	1.48	1.19	1.35	1.28	.121
Using the Internet to ask for (or purchasing) a paper and submitting it as your own.	1.37	1.46	1.31	1.36	1.29	.280

Note 1: Scale 1 = *Never* to 5 = *Very Frequently*.

Note 2: Scale 1 = *Strongly Agree* to 5 = *Strongly Disagree*

* Statistically significant, $p \leq 0.05$

Table 1: Summary Sample by Discipline and Gender (Mean values)

In Table 1 four groups of students are identified; Male Engineers (N = 229, 32%), Female Engineers (N = 37, 5%), Male Business (N = 200, 28%) and Female Business (N = 242, 34%). The summary of the sample is shown in Table 1 presents the mean responses to the two questions asked about each of the six scenarios presented to the students and also the results of an analysis of variance (ANOVA) between the four groups.

The questionnaire also asked students whether or not they had received any teaching on academic honesty, 42% of engineering students and 23% of business students answered that they had received such training.

The data presented in Table 1 suggest that there are differences between the four groups of students identified but that these differences relate to students' engagement in plagiarism rather than their ethical views. In other words, all students regardless of gender or discipline agree that plagiarism is wrong, whether or not the internet is involved, but despite this some students engage in plagiarism to a significantly higher level than others. A more detailed analysis of the data based on the three questions posed in the introduction follows.

3.2 Discipline based differences

Discipline based differences between engagement in and ethical views towards plagiarism are shown in Table 2. For each question the responses of all engineers are compared with those of all business (All). In addition, male engineers are compared with male business (Male) and female engineers are compared with female business (Female). The results confirm that there are no statistically significant differences between the ethical views of engineering and business students, but that there are differences between the levels of engagement of both groups. In five of the six scenarios presented engineering students are more likely to engage in plagiarism than business students. When this is broken down by gender fewer differences emerge. Male engineering students are more likely to use the internet for the purpose of plagiarism than male business students and female engineering students are more likely to copy text and insert it in a paper without citation (using the internet or not) than female business students.

	How often do you engage in... ¹			You consider it wrong to engage in... ²		
	All	Male	Female	All	Male	Female
Copying text and inserting it in a paper without citation.	.008*	.330	.024*	.059	.342	.529
Copying an entire paper without citation.	.017*	.329	.132	.284	.928	.701
Asking someone for (or buying) a paper and submitting it as your own.	.234	.782	.813	.230	.908	.301
Using the Internet to copy text and insert it in your paper without citation.	.000*	.004*	.018*	.266	.959	.530
Using the Internet to copy an entire paper without citation and submitting it as your own.	.031*	.460	.131	.257	.549	.500
Using the Internet to ask for (or purchasing) a paper and submitting it as your own.	.001*	.002*	.316	.168	.552	.879

* Statistically significant, $p \leq 0.05$, Mann Whitney U Test

Table 2: Differences between engineering and business students (p -values)

In summary, the answer to Question 1 is; yes, there are differences between students' engagement in plagiarism based on discipline but; no, there are no differences in students' ethical views of plagiarism based on discipline.

3.3 Gender based differences

Gender based differences between engagement in and ethical views of plagiarism are examined in Table 3. For each question the responses of all male students are compared with those of all female students (All). In addition, male engineering students are compared with female engineering students (Engineers) and male business studies students are compared with female business studies students (Business).

	How often do you engage in.... ¹			You consider it wrong to engage in.... ²		
	All	Engineers	Business	All	Engineers	Business
Copying text and inserting it in a paper without citation.	.035*	.498	.083	.055	.528	.254
Copying an entire paper without citation.	.039*	.961	.121	.002*	.134	.011*
Asking someone for (or buying) a paper and submitting it as your own.	.003*	.347	.007*	.131	.908	.151
Using the Internet to copy text and insert it in your paper without citation.	.000*	.477	.009*	.032*	.644	.061
Using the Internet to copy an entire paper without citation and submitting it as your own.	.045*	.959	.096	.046*	.150	.234
Using the Internet to ask for (or purchasing) a paper and submitting it as your own.	.290	.721	.397	.040*	.275	.178

* Statistically significant, $p \leq 0.05$, Mann Whitney U Test

Table 3: Differences between male and female students (p -values)

The data show that in all except one of the scenarios presented male students are statistically more likely to engage in plagiarism than female students. This difference is not seen within the engineering students where both male and female students are equally likely to plagiarise. But, male business students are more likely to engage in some forms of plagiarism than their female counterparts. Statistical differences are also found between the ethical views of male and female students, in four of the scenarios presented females are found to have higher ethical standards than males.

