Investigating the probability of student cheating: The relevance of student characteristics, assessment items, perceptions of prevalence and history of engagement

Michael L Kremmer
Griffith Business School
Griffith University, Australia

Mark Brimble
Griffith Business School
Griffith University, Australia

Peta Stevenson-Clarke
Griffith Business School
Griffith University, Australia

Abstract

Academic dishonesty is a fundamental issue in terms of the educational integrity of higher education institutions. Accordingly, there is a growing pool of literature that examines this issue. This study adds to this literature by investigating factors that may influence student engagement in academic misconduct. We examine the influence of the type of assessment items, age, gender, nationality, discipline and level of study and the students' self-reported history of cheating. Drawing from a survey of 1,057 students across four major Queensland universities, we find that a student's age, gender and nationality are useful in explaining the probability of a student cheating. Our key finding, however, suggests that the likelihood that a student will engage in any given cheating behaviour is most strongly influenced by the extent to which the student engages in other forms of cheating, supporting the notion of 'once a cheat always a cheat'. We conclude that more needs to be done to combat a culture of acceptance of academic dishonesty and to minimise defensive misconduct by students who otherwise might not engage in such behaviour. We suggest that university administrators devote increased resources to this issue and develop mechanisms for managing and curtailing the level of academic misconduct. A failure to do so may result in a further undermining of the academic integrity of the Australian tertiary sector.

Introduction

The role of universities in the modern, knowledge-based economy has become the topic of much discussion and debate in recent times, extending across both popular and academic literature. Some argue that the core business of universities is twofold: teaching and research. Others suggest a broader role of fostering community and economic development. A significant pool of academic literature debates these issues (Batson, Ahmad, & Tsang, 2002; Bond & Paterson, 2005; Boyer, 1996; Bringle, Games, & Malloy, 1999; Bringle & Hatcher, 2002, among others). The interesting context to this literature is the growing recognition that the use of public funds by universities is attracting increasing attention from governments, who are

reconsidering the economic and social purpose of these institutions. This has led to calls for institutions to be more accountable for their use of these funds and to become more relevant to their communities rather than detached or adopting a universalist perspective (Bond & Paterson, 2005).

In the Nelson Report (2002), the Australian Commonwealth Government weighed into this debate, arguing that the role of higher education is "…much greater than preparing students for jobs", regarding higher education as "…contributing to the fulfilment of human and societal potential, the advancement of knowledge and social and economic progress". Indeed, the report states the main purposes of Australian higher education are to:

- "inspire and enable individuals to develop their capabilities to the highest potential
- enable individuals to learn throughout their lives
- advance knowledge and understanding
- aid the application of knowledge and understanding to the benefit of the economy and understanding
- enable individuals to adapt and learn
- contribute to a democratic, civilised society and promote the tolerance and debate that underpins it" (Nelson, p. 1).

Such aims are admirable, but there are several factors that mitigate the likelihood of these being achieved. One such factor is student academic misconduct since it directly undermines these goals, presenting a serious ethical and moral dilemma for universities. This factor becomes particularly pertinent when one considers recent literature suggesting that student academic dishonesty is not only prevalent in universities around the globe, but tends to be seriously underestimated at the institutional level (Brimble & Stevenson-Clarke, 2005; Bowers, 1963; Crown & Spiller, 1998; de Lambert, Ellen, & Taylor, 2003; Dick, Sheard, & Markham, 2001; McCabe & Trevino, 1996). It is further postulated by this research that factors such as technological advancement and a tendency toward increasingly large, impersonal and bureaucratic universities with relatively scarce resources to counter the problem have contributed to an increasing prevalence of student academic dishonesty (Bowers, 1963; McCabe, Trevino, & Butterfield, 1999). Additional concern arises from evidence of a divergence between the opinions of academics and students in relation to both the seriousness of various types of academic misconduct and the severity of penalties that should be attached to them. Students present a more tolerant view than academics in both respects (Brimble & Stevenson-Clarke, 2005; Bailey, 2001; de Lambert, Ellen, & Taylor 2003; Roberts & Toombs, 1993; Roig & Ballew, 1994). Such a culture of acceptance of academic misconduct within the student population serves only to weaken the academic integrity of our tertiary institutions.

Academic dishonesty therefore is a serious issue in terms of quality in learning, teaching and scholarship at tertiary institutions. We predict that universities in Australia will come under increasing pressure to manage this issue as governments increasingly adopt national measures of teaching and learning performance. The wider circulation of such data (including course experience questionnaires and graduate destinations data), together with public investigations of complaints over 'soft marking' and corruption in relation to teaching issues in a number of universities (see, for example, Elliot, 2003) have begun to put pressure on the teaching and learning policies and performance of all Australian universities. This raises academic misconduct as a serious issue for universities in light of the evidence of its prevalence. To counter this situation we need to understand more clearly the motivations of students and the factors that are likely to lead them to behave dishonestly. In this study we model the probability that a university student will cheat: individually, in collaboration with others, in their exams and in their assignments. In respect of each of these scenarios, we investigate the extent to which this probability

can be explained by the students' personal characteristics, their perception of the extent to which other students cheat and the extent to which they report cheating in other circumstances or during other forms of assessment.

