

# Influences on Cheating Practice of Graduate Students in IT Courses: What are the Factors?

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## ABSTRACT

This paper presents an analysis of results of a survey of graduate students in IT courses that aimed to gain an understanding of their views of cheating and knowledge of their cheating practice. The survey was part of an investigation into the cheating behaviour of IT students within the Faculty of Information Technology of Monash University. Using a factor analysis technique, categories of cheating behaviour and categories of reasons that could cause cheating or prevent cheating were identified. These were then used to determine possible influences on different types of cheating behaviour. A search of the literature has shown that there is a scarcity of studies of cheating behaviour of IT students, especially at the graduate level. The results of this study are informing an education program and development of policy on student cheating within our Faculty.

## Categories and Subject Descriptors

K.3.2 [Computers and Education]: Computer and Information Science Education - *computer science education*

## General Terms

Human Factors

## Keywords

Cheating, plagiarism, graduate students, information technology

## 1. INTRODUCTION

The prevalence of student cheating within our universities is a serious problem that affects the integrity of these institutions and their courses. For many years research studies have consistently reported high levels of cheating amongst tertiary students, however there are concerns that the problem is increasing. Over the last decade, several large studies have found alarmingly high levels of cheating, with between 88% to 92% of students reporting to have engaged in some form of academic misconduct [7,12]. Of further concern is that many of the students in these studies admitted to cheating on more than one occasion.

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Of interest to IT educators is the cheating behaviour of students within IT courses. Although a search of the literature found no specific studies of IT students, indications are that there is a high level of cheating in the IT discipline. Newstead, Franklyn-Stokes and Armstead [12], in a study of 943 undergraduate students, found that computing, which was categorised under technology, second only to science in levels of cheating. Lipson and McGavern [9] in a study of cheating at MIT found that 50% of 891 students surveyed felt that cheating was more likely in computer programming courses. An added difficulty when trying to understand the cheating behaviour of IT students, is that reported levels of cheating have been found to vary significantly across disciplines of study, so findings from studies of students in other disciplines should not be used to give an understanding of what occurs in the IT discipline [1,3].

Most research on student cheating in universities has focused on the undergraduate cohort; a literature search found very few studies of the cheating behaviour of graduate students and no comparative studies of undergraduate and graduate students. However, if we consider findings by Haines [8] that students who cheat less tend to be more mature then we would expect to find a difference in cheating behaviour between undergraduate and graduate students. The few studies of graduate students that were found indicate that cheating is a problem in graduate programs. A study of 207 graduate business students by Brown [2] found that 80% of the students admitted to having engaged in some form of unethical practice. Love [10], in a qualitative study, found evidence of cheating within three Masters programs. Reported incidents of practices such as collusion on assignment work, a doctoral student submitting a paper for assessment in two different classes, and a graduate student caught stealing test papers, give insights into serious unethical practices occurring in graduate programs [10].

To address effectively the problem of student cheating, it is important to have an understanding of student perceptions of what constitutes cheating and what influences them to cheat or not to cheat. Previous papers have reported the students' attitudes to a range of questionable behaviours [4] and their views on what influences cheating behaviour [5]. This paper presents results of an analysis to determine types of cheating practices and the particular motivations for these. This is part of a larger study that is investigating the cheating behaviour of undergraduate and postgraduate students in the Faculty of Information Technology (FIT). The longer-term aim of this project develop an education program to educate IT students and academics on the problem of cheating, and assist in the development of an informed policy on student academic misconduct within our Faculty.

## 2. FACTORS WHICH INFLUENCE CHEATING

To address the issue of cheating it is important to have an understanding of what constitutes cheating behaviour. When considering student cheating in tertiary institutions there are many aspects to consider. It is therefore not surprising that a search of the literature has shown a lack of any simple definitions. The difficulty of clearly defining cheating is exacerbated by differences across institutions, across disciplines of study, and across courses [11]. Typically cheating is described in terms of a series of practices, which cover a range of areas that can be defined as illegal, unethical, immoral or against the regulations of the course or institution. In an attempt to clarify an understanding of cheating behaviour various studies have attempted to categorise these behaviours. Some studies have described cheating with four constructs: cheating on tests or assignments, plagiarism, inappropriate use of resources and theft or mutilation of resources [6]. Lipson and McGavern [9] categorised a list of 18 cheating practices into: cheating in exams, gross plagiarism, less serious forms of plagiarism such as not acknowledging someone else's work, and cheating on set homework. Newstead, Franklyn-Stokes and Armstead [12] used a factor analysis to categorise 21 cheating behaviours based on students ratings of whether the behaviour constituted cheating. This identified five categories: cheating on coursework (plagiarism or data manipulation), cheating on coursework (collaboration), cheating on exams (collusion), lying, cheating on exams (non-collaborative).

All of the above studies have focussed on undergraduate students. It is of interest in our study to describe categories of cheating as determined by our graduate students.

Of importance when exploring student cheating behaviour is determining the influences on this behaviour. Very few studies were found which have investigated factors that cause or prevent cheating amongst graduate students. The study by Brown [2] showed that the most commonly stated graduate students' reasons for unethical behaviour were to get a high grade, time pressures or laziness. These factors were also found by Love [10] who identified 13 factors that would inhibit cheating and five which would contribute to cheating. However, as this was a qualitative study of only six students, it is not reasonable to generalise these findings, and the relative importance of each of these factors cannot be determined.

Cheating is a complex issue. Considering the many possible cheating practices that students may engage in, and the different influences on cheating behaviour, it is important to look for underlying factors to help understand this problem. This study explored the use of factor analysis to identify categories of cheating behaviours and explore influences on cheating behaviour of graduate students. Factor analysis is an exploratory technique used to find meaningful structure underlying a number of variables. It is used to reduce a set of variables to a manageable number of dimensions or factors. There are typically two stages to a factor analysis: an *extraction*, which is used to determine the number of factors, and a *rotation*, which is used to obtain a clearer view of the factors making these factors more interpretable. The number of factors that are chosen to be interpreted from the extraction depends on whether meaningful interpretations can be placed on the set of factors produced. The factor analysis performed in this study used a Principal Axis Factoring extraction and a Varimax rotation with Kaiser normalization.

## 3. RESEARCH METHOD

### 3.1 Participants

Students from selected postgraduate (graduate diploma and Masters) subjects from each year level of FIT courses were invited to participate in this study. One hundred and twelve students participated. Approximately two thirds of the students were male; approximately two thirds were full time students. The mean age of the group was 28.5.

### 3.2 Procedure

To gather information about the cheating attitudes and behaviours of the graduate IT students it was decided to use a paper-based survey. A questionnaire was designed by staff in FIT and was trialed by staff and students before it was administered to the students. Ethics approval for the study was gained from the Monash Standing Committee on Ethics in Research involving Humans (SCERH).

A paper questionnaire was given to the students in their tutorial classes near the end of second semester 2000. Participation was voluntary. In order to maximise the return rate and encourage honest responses the questionnaire was anonymous. Most students chose to participate and returned a completed questionnaire.

### 3.3 Survey Questionnaire

The survey questionnaire contained questions to determine:

- demographic information
- students' ratings of the acceptability of various questionable work practices described in 18 different scenarios
- students' practice and knowledge of others practising each questionable work practice
- reasons which could cause cheating
- reasons which could prevent cheating

Other questions sought students' responses to the cheating behaviour of other students, and their opinions of staff and University attitudes to cheating. These results have been reported in other papers [4,5].

### 3.4 Questionable work practice scenarios

The 18 scenarios were designed by staff within FIT. These described different cheating practices, which, although fictitious, were situations which staff had encountered in their experiences as educators of IT students or were sourced from other studies found in a literature search [11,12]. The scenarios were referred to as "questionable work practices", so as not to prejudice the students' judgements of their acceptability. The scenarios ranged from mild to serious forms of cheating. In addition, two scenarios that were not considered by staff to be cheating were included to encourage students to discriminate between the practices. It was interesting to note that this did appear to happen as no students gave identical responses to all questions. Brief descriptions of the scenarios are given Table 1 and a copy of the Questionable Work Practices survey questionnaire with the full description of the scenarios can be found at: <http://cerg.csse.monash.edu.au/reports/>.

## 4. RESULTS AND DISCUSSION

The analysis of the survey data to determine influence on cheating behaviour was conducted in several stages. First, a factor analysis was conducted on the students' ratings of the questionable work practice scenarios to determine a set of cheating categories. Then, using these categories, the students who had performed (by their

own admission) any of the practices in each cheating category were determined. This gave a group of cheating and a group of non-cheating students for each cheating category.

Factor analyses were then performed on the reasons for cheating variables and the reasons for not cheating variables, reducing these to smaller sets of *influence* constructs. The mean of each rating was determined within each construct for each student.

Finally, the influence of the reasons for cheating and reasons for not cheating on the cheating behaviour of students within each cheating category was determined by comparing the mean ratings of reasons for each *influence* construct of the cheating and non-cheating groups.

## 4.1 Cheating Factors

The analysis in this section determines the cheating categories. For each scenario, the students were asked to rate how acceptable the work practice was, using a 5-point Likert scale, where 1 indicates *acceptable* and 5 indicates *not acceptable*. The students' ratings of acceptability of the scenarios were analysed using a factor analysis. The initial factor analysis yielded five factors with eigenvalues<sup>1</sup> greater than 1.0. However, the fifth eigenvalue was very close to 1.0 and an examination of the scree plot<sup>2</sup> indicated that a four factors solution should be investigated. Examination of the variable loadings within the rotated factor matrix of the four

factor solution, indicated interpretable results for each factor, and this was deemed more interpretable than the five factor solution.

The factor structure for the four factor solution is shown in Table 1. This solution accounted for 46.9% of the total variance. Using a minimum variable loading of |0.38|, all but two scenarios show a clear loading on one factor. Scenario 9 loaded on two factors and scenario 18 did not load on any factor. Scenario 18 involved a form of cheating by non action, which did not fit with any of the other scenarios. Ferrell and Daniel [6] also did not categorise this practice in the cheating constructs they determined in their study. The interpretation of each factor is as follows:

Factor 1: Exam cheating, fraud, plagiarism.

Factor 2: Major plagiarism (copying entire piece of work, stealing).

Factor 3: Minor plagiarism (copying from a resource, resubmission).

Factor 4: Unacceptable assistance.

The factor structure was very similar to the four cheating categories found by Lipson and McGavern [9] in their study, however less similar to those found by Newstead, Franklyn-Stokes and Armstead [12] and Ferrell and Daniel [6].

**Table 1 Acceptability of cheating: rotated factor matrix**

Scenario	Factor			
	1	2	3	4
1. Using a hidden sheet of paper with important facts during an exam	.855			
2. Swapping assignments with a friend, so that each does one assignment, instead of doing both	.603			
3. Obtaining a medical certificate from a doctor to get an extension when you are not sick	.580			
4. Hiring someone to sit an exam for you	.554			
5. Hiring a person to write your assignment for you		.776		
6. Being given the answer to a tutorial exercise worth 5% by a class mate if the computer you used has problems		.649		
7. Taking a student's assignment from a lecturer's pigeonhole and copying it		.474		
8. Copying all of an assignment given to you by a friend		.473		
9. Copying another student's assignment from their computer without their knowledge and submitting it		.467	.443	
10. Copying material for an essay from the Internet			.841	
11. Copying material for an essay from a text book			.618	
12. Submitting a friend's assignment from a past running of the subject			.491	
13. Copying the majority of an assignment from a friend's assignment, but doing a fair bit of work yourself			.380	
14. Resubmitting an assignment from a previous subject in a new subject				.822
15. * Posting to an Internet newsgroup for assistance				.620
16. * Showing assignment work to a lecturer for guidance				.457
17. Two students collaborating on an assignment meant to be completed individually				.395
18. Not informing the tutor that an assignment has been given too high a mark				
Eigenvalues	2.29	2.26	1.99	1.91
Percentage of variance	12.7	12.6	11.0	10.7
* Scenario is not considered to be cheating in this study				

<sup>1</sup> An eigenvalue is a measure of the amount of variance accounted for in the set of variables.