Based on this analysis the answer to Question 2 is yes, there are differences between students' engagement in and ethical views of plagiarism based on gender.

3.4 Internet based differences

To analyse the differences between students' engagement in and attitudes towards internet enabled and non-internet plagiarism their responses to the first three scenarios are compared with their responses to the second three scenarios. These comparisons are conducted within each of the four groups of students involved in this study and the results are shown in Table 4 below. Students are less likely to use the internet to ask for a paper to submit as their own, in other words they are more inclined to ask for papers using other means. Female business studies students are less likely to use the internet to copy text without citation. In terms of ethical views, students consider it more acceptable to use the internet to plagiarise than to use non-internet means.

These findings suggest that there are differences between students' engagement in and ethical views of internet based and non-internet based plagiarism, the answer to Question 3 is yes.

	All	Male Engineers	Female Engineers	Male Business	Female Business
How often do you engage in....¹					
<i>Internet vs non-internet</i> copying text and inserting it in a paper without citation.	.266	.238	.206	.406	.039*
<i>Internet vs non-internet</i> copying an entire paper without citation.	.458	.464	.480	.441	.926
<i>Internet vs non-internet</i> asking someone for (or buying) a paper and submitting it as your own.	.000*	.028*	.414	.000*	.114
You consider it wrong to engage in....²					
<i>Internet vs non-internet</i> copying text and inserting it in a paper without citation.	.184	.346	.635	.721	.170
<i>Internet vs non-internet</i> copying an entire paper without citation.	.002*	.090	.236	.026*	.349
<i>Internet vs non-internet</i> asking someone for (or buying) a paper and submitting it as your own.	.000*	.132	.326	.013*	.033*

* Statistically significant, $p \leq 0.05$, Mann Whitney U Test

Table 4: Differences between internet enabled and non-interneted plagiarism (p -values)

5. DISCUSSION

Analysis of the data (Table 1) shows that overall, students across the sample declare to hold high ethical views regarding plagiarism, and report low levels of engagement in such behaviour. This result is very similar to the level of reported use of uncited online and printed sources found by Rettinger and Kramer (2009) and Scanlon and Neumann (2002). The measures used in this study were taken from Scanlon and Neumann (2002) allowing a direct comparison of results. The results from the Irish study were lower than those reported by Scanlon and Neumann, for example, the mean value reported for copying text and inserting it without citation in the Scanlon and Neumann study was 2.04, compared to 1.66 in this study. The other measures follow a similar trend. This finding suggests that the students who participated in this study report lower rates of engagement in plagiarism than the participants in other studies.

Findings according to gender are consistent with much of the existing literature. Academic offences tend to be more ethically acceptable to males as reported by Underwood and Szabo (2003) and Whitley (2001). Also, female students were significantly less likely than males to report that they would engage in dishonest educational practices, according to findings by Elzubeir and Rizk (2003), Genereux and McLeod (1995), and Newstead et al. (1996). Interestingly, we found indications that moral beliefs play an important role in women's plagiarism intentions, while it does not seem to be such an issue for males, as also argued by Tibbetts (1997, 1999). The authors attribute this tendency to higher levels of anticipated shame among women and less self-control among men, which accounted for most of the variation in cheating intentions between women and men.

Regarding discipline, we have noted that engineering students were more likely to have engaged in plagiarist behaviour than business students despite the fact that almost twice as many engineering students claim to have received training in academic honesty. This is

consistent with findings elsewhere indicating that reported cheating was more common in science, technology and engineering students than those in other disciplines (Carpenter, et al., 2006; Newstead et al., 1996). However, the ethical views of engineering students were no different than the views of business students suggesting a dissonance between what engineering students believed and what they actually did. Engineering students are also significantly more likely to use the internet to engage in plagiaristic behaviour, this could possibly be due to the fact that engineering students are more comfortable with the use of technology.

6. CONCLUSIONS

The findings discussed here have painted a descriptive and preliminary picture of a complex reality, without making assumptions of causal relationships between variables. Male students and engineering students are more likely to engage in plagiaristic behaviour than female or business students, this is broadly in line with the results of previous studies. The findings seem to point to the need for further attention to plagiarism policies in both engineering and business courses, and its likely relation to writing and literacy skills. This is relevant in the context of a curriculum that promotes transferable skills across all disciplines. Specifically the training on academic honesty received by engineering students needs to be examined.

While we have contributed with some additional evidence to the narrow body of literature existing on discipline-specific views and behaviours on plagiarism, much remains to be done to explore the underlying variables that may explain the blatant differences found.

Further research must also address lecturer perceptions and teaching approaches to plagiarism prevention by discipline, as it is likely that these factors have a strong influence on students' behaviours and views.

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