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Helping Cheats Prosper

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ABSTRACT

The current computing environment makes it easy to copy existing solutions and with minor alterations pass unoriginal material off as the student's own work. This has happened at the same time as an influx of students from different cultures into Western countries and arguably a development of our own culture that emphasises success over moral behaviour. The results are that instructors can no longer assume that they share an ethic with students in regard to cheating and that institutions claim to observe a sharp rise in the incidence of cheating. This paper explores the situation within which cheating occurs with a view to finding teaching approaches that get students to make use of resources in the computing environment in a way that develops their learning while discouraging cheating.

1. INTRODUCTION

As teaching staff, cheating worries us, offends us and takes up valuable time. US studies quoted in Michaels and Miethe (1989) quote a surprising range of figures for self-reported cheating from a low of 13% to a high of 95% of students studied who admitted to having cheated at some stage in their college careers. There is widespread concern by tertiary staff that cheating is on the increase. However, Spiller and Crown (1995) note that despite similar concerns held by American academics there is little supporting data. Where comparisons over time have been attempted, the different definitions of cheating used render the results suspect.

Cheating can be defined as activity aimed at giving a falsely favourable rating of the cheat's academic achievement. This covers exam cheating, various forms of using other peoples' work in assignments and in some US studies, dishonesty in self marked tests and homework exercises.

I will concentrate mainly on assignment cheating by students taking programming courses. Computing in some ways is a discipline that should lend itself to cheating. Code is a medium that suits copying. We are immersed in electronic communications and there are large numbers of reference sites on the web that supply detailed solutions to technical problems. Polytechs' urban legends include high tech personal communicators with infra-red beams, vast reams of downloaded notes in electronic dictionaries and web sites devoted to supplying professionally written assignments.

However on searching the web I found that the web resources specifically for cheating are geared towards sites that provide essays in humanities subjects.

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Computer programming does not appear to have the equivalent of school_sux.com. In part this may be because constructing individual programs to specific requirements is fairly expensive. Watch for enterprising Indian or Russian programmers reducing the price of a bespoke assignment solution to within the price range of Western students! On the other hand there are extensive libraries of code giving solutions to standard computer science problems. Experts-exchange.com provides answers to specific programming problems so that if a student could not find a bug in their code they could get help here or from sites and discussion groups supporting programmers who use particular languages. I have so far seen little evidence of students using such assistance, possibly because the cheats we meet in programming tend to be students who have a wide ranging confusion about the whole topic. As such they have difficulty framing questions that would obtain help from sites that tend to respond best to focussed enquiries. This certainly fits the pattern I see in students' emails to me on assignment issues.

When we look at how the programming students we catch engage in cheating, the reality is more often low tech. Another student's code is found on lost floppy disks. Students ask each other for detailed help with difficult parts of assignments or simply for copies of code. Code printouts are left in the paper recycle bins. Essay descriptions of how language features work are downloaded from Borland.com or similar sites and used without acknowledgement to provide material for research sections of assignments. I have had one of my advanced students download source code for a Delphi component from a web site without acknowledging it but this has been rare. In fact I generally have to bully and blackmail my students to go and look at web sites that provide programming extension material, students like staff, are coping with overload by excluding non-essentials.

2. DETECTING CHEATING

Staff detect cheating in fairly limited ways. We observe cheating behaviour in exams, we find identical answers or more importantly identical mistakes in code. We find that apparently illiterate students hand in assignments with isolated sections of grammatically enlightened prose. Those I catch are almost always the least competent students. I am never sure what percentage I catch of the total and whether I simply miss the cheats who are clever enough to change variable names and layout in code. There are the inevitable cases where there is suspicion, the student turns in work that is much better than ones estimate of their ability. However the evidence is often too vague to pursue. The final source that staff rely on in detecting cheating is student complaints. Students in general seem to be unwilling to report cheating by fellow students though as McCabe (1992) notes there is a greater likelihood of reporting dishonesty by other students if it involves exam situations. McCabe also notes that it appears that honour codes, that require honesty, define cheating and plagiarism and require students to report cheating by others, have little effect. From an internet discussion on cheating, "…in desperation we tried putting our students on their honour and still they all cheated like bandits". In this context a paper by Roig and Ballew (1994) shows that there is a wide gap between students attitudes to cheating and those of staff. Toig and Ballew administered an attitudinal scale to staff and students. The results from the scale could vary from 45 to -45 where -45 represents extremely negative attitudes to cheating. Staff attitudes were around -26 while student attitudes were around -4. Students were also asked to predict the attitudes of a typical staff member, they were reasonably accurate estimating around -24. However the students who admitted to most cheating predicted a somewhat less negative attitude on the part of staff, around -18.