<sup>2</sup> A scree plot is produced by plotting the eigenvalues against the factor number.

## 4.2 Reasons for Cheating Factors

The ratings of the likelihood of each reason causing cheating variables were analysed using a factor analysis. The factor analysis yielded four factors with eigenvalues greater than 1.0. Examination of the variable loadings within the rotated factor matrix, using a minimum variable loading of [0.43], indicate interpretable results for each factor. Three variables (3, 5 and 7) were salient within more than one factor and have been included in more than one factor. The factor structure is shown in Table 2. This solution accounted for 63.3% of the total variance. The interpretation of each factor is as follows:

Factor 1: Avoiding failure.

Factor 2: Improving results.

Factor 3: Not seeking advantage.

Factor 4: Finding work hard.

The first two factors which described pressure of workload and concerns about failure were similar influences to those found in studies of undergraduate students [12]. However, Brown [2], in a quantitative study of graduate students, found that laziness was a frequently mentioned reason.

**Table 2 Reasons for cheating: rotated factor matrix**

Reason	Factor			
	1	2	3	4
1. Too great a workload at university	.780			
2. Will fail otherwise	.737			
3. Afraid of failing	.722	.478		
4. Not enough time	.686			
5. Can't afford to fail	.623	.583		
6. Exams are too hard	.568			
7. Assignments are too hard	.502			.527
8. Need to get better marks		.658		
9. For monetary or other reward		.584		
10. Everyone does it		.498		
11. Parental pressure		.497		
12. Missed classes due to ill health			.776	
13. To help a friend			.656	
14. Lazy				.783
Eigenvalues	3.43	2.11	1.78	1.54
Percentage of variance	24.5	15.1	12.7	11.0

## 4.3 Reasons for Not Cheating Factors

The ratings of the likelihood of each reason preventing cheating were analysed using a factor analysis. The factor analysis yielded three factors with eigenvalues greater than 1.0. Examination of the variable loadings within the rotated factor matrix, using a minimum variable loading of [0.45], indicate interpretable results for each factor. Two reasons, "Fairness to other students" and "Against your religious beliefs", did not load clearly on any factor and have not been included in any factor structure. This factor structure is shown in Table 3. This solution accounted for 47.7% of the total variance. The interpretation of each factor is as follows:

Factor 1: Personal integrity.

Factor 2: Fear.

Factor 3: Never considered.

The first factor which describes pride and ownership of work has been found to be the main factors in preventing cheating in studies of undergraduate students [12].

**Table 3 Reasons for not cheating: rotated factor matrix**

Reason	Factor		
	1	2	3
1. Want to know what your work is worth	.772		
2. Pride in your work	.671		
3. Can get good marks without cheating	.602		
4. Against your moral values	.442		
5. Penalties if caught are too high		.822	
6. Fear of being found out		.684	
7. Never thought about it			.903
8. Don't know how to			.585
Eigenvalues	1.77	1.68	1.32
Percentage of variance	17.7	16.8	13.2

## 4.4 Extent of Cheating

Within each cheating category as determined in a previous section, the number of students who had performed at least one of the cheating practices was calculated. This gave a group of students who had cheated and a group who had not cheated in each category. These frequencies are shown in Table 4.