The remainder of the paper is set out as follows. The next section provides a brief review of the literature. This is followed by a description of the data and an explanation of how the data set was constructed, along with a brief explanation of the logistic regression technique employed in the study. The empirical results are then presented and discussed, while the paper concludes with some observations and suggestions as to how this research might be usefully extended.

Literature review

The literature on academic dishonesty at the tertiary level has largely concentrated on developing our understanding of the prevalence, penalties and perceptions of dishonesty among students. This literature overwhelmingly concludes that academic dishonesty is highly prevalent in our institutions of higher education, that few students who engage in such behaviour are being caught, and that penalties for those who are caught are insufficient to act as an effective deterrent. For example, in one of the earliest published studies, Bowers in 1963 (cited in McCabe & Trevino, 1996) surveyed five thousand students across ninety-nine US university campuses. Three out of four students surveyed admitted to having engaged in at least one of thirteen 'questionable' activities, such as copying from another student during an examination, using unauthorised materials during an examination, padding out a bibliography or collaborating on assignments requiring individual work. The results were similar thirty years later in a follow-up study across the same campuses. It was found that while the overall proportion of students admitting to having engaged in such questionable activities had increased only modestly, the incidence of some activities (including cheating in examinations, helping others to cheat and collaborating on individual work) had risen dramatically, suggesting a shift in emphasis toward particular forms of cheating (McCabe & Bowers, 1994; McCabe & Trevino, 1995). Numerous other (predominantly US) studies have reported that student academic dishonesty is both prevalent and growing, including Hard, Conway and Moran (2006), McCabe, Trevino and Butterfield (2001), and Pincus and Schmelkin (2003).

A limited pool of Australian research also documents the prevalence of academic misconduct, as well as a lack of correspondence between the views of students and university academics with respect to what constitutes misconduct and how incidents of misconduct should be dealt with (see, for example, Brimble & Stevenson-Clarke, 2005 and 2006; Dick, Sheard, & Markham, 2001; Godfrey & Waugh, 1997; Marsden, Carroll, & Neill, 2005; Sheard, Dick, Markham, MacDonald & Walsh, 2002).

A number of factors have been suggested as contributing to what appears to be a global trend in the incidence of student academic misconduct, including: (1) a changing environment for tertiary education, where universities have become larger, less personal and more competitive, leading to increasing student cynicism toward academic dishonesty (McCabe & Trevino, 1996); (2) changing attitudes toward education, with universities increasingly regarded by students more as credentialing institutions than as educational institutions, allowing students to rationalise cheating more easily (Nonis & Swift, 2001); and (3) changing attitudes toward what constitutes acceptable behaviour, particularly in the business world, enabling students to justify more readily their own dishonest behaviour (Cole & Smith, 1995; Lawson, 2004).

Perhaps one of the most alarming aspects of the recent empirical findings regarding academic misconduct is the frequently observed gap between academic staff and students' perceptions of the seriousness of various forms of academic misconduct, and what appears to be growing acceptance of such behaviours by the student body

(see, for example, Brimble & Stevenson-Clarke, 2005; Roberts & Toombs, 1993; Whitley & Keith-Speigal, 2002). The gravity of this situation is compounded by suggestions of the academic community being under-resourced and too time-poor to deal effectively with the issue, and institutional management too often failing to take action on reported cases (see, for example, Brimble & Stevenson-Clarke, 2006; McCabe & Drinan, 1999; Pyvis, 2002; Schneider, 1999).

While the results of these Australian studies are broadly consistent with the US literature, there are multiple avenues for further research into academic misconduct in the Australian context. One such line of research involves investigating the factors, both 'individual' and 'situational', that influence the propensity of individuals to engage in academic misconduct.

In a review of empirical studies published in the US between 1972 and 1997, Crown and Spiller (1998) noted with respect to individual factors that while early studies suggested cheating was more prevalent among males, later studies documented an increase in female cheating, possibly arising out of a convergence of role requirements among males and females in the academic environment. These authors also documented mixed findings regarding whether older or younger students within the traditional age-span of seventeen to twenty-two years are more likely to cheat, while citing evidence that non-traditional age students cheat less. Strong empirical support was also noted for a negative correlation between academic ability and cheating (Crown & Spiller, 1998). With regard to situational factors, Crown and Spiller observed that there is strong empirical support for negative correlations between honour codes and cheating, and between the extent of surveillance and cheating.

Within the Australian context, Marsden et al. (2005), in an investigation of university students' self-reported exam cheating and plagiarism, observed significant associations with a number of individual factors including sex and age (male students and younger students were more dishonest) as well as with year of study (first year students cheated less) and field of study (engineering students were the least honest). Various US studies have also investigated whether students in particular fields of study are more likely to engage in academic dishonesty, with a number of these finding that business students are more likely than non-business students to self-report academic dishonesty (see, for example, McCabe & Trevino, 1995; McCabe & Trevino, 2006; Smyth & Davis, 2004). A further factor, often suggested anecdotally and demonstrated in recent Australian (Marshall & Garry, 2006) and UK (Mainka, Raeburn, & Earl, 2006) studies as being associated with greater participation in academic misconduct, is non-English speaking background (NESB); a factor likely to gain increasing research attention as the proportion of NESB students in English language universities continues to increase.