3. STAFF RESPONSES

How do staff respond to cheating? I see a range of staff responses to cheating. Some turn a blind eye to all but the most flagrant cases, some devote time and energy appropriate to major fraud investigations, for these staff nailing the cheats becomes a personal crusade. Most staff seem to feel an aspect of broken trust and being personally let down by having their students cheat and can feel hurt and possibly vengeful. Institutions increasingly remove teaching staff from the process of establishing formal proof of cheating and determining its punishment. This reduces the risk of legal action but cautious official investigation and relatively minor penalties can leave staff highly frustrated as well as wasting considerable time.

What do staff see as the consequences of cheating? In conversation staff members offer the following reasons for combating cheating. Students who cheat are able to avoid work, thus they learn less and are less competent graduates. Such students are less motivated to extend themselves and there is the possibility that previously honest students become contaminated establishing a culture of cheating. In addition staff authority and the class atmosphere are undermined. There is a concern that the development of an institutional culture where cheating is the norm will lead to the quality of graduates and reputation of the qualification / institution being reduced.

I have heard it argued that the likelihood of unethical behaviour in later jobs increases if cheating is not stamped on and that cheating leads to a reduction of competence and responsibility for ones own efforts in the workforce. How true these assumptions are and how great such effects might be has not been investigated to my knowledge.

A counter view might propose that successful cheating has the effect of keeping a student in the learning environment. Given that the student learns some things without cheating, a medium term effect of cheating is to increase the amount of learning the student achieves. Studies quoted in Michaels and Miethe (1989) suggest that individual cheating declines over a student's college career, again a possible implication is that a few incidents of early cheating may allow the continuation of the career of someone who may become a worthwhile student.

One could also reframe the way in which we consider cheating by looking at shop-lifting. Here we have an activity which is bad, causes social costs and is a predictable and presumably fairly natural human response to piles of abundant and tempting goods. Store managers certainly attempt to prevent shop lifting, they also measure it on the grounds that if there is very little shop-lifting relative to the opportunity then the displays are not tempting enough to motivate honest shoppers to part with their money! If none of our students cheat are we presenting courses that are not challenging enough?

4. WHY STUDENTS CHEAT

When we look at why students cheat, Michaels and Miethe (1989) report that the students they studied state the strongest pressures to cheat came from; parental pressure on grades, insufficient study and having cheating friends. Interestingly poor quality instruction and courses was not rated as a significant pressure. Opportunity and lack of risk of being caught also contributed. However in McCabe's (1992) study students did cite poor lectures, overload and poor resources as some of the many justifications offered for cheating. In Michaels and Miethe's study only 14% of their sample were strictly non-cheaters (if they reported honestly!) The authors suggest that this means that cheating is normative behaviour. However when one looks at the detail they provide most students did not engage in repetitive cheating and while cheating levels in homework reached 78%, cheating in projects 28% and exams 42% was much lower. Note that students were classified as cheats if they said that they had ever cheated in a particular situation. The situation remains that despite the apparently alarming figures most students apparently completed most items of academic assessment without cheating. In general cheating does not seem to be a preferred option but one resorted to under pressure or, as McCabe reports, when the seriousness of the offence was perceived as low, for example in tests and homework rather than exams and projects.

5. CREATING THE CHEATING ENVIRONMENT

One of the themes of this paper is that we create the environment that shapes cheating. For example when we look at the question of when academic cheating began, Postman (1985) points out that examinations (and hence the possibility of cheating) are a comparatively recent innovation in tertiary education, first introduced at Oxford in the early 1800s. Previously evaluation was in terms of the tutor's estimate of the quality of the student's discussion and learning over long periods of direct one to one contact. In a sense it is this change in teaching and assessment methods that has made cheating part of tertiary education.