**Table 4 Percentages of students in each cheating category**

Cheating Category	Cheating students	Non cheating students
	%	%
Exam cheating, fraud, plagiarism	9	91
Major plagiarism	14	86
Minor plagiarism	37	63
Unacceptable assistance	38	62

## 4.5 Determining Influences on Cheating

To explore the impact of the various influences on different types of cheating behaviour that were determined in the previous sections, the mean ratings of reasons within each influence construct for the cheating and non cheating groups within each category were compared. These differences were tested using t-tests for independent groups. The results are presented under the four cheating categories:

**Factor 1: Exam cheating, fraud, plagiarism.** This factor involved cheating practices in exam situations and obtaining advantage by use of fraud. These were seen as the most serious forms of cheating by the students and were the scenarios that had been practised the least. However, it is of concern that 9% of the students in the study admitted to having practiced one of these scenarios at least once.

The students that had performed these practices indicated that there were various reasons that would cause them to cheat. They indicated that they were significantly more likely than the non cheating students to be influenced by workload pressures and concern about failure ( $t(107) = -3.14, p < 0.05$ ), and the need to improve their marks and various external pressures ( $t(106) = -2.61, p < 0.05$ ). However, examination of the factors that would prevent cheating showed that there were no differences between the two groups for these influences.

*Factor 2: Major plagiarism (copying entire piece of work, involving stealing)* This factor involved incidents of plagiarism where the student had stolen or copied an entire assessment task solution, generally from another student, with or without their knowledge. This was also seen as a serious form of cheating and worrying that 13% of the students admitted to this practice.

There were no differences between the cheating and non cheating students for any reasons that would influence them to practice these types of cheating. However, the non cheating students stated that they were significantly more likely than the cheating students to find that pride in their work and moral values ( $t(103) = 2.72, p < 0.05$ ) and fear of consequences ( $t(102) = -2.42, p < 0.05$ ) would influence them not to cheat.

*Factor 3: Minor plagiarism (copying from a book or Website, resubmission)* The scenarios in this factor described plagiarism incidents where material is taken from books, the Web, or other students. In contrast to the more serious forms of plagiarism described in Factor 2, in these practices the plagiarised material only forms part of the assessment work. The students rated this type of cheating as less serious than the practices in Factors 1 and 2. More than a third of the students reported that they had performed one of these practices.

The students that had practiced one of these forms of cheating rated each of the influences for cheating as more likely to cause cheating and the students who had not cheated rated each of the influences for not cheating as more likely to prevent cheating. Looking at this another way, the cheating students are less likely to be influenced by any of the reasons that would prevent them from cheating and the non-cheating students are less likely to be influenced by any of the reasons to cheat. These differences were all significant at the 0.05 level.

*Factor 4: Unacceptable assistance* The scenarios in this factor described practices that were minor forms of cheating such as collaborating on assignment work or practices that are usually not considered cheating, for example posting to the Internet for help. There were no differences between the cheating and non cheating groups in any of the factors that would cause cheating or prevent cheating for any of the scenarios in this factor.

## 5. CONCLUSION

To properly address the problem of student cheating, it is important to know the extent of students' cheating practice, and an understanding their perceptions of what constitutes cheating and factors which would influence their cheating behaviour.

The use of a factor analysis gave manageable sets of constructs to assist in understanding the influences on student cheating behaviour. The results showed that at least 10% of the students admitted to engaging in serious forms of cheating involving exams and plagiarism. They indicated that pressures of failure and workload are factors that influence them to cheat in exams. However, they indicated that pride in their work, a sense of moral

values, concern for other students and fear of punishment are factors which could influence them not to engage in serious forms of plagiarism. With less serious forms of cheating all factors identified were influences on cheating or preventing cheating.

These results indicate that helping students to manage their workloads and prepare for exams may reduce their need to cheat in exams, whereas engaging students in learning may reduce incidents of serious plagiarism. Furthermore, all of these strategies may help reduce the incidence of less serious forms of cheating.

This work will inform the development of an education program to educate IT students and academics on the problem of cheating and assist in the development of an informed policy on student academic misconduct. Further work will apply the technique used in this study to exploring the influences on cheating behaviour of our undergraduate students.

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