Concern over academic misconduct in universities is heightened upon consideration of the documented link between cheating in the classroom and cheating in the workplace (Lawson, 2004; Nonis & Swift, 2001; Sims, 1993). Recent events in the corporate world, such as the collapses of Enron, HIH and Barings Bank, the National Australia Bank derivates trading fraud and Australian Taxation Office investigations into the alleged use of offshore schemes by a number of high profile Australians to avoid tax, have helped focus attention on the issue of ethics in the workplace. Given the findings of Lawson, of Nonis and Swift, and of Sims, that students who engage in dishonest behaviour in their tertiary studies are more likely to engage in dishonest behaviour in the workplace, it becomes increasingly incumbent upon educational institutions to arrest the problem of student dishonesty since it is not just a matter of cheating for grades; rather the behaviour becomes part of one's moral and decision-making conscience. Therefore, it may be argued that universities have a role to play in not just creating technically competent and generically skilled graduates, but graduates with a sense of civic responsibility, morality and social justice; put simply, graduates who will 'do the right thing' by society. Clearly, the evidence of rife

academic misconduct in our tertiary institutions undermines the capacity of universities to achieve this.

An important part of understanding academic misconduct and working toward developing and implementing strategies for dealing with it is to understand what factors influence the propensity of students to engage in such behaviour. This study provides some insights into these factors through an examination of a number of variables examined in the earlier literature (including age, gender, nationality, field of study and level of study), together with two additional potential explanators (type of cheating and the pattern of cheating by students). These variables are used to model the probability that a student will cheat individually, collaboratively and in their examinations and assignments.

Data and methodology

The data used in this study were extracted from the results of a survey conducted across students at four major Queensland universities. The survey was administered during class times to 1,206 students, with 122 responses eliminated from the sample due to incomplete data, giving a final sample of student responses of 1,084. Details of the composition of the sample are provided in Appendix 1. The survey instrument described twenty different scenarios that could be interpreted as 'cheating' and invited students to answer a series of questions relating to each scenario, including whether the student had personally engaged in this behaviour. In effect, the students were given twenty opportunities to confess to cheating and so we created a dichotomous dummy variable taking the value one if a student confessed to the 'cheating' behaviour and zero otherwise.

The procedure was extended by classifying each cheating scenario upon the basis of: (a) the kind of assessment involved and (b) whether the scenario involved the collaboration of other students. The outcomes of this system of classification are presented in Table 1 (below).

Table 1
Survey Scenario Classification
Of the twenty scenarios described in the survey instrument, eleven could be classified

Scenario Number	Type of Cheating	Nature of Assessment	Scenario Number	Type of Cheating	Kind of Assessment
(1)	(2)	(3)	(4)	(5)	(6)
1	Individual	Exam	11	Collaborative	Assignment
2	Collaborative	Exam	12	Collaborative	Assignment
3	Individual	Exam	13	Individual	-
4	Collaborative	Exam	14	Individual	-
5	Collaborative	Exam	15	Individual	-
6	Collaborative	Exam	16	Individual	-
7	Individual	-	17	Collaborative	-
8	Collaborative	-	18	Individual	-
9	Individual	-	19	Collaborative	Assignment
10	Individual	-	20	Individual	Assignment

as referring to instances of cheating by individual students, while the other nine could be classified as acts of collaborative cheating requiring the active assistance of other students (see Table 1, second and fifth columns). We therefore created two more dummy variables, one to indicate whether the student had confessed to individual

cheating and the other to indicate whether a student had confessed to collaborative cheating. Furthermore, six of the scenarios could be unambiguously classified as relating to exams, while another four could be unambiguously classified as relating to cheating on assignments (see Table 1, third and sixth columns). This allowed us to create two more dummy variables to indicate whether a student had confessed to cheating in exams and to cheating in assignments.

In addition to constructing the five dummy dependent variables just described, we also constructed an independent variable indicating the students' perception of the prevalence of cheating. In respect of each of the twenty scenarios, the survey instrument asked students to indicate the percentage of other students they believed engaged in the particular kind of cheating described. These percentages were averaged over all twenty questions and over each of the five sub-categories previously described. We also obtained, from the survey instruments, data pertaining to the students' age, gender, nationality, faculty in which they were studying, major area of study and whether they were a graduate student. The descriptions and coding of these independent variables is indicated in Table 2 (below). With the exception of the age variable, which has five categories, and the variable indicating the average percentage of students a respondent believed to be involved in cheating, all other variables are binary, taking the values of either 0 or 1 as indicated. The resulting dataset consisted of 1,057 observations.

Table 2
Classification and Coding of Independent Variables

Variable	Variable Description	Coding	Condition
x_1	Age	1	Student is < 20 years old
x_1	Age	2	Student is between 20 and 25 years old
x_1	Age	3	Student is between 26 and 35 years old
x_1	Age	4	Student is between 36 and 45 years old
x_1	Age	5	Student is > 45 years old
x_2	Gender	1	Student is female
x_3	Nationality	1	Student is not Australian
x_4	Non Business	1	Student is not a business major
x_5	Grad Student	1	Student studying for masters degree
x_6	Accounting	1	Student is majoring in accounting
x_7	Perception	0 - 100	Average percentage of students believed to be involved in cheating

The methodology employed in this study is the logistic regression or logit model. The logit model assumes that we have a regression model:

(1)

$$y_i^* = \beta_0 + \sum_{j=i}^{k} \beta_j x_{ij} + u_i$$

where y_i^* is a 'latent' variable that is not observed. What is observed is a dummy variable, which is a dichotomous realisation of the latent variable.

$$y_i \equiv \begin{cases} 1 & \text{if} \quad y^* > 0 \\ 0 & \text{otherwise} \end{cases}$$

(2)

In this case the latent variable would be defined as the propensity to cheat while the observed variable simply indicates whether or not the student has reported cheating. The logistic regression uses the independent variables in (1) and the observed dummy variable in (2) to explain the log of the odds ratio or in this case the log of the odds in favour of a student cheating. The model is written as:

$$\ln\left(\frac{P_i}{1 - P_i}\right) = \beta_0 + \sum_{j=i}^{k} \beta_j x_{ij} + u_i$$

(3)

where P_i is the probability of a student cheating and ($1 - P_i$) is the probability of a student not cheating. The odds ratio, $P_i / (1 - P)$, thus refers to the odds in favour of a student cheating. The logit model tells us that the log of the odds ratio

$$\ln\left(\frac{P_i}{1 - P_i}\right)$$

is a linear function of the same variables that explain the latent variable in equation (1). The model in (3) is estimated by the method of maximum likelihood, which is available in most statistical analysis packages. The procedure uses y_i

(the observed dummy variable) as the dependent variable and the x_{ij} 's in (1 and 3) as the independent variables, as if one were running an ordinary least squares regression. The details of how the estimation is actually performed need not detain us but can be found in Maddala (1989).

The estimated parameters (the $\hat{\beta}_j$'s) are interpreted in much the same manner as those in an ordinary regression model; however, it must be remembered that the dependent variable explained by the independent variables and their estimated parameters is the log of the odds ratio. Therefore the estimated value of a particular

$\hat{\beta}_j$ indicates by how much $\ln\left(\frac{P_i}{1 = P_i}\right)$ will change in response to a one unit

change in its associated independent variable, not by how much P_i (the probability that a student will cheat) will change; though this is easily calculated if required.

Nevertheless, the sign of the estimated parameters $\hat{\beta}_{ij}$ has the intuitively obvious

interpretation. An estimated $\hat{\beta}_j$ parameter with a positive sign indicates that an increase in its associated variable will *ceteris paribus* increase the probability that a student will cheat, while a negative sign indicates that an increase in this variable will decrease the probability that a student will cheat. One can also take the anti-log of an

estimated parameter $e^{\hat{\beta}_{ij}}$, subtract 1 from it and multiply the result by 100 to obtain

the percentage change in the odds ratio for a unit increase in the associated independent variable.

Empirical results

The empirical results are presented in Table 3 (below), which is divided into eleven columns and five panels. Each of the five panels relates to a model that uses different dependent variables as previously described. The first is the model of all twenty scenarios in the survey, the second relates to those involving individual cheating, the next those involving collaborative cheating, and so on. For each model, the estimated parameters and their standard errors are given along with the percentage change in the odds of a student cheating given a unit change in the relevant variable. The final two columns provide two additional summary statistics: the standard error of the regressions and McFadden R-squared. The table is most instructively read down the columns so the effects of each variable as the model changes from one to another can be fully appreciated.

Beginning with the final column, column (11): McFadden R-squared, like the R^2 used in ordinary regression analysis, ranges from zero to one and is intended to give some indication of how well the model explains the log odds of, in this case, students cheating. Unfortunately it does not have the usual interpretation of explained/ unexplained variation in the dependent variable. Nevertheless, for the model of all forms of cheating the McFadden R-squared is 0.12, which would indicate that some important factors that go toward explaining cheating have been omitted. Interestingly, when we consider this statistic for the sub-category models, it is substantially higher. This increase can be attributed to the inclusion of a dummy variable, column (9), which takes the value of one if the student has indicated having cheated in ways other than those the model is investigating. For example, in the model investigating individual cheating this additional variable indicates the student has admitted to collaborative cheating, or *vice versa*. Similarly, in the model investigating cheating during exams this additional variable takes the value of one if the student has admitted to cheating in ways unrelated to exams; in the case of assignments, in ways unrelated to assignments.

Let us now turn our attention to column (2) which considers the effect of increasing age on the probability that a student cheats. For each model the estimated parameter has a negative sign, indicating that increasing age reduces the probability that a student cheats. Furthermore, the estimated parameters are significantly different from zero at either the five or one percent level, with the exception of the model for individual cheating. When we look at the average percentage decrease in the odds that a student cheats, that can be expected from a student moving from one age category to the next higher one, we find it ranges from -5.48 percent for individual cheating (though this is not significantly different from zero) to -28.34 percent for collaborative cheating. This suggests that while older students are less likely to cheat in general, those who do are neither more nor less likely to cheat on an individual basis than their younger peers. However, they are far less likely to engage in collaborative cheating, with a possible explanation being that older students are more likely to be part-time students, which mitigates the development of a social circle conducive to collaborative cheating.

We turn now to column (3) and the question of gender. Here we find that all other things held constant, a female student is far less likely to cheat than her male peers. For each model the estimated parameter is negative and, except for the models of collaborative and assignment cheating, statistically different from zero at the one percent level of significance. The two exceptions are of interest. Although the estimated parameter in the model of collaborative cheating is negative, it is only significant at the ten percent level, while that for assignment cheating is not significant at all. One possibility that might explain the difference between these results and

those for individual and exam cheating is that many women might not consider the scenarios that describe collaborative cheating on assignments to be cheating at all, but rather as providing innocent assistance to friends. Note this is speculation only. Given the similarity in the magnitudes of the estimated coefficients, and that most of the scenarios concerned with cheating on assignments involved collaborative cheating, this result suggests further investigation of this issue would be warranted in future research.

Moving on to column (4), we find that a student who is a foreign national is significantly less likely, overall, to report having cheated. On average, all other things held constant, we could expect the odds that a foreign national will cheat to be 31.98 percent lower than that of their Australian peers. However, when we turn to the results for exam cheating we find that on average, all other things held constant, we could expect the odds that a foreign national will cheat to be 56.6 percent higher than that of their Australian peers. Thus, it appears that exam cheating is the preferred form of academic dishonesty among foreign national students, leading us to speculate that these students believe that assignment cheating, particularly the various forms of plagiarism, are more easily detected when the student's mastery of written English may be poor, so that cheating in exams provides the only opportunity for 'enhancement' of results.

The results for non-business, graduate and accounting students, column (4) through column (6), can be dealt with as a group. In most cases the results indicate that these students do not significantly differ from their peers. The exception for the non-business student is cheating on exams, where the estimated parameter is positive and significant at the one percent level. This indicates that, all other things held constant, we can expect the odds of a non-business student cheating on their exams to be 68 percent higher than that of their business major peers. Likewise, the probability that a graduate student cheats on exams is significantly higher than that of non-graduate students; however, the probability that they cheat on assignments is significantly lower. This finding can perhaps be attributed to some form of 'learning from experience' effect with respect to exam cheating, and the fact that the topics of assignments undertaken by graduate students are more often selected by the student and involve an area in which they are interested. Finally, we consider the findings for accounting students. With the exception of the model for exam cheating, all of the estimated parameters are negative in sign. However, statistical significance is achieved for only two models: cheating in general and individual cheating, both of which are significant at only the 10 percent level. We thus find no persuasive evidence that accounting students behave any differently to their non-accounting peers with respect to cheating.

The most interesting and suggestive results of this study concern the last two estimated parameters: the perceived prevalence of cheating and engaging in other forms of cheating (columns (8) and (9), respectively). The estimated parameters in column (8) are all positive in sign and significantly different from zero at the one percent level. If we look at the effect of a one percent change in a student's perception of the average percentage of students who cheat, we can expect to see a percentage increase in the odds that that student will cheat of between 3.5 and 5.68 percent. Clearly, if students believe that cheating is pervasive they are more likely to cheat themselves. It can be argued that regardless of whether students are graded on a curve, where the successful cheat lowers every other student's grade, or upon the basis of absolute values, cheating debases the value of higher grades. If students believe that cheating is pervasive they may believe it necessary to cheat, defensively as it were, to protect their own relative and absolute standing, resulting in a self-fulfilling prophecy.

Table 3
Results of logistic repression models

Type of Cheating		Intercept	Age	Female Student	Foreign National	Non-Business Student	Graduate Student	Accounting Student	Perceived Prevalence of Cheating	Other Cheating	S.E	McFadden R-squared
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
All	β	1.835	-0.329***	-0.555***	-0.385**	0.327	0.046	-0.432*	0.055***	-	0.36	0.12
	s.e	0.338	0.085	0.185	0.181	0.218	0.298	0.224	0.009	-		
	%	-	-28.05	-42.59	-31.98	38.72	4.72	-35.1	5.64	-		
Individual	β	-0.095	-0.056	-0.487***	-0.301	0.253	-0.122	-0.42*	0.038***	2.436***	0.35	0.30
	s.e	0.331	0.092	0.185	0.188	0.224	0.318	0.238	0.007	0.197		
	%	-	-5.48	-38.53	-25.99	28.8	-11.5	-34.31	3.91	1043.28		
Collaborative	β	-1.146	-0.333***	-0.277*	0.008	0.182	0.233	-0.036	0.043***	2.518***	0.40	0.25
	s.e	0.315	0.079	0.159	0.163	0.191	0.275	0.214	0.007	0.201		
	%	-	-28.34	-24.19	0.8	20	26.2	-3.5	4.36	1140		
Exam	β	-2.383	-0.277***	-0.586***	0.446***	0.5***	1.065***	0.21	0.05***	1.937***	0.42	0.18
	s.e	0.338	0.082	0.153	0.157	0.181	0.292	0.203	0.008	0.233		
	%	-	-24.22	-44.3	56.2	64.8	190	23	5	594		
Assignment	β	-.188	-0.19**	-0.21	-0.042	0.007	-0.515**	-0.048	0.035***	2.058***	0.42	0.22
	s.e	0.277	0.078	0.15	0.154	0.179	0.26	0.201	0.005	0.161		
	%	-	-17.2	-18.9	-4.1	0.71	-40.2	-4.6	3.5	682		

Notes: *** Significant at the 1% level. ** Significant at the 5% level. * Significant at the 10% level.
The final parameter, in column (9), estimates the effect upon the log of the odds of a student cheating in one particular circumstance when they have reported cheating in other

different circumstances. As previously discussed, the inclusion of this variable doubled the size of the McFadden R-squared indicating that this variable effectively doubles the explanatory power of the models. In each model the estimated parameter is positive, extremely large and statistically significant at the one percent level. This suggests that the most important indication that a student will cheat in one way, or in one particular circumstance, is that they cheat in other ways and other circumstances. In fact, it provides persuasive evidence for the adage 'once a cheat, always a cheat'. When we consider the average percentage change that we can expect to see in the odds that a student will cheat given they have reported cheating in other situations and circumstances, the results are extraordinary. They range from an increase of 594 percent in the odds that a student will cheat on their exams to a 1,140 percent increase in the odds that the student will cheat on an individual basis. The implications of this finding are clear. Where a student is caught cheating for the first time, this should not be considered as being indicative of a single unfortunate event, but rather as indicative of a habitual and pervasive pattern of behaviour that has until this time gone undetected. Given that the probability of being detected cheating is low (Brimble & Stevenson-Clarke, 2006), it becomes obvious that if penalties for cheating are to have any deterrent effect, the expected cost of being caught cheating must exceed the benefits the student has obtained from their other undetected instances of cheating.

Discussion and conclusions

Academic misconduct is a continuing problem for tertiary institutions and one that directly impacts on the integrity of teaching, learning and scholarship within these institutions. A growing pool of literature from around the globe provides evidence of the high prevalence of this behaviour and a growing divergence of opinion between academic staff and students in terms of the acceptability of such behaviour and the penalties it should attract. This poses moral, financial and policy/management concerns for Australian universities in relation to their performance in teaching, learning and scholarship and how to respond to the issue of academic dishonesty.

The models presented here indicate that a student's personal characteristics, the program in which they are enrolled and their perception of the extent to which cheating is prevalent have some power to explain the probability that a student will cheat. For example, with respect to cheating in exams, it is more likely that a student will cheat if they are male, young, majoring in a discipline other than accounting, a graduate student or a foreign student. However, in terms of their explanatory power, these factors are trivial when compared to the increase in explanatory power obtained by including a variable to indicate the extent to which a student engages in other forms of cheating. Put simply, students cheat because they have cheated before, and the opportunity to cheat is again available.

These findings offer some guidance that may be useful to those in tertiary institutions developing policies and strategies to manage academic misconduct. While the results suggest that more needs to be done to combat a developing (already developed?) culture that engenders the acceptance of academic dishonesty, this is likely to be difficult to achieve when one considers a recent finding that 49 percent of students believed that college/university cheating is acceptable even though 85 percent thought it was ethically wrong (Grimes, 2004). Furthermore, Lawson (2004) and Grimes both suggest that increasing levels of student dishonesty may be reflective of the value systems being internalised by today's young people exposed to an almost daily media litany of fraud, bribery, insider trading and other forms of unethical behaviour in the 'real world'. We fear that cheating has become normative behaviour for today's students who are arguably under more pressure than ever before to achieve high grades to secure scholarships, well-paid employment and positions in graduate programs. It thus becomes increasingly important that university administrators understand the factors that cause and maintain cheating behaviour, in order to be better positioned to promote and engender ethical attitudes and

behaviours among students. Within the current environment, combating this issue will require a significant and sustained effort over time in order for the perceptions of students (and staff) to be changed. That is to say, there is no quick policy fix for this issue.

So what can universities do? The literature proposes a variety of strategies that may help reduce the incidence of academic dishonesty. The most intuitively appealing is the integrated approach in which universities develop a strategic plan for managing academic misconduct that utilises a number of strategies advocated in the literature. Such a program could include a number of strategies including: (1) reducing opportunities for students to engage in such behaviour through, for example, carefully designed assessment items and close supervision of examinations; (2) more thorough education of students in relation to what constitutes unacceptable behaviour and how to reference appropriately; (3) stricter enforcement of (appropriate) penalties for students who choose to engage in dishonest behaviour; (4) strengthening student codes of conduct (including education of staff and students about these as well as greater student involvement in their establishment and implementation); and (5) the modelling of ethical behaviour by faculty members. The success of such a strategy would depend on it being conducted in a coordinated and logical fashion at both the departmental and institutional levels, rather than being left up to individuals to apply at the course or subject level. Our results provide direction for tertiary institutions in terms of probability that particular cohorts of students will engage in dishonest behaviour and in what types of assessment items. In addition, our results in relation to students' perceived prevalence of cheating and the degree to which they engage in other forms of cheating, highlight the importance of the development of a culture in which academic dishonesty is not acceptable. We argue that this supports the integrated approach as influencing the culture of a tertiary organisation and the attitudes and behaviours of students will require a sustained whole of institution approach. We further suggest that given our evidence, and that of the prevalent literature, an investment in such an approach is more than justified.

In terms of further developing this line of research, there are several interesting questions suggested by this study's findings, and which we will attempt to answer in the future. The first pertains to how students' own cheating informs their perceptions of the extent to which cheating occurs in the general student population. The second relates to the extent to which students' own perceptions of what constitutes cheating explain their own cheating behaviour and how or if those perceptions might be amenable to change.

Author biography

Michael Kremmer is an econometrician with a broad range of teaching and research interests in empirical finance and applied microeconomics. Peta-Stevenson-Clarke's research interests are in capital markets, accounting theory and accounting education (the later with a particular bent towards academic dishonesty). Peta teaches a range of courses in Accounting, Accounting Theory and Financial Analysis. Mark Brimble teaches courses in finance and banking, with research interests in capital markets, personal finance and education.

References

Bailey, P. (2001). Academic misconduct: Responses from deans and nurse educators. *Journal of Nursing Education, 40*(3), 124-131.

Batson, C., Ahmad, N., & Tsang, J. (2002). Four motives for community involvement. *Journal of Social Issues, 58*(3), 429-445.

Bond, R. & Paterson, L. (2005). Coming down from the ivory tower? Academics' civic and economic engagement with the community. *Oxford Review of Education*, *31*(3), 331-351.

Bowers, W. (1963). *Student dishonesty and its control in college*, New York: Bureau of Applied Social Research, Columbia University.

Boyer, E. (1996). The scholarship of engagement. *Journal of Personality and Social* Psychology*, 57*, 792-807.

Brimble, M. & Stevenson-Clarke, P. (2005). Perceptions of the prevalence and seriousness of academic dishonesty in Australian universities. *Australian Educational Researcher, 32*(3), 19-44.

Brimble, M. & Stevenson-Clarke, P. (2006). Managing academic dishonesty in Australian universities: Implications for teaching, learning and scholarship. *Accounting, Accountability and Performance*, *12*(1), 32-63.

Bringle, R. & Hatcher, J. (2002). Campus-community partnerships: The terms of engagement. *Journal of Social Issues*, *58*(3), 503-516.

Bringle, R., Games, R., & Malloy, E. (1999). *Colleges and universities as citizens*, Boston: Allyn and Bacon.

Cole, B. & Smith, D. (1995). Effects of ethics instruction on the ethical perceptions of college business students. *Journal of Education for Business, 70*(6), 351-356.

Crown, D. & Spiller, M. (1998). Learning from the literature on collegiate cheating: A review of empirical research. *Journal of Business Ethics, 17*, 683-700.

de Lambert, K., Ellen, N. & Taylor, L. (2003). *Prevalence of academic dishonesty in tertiary institutions: The New Zealand story.* Working Paper, Christchurch College of Education.

Dick, M., Sheard, J. & Markham, S. (2001). *Is it OK to cheat? – the views of postgraduate students*. Proceedings of the 6th Annual SIGCSE/SIGCUE Conference on Innovation and Technology, Canterbury, UK.

Elliot, T. (2003, June 2). Top in enterprise, bottom in integrity. *Financial Times, London*, 13.

Grimes, P. (2004). Dishonesty in academics and business: A cross-cultural evaluation of student attitudes. *Journal of Business Ethics, 49*, 273-290.

Godfrey, J. & Waugh, R. (1997). Students' perceptions of cheating in Australian independent schools. *Education Australia, 37*, 14-16.

Hard, S., Conway, J., & Moran, A. (2006). Faculty and college student beliefs about the frequency of student academic misconduct. *Journal of Higher Education*, *77* (6), 1058-1080.

Lawson, R. (2004). Is classroom cheating related to business students' propensity to cheat in the 'real world'? *Journal of Business Ethics, 49*(2), 189-199.

Maddala, G. (1989). *Introduction to Econometrics*, New York: Macmillan Publishing Company.

Mainka, C., Raeburn, S., & Earl, S. (2006). A UK institution's university-wide approach to plagiarism: First results and recommendations. *International Journal for Educational Integrity, 2*(1), 13-25.

Marsden, H., Carroll, M., & Neill, J. (2005). Who cheats at university? A self-report study of dishonest academic behaviours in a sample of Australian university students. *Australian Journal of Psychology, 57*(1), 1-10.

Marshall, S. & Garry, M. (2006). NESB and ESB students' attitudes and perceptions of plagiarism. *International Journal of Educational Integrity, 2*(1), 26-37.

McCabe, D. & Bowers, W. (1994). Academic dishonesty among male college students: A thirty year perspective. *Journal of College Student Development, 35*, 3-10.

McCabe, D. & Drinan, P. (1999). Toward a culture of academic integrity. *The Chronicle of Higher Education, 46*(8), B7.

McCabe, D. & Pavela, G. (2000). Some good news about academic integrity, *Change*, *September/October,* 32-38.

McCabe, D. & Trevino, L. (1995). Cheating among business students: A challenge for business leaders and educators. *Journal of Management Education, 19*, 205-218.

McCabe, D. & Trevino, L. (1996). What we know about cheating in college. *Change, January/February,* 29-33.

McCabe, D., Trevino, L., & Butterfield, K. (1999). Academic integrity in honour code and non-honour code environments. *The Journal of Higher Education, 70*(2), 211-234.

McCabe, D., Trevino, L., & Butterfield, K. (2001). Dishonesty in academic environments. *The Journal of Higher Education, 72*(1), 29-45.

Nelson, B. (2002). *Higher education at the crossroads: An overview paper.* Department of Education, Science and Training.

Nonis, S. & Swift, C. (2001). An examination of the relationship between academic dishonesty and workplace dishonesty: A multicampus investigation. *Journal of Education for Business*, *Nov/Dec, 77*(2), 69-77.

Pincus, H. & Schmelkin, L. (2003). Faculty perception of academic dishonesty. *Journal of Higher Education, 74*(2), 196-209.

Pyvis, D. (2002). Plagiarism and managerialism. *Australian Universities Review, 45* (2), 31-36.

Roberts, D. & Toombs, R. (1993). A scale to assess perceptions of cheating in examination-related situations. *Educational and Psychological Measurement, 53*, 755-762.

Roig, M. & Ballew, C. (1994). Attitudes toward cheating of self and others by college students and professors. *The Psychological Record*, *44*(1), 3-12.

Schneider, A. (1999). Why professors don't do more to stop students who cheat, *The Chronicle of Higher Education*, *45*(20), A8-A10.

Sheard, J., Dick, M., Markham, S., Macdonald, I., & Walsh, M. (2002). *Cheating and plagiarism: Perceptions and practices of first year IT students.* Working Paper, Monash University.

Sims, R. (1993). The relationship between academic dishonesty and unethical business practices. *Journal of Education for Business, March/April*, 207-211.

Smyth, M. & Davis, J. (2004). Perceptions of dishonesty among two-year college students: Academic versus business situations. *Journal of Business Ethics, 51*, 63-73.

Whitley, B. & Keith-Spiegel, P. (2002). *Academic dishonesty: An educator's guide.* Lawrence Erlbaum Assoc.

	No. Respondents (%)	
Male	441 (40.7)	
Female	643 (59.3)	
< 20 years old	299 (27.6)	
20 - 25 years old	471 (43.5)	
26 - 35 years old	197 (18.2)	
36 - 45 years old	88 (8.1)	
> 45 years old	29 (2.7)	
Australian	653 (60.2)	
Not Australian	431 (39.8)	
Undergraduate	999 (92.2)	
Masters student	85 (7.8)	
Business major	Accounting	195 (18.0)
	Non-accounting	626 (57.7)
Non-business major		263 (24.3)

Note: Business major total 821 (75.7)

No.	Scenario
1	Copying from another student during a test.
2	One student allowing another to copy from them in a test.
3	Taking unauthorised material into a test – notes, pre-programmed calculator, etc.
4	Giving answers to another student by signals in a test.
5	Receiving answers from another student by signals in a test.
6	Getting someone else to pretend they are the student – impersonating the student in a
7	Continuing to write after a test has finished.
8	Gaining unauthorised access to test material before sitting - test paper, marking schedule, etc.
9	Requesting special consideration/deferred exam (e.g. for illness) knowing that the conditions are not genuinely met.
10	Padding out a bibliography with references that were not actually used.
11	Paying another person to complete an assignment.
12	Writing an assignment for someone else.
13	Paraphrasing information from a web site, book or periodical without referencing the source.
14	Copying information directly from a web site, book or periodical with reference to the source but no quote marks.
15	Copying information directly from a web site, book or periodical without referencing the source.
16	Copying information directly from another student's assignment (current or past) without their consent.
17	Copying information directly from another student's assignment (current or past) with their consent.
18	Falsifying the results of one's research.
19	Working together on an assignment when it should be individual.
20	Preventing other students' access to resources required to complete an assignment.