Another illustration of the theme is a possible difference between cheating in New Zealand and America. My impression of cheating in New Zealand is that the aim is to pass courses. In contrast in the States students are concerned with maintaining grade point averages and the pass/fail distinction is less black and white. I am repeatedly surprised by how little connection New Zealand students appear to make between grades and employment, their focus seems to me to be on getting the qualification, not on how well they have done in doing this. American students by contrast receive a continuing emphasis on their grade-point average and its relation to future opportunities. My impression is that this difference means that in NZ cheating is done by less able students who are in danger of failing while in the US cheating is more evenly spread across academic ability by students who know their grades are important for later opportunities. A study by Roig and DeTommaso (1995) did find a negative correlation between grade-point average and cheating but the correlation was small -0.27 indicating a significant spread of cheating behaviour across the ability range. Other studies cited by Roig and DeTommaso give one finding supporting their results and two findings of no relationship between grades and propensity to cheat. It would be interesting to gather data to see if my belief, that New Zealand has a clearly different cheating pattern, is justified.

6. CHEATING AND CULTURE

There have been occasions when staff have seen students from some overseas groups as more likely to cheat. Staff at a number of New Zealand institutions have reported that they associated the recent increase in cheating they felt was affecting their institution with an influx of overseas born (mainly Asian) students. I am not certain that this is an accurate impression. The first question is whether there is really more cheating among overseas born non English speaking students? Is it simply easier (for staff) to remember instances of cheating by people who are distinctive? Our overseas born non English speaking students have a significant language handicap. Note though that these students also contain a number who have significant preparation in terms of having overseas degrees, so lack of fluent English does not simply equate to poor ability to handle the courses. They are removed from the constraints imposed by day to day contact with their own family and society but at the same time they may be striving to meet demanding goals set by their, now remote, parents or funders. They have not necessarily adopted a loyalty to the new society and institution in which they find themselves. They study very hard to survive academically and this demands studying in groups. This may at times shift into cheating. I still note that I find the vast majority of my foreign born students do not cheat. A reasonable question might be whether under similar pressures, our locally born students would perform as honestly?

There are studies that show statistical national differences in attitudes to various forms of cheating, see Brilliant (1996), Buranen (1999), Burns *et al* (1998) Enker (1987) and Evans et al (1993) but the differences are not vast and it is hard to see them as having great importance given the wide spread in the levels of cheating found within US studies. I also suggest that one cannot safely generalise between studies of students acting within their own culture and the behaviour of our non English speaking students in the process of adapting to a foreign culture.

7. ENVIRONMENTAL CONTRIBUTIONS TO CHEATING

If we assume that cheating is not the student's preferred option we can ask what is it about the structure of the environment in which we place the student that encourages cheating? I do not claim that improving the environment will provide a complete answer. Some cheating will occur for reasons that are outside our control and as Michaels and Miethe (1989) point out students who form groups involved in cheating are likely to reinforce the values of the group and be less influenced by external factors. We will look at some aspects of the external environment and then consider contributions to cheating which are partly under the control of teaching staff.

7.1 Contributions from the External Environment

7.1.1 Overload

The increased amount that needs to be mastered in modern computing means that students are being faced with a near impossible task. Both staff and students suffer from the rapid expansion in topics that need to be covered in order to be a current computing expert. We already see an adaptation to overload in the short term "is it assessed?' focus adopted by students. Do we really see students as being opposed to general knowledge, or are they adopting a survival strategy. "Concentrate ruthlessly on what you need to know to pass – because passing is very hard and demands pruning the course materials down to essentials". Students are also aware that the facts taught in a computing course rapidly become out of date. The implication is that it is the act of passing that is relevant, not the knowledge gained from the course. Persuading students that career success comes from understanding the deeper context in which computing facts relate to each other and to the organisations served by computer systems, passes straight over the heads of those most likely to cheat!

7.1.2 Moral and Social Decline as an Explanation

It is tempting to look at today's students as a product of a degenerate culture that emphasises instant gratification and entertainment at the expense of the disciplined skills needed for long term achievement. Are our students lazy and is cheating just another manifestation of this? I see only a few "lazy" students. I ask myself is "lazy" a fair judgement in any case? I tend to see a mix in the poorly performing students, most have trouble with understanding, some are overloaded with paying work, some are more interested in other parts of their lives and may be highly motivated in these areas, a small minority are able but appear to trade on this to be "slack". I note though that I only see these students in the narrow confines of a few classes. Staff have a payoff from complaining

about "bad" students. We are not immune to the joys of the moral high ground but this may affect our accuracy. I do however see many students who manage their time remarkably poorly from my point of view. Procrastination can be seen as one measure of poor time management. However a study by Roig and DeTommaso (1995) found that there are no effects of the student's procrastination scores upon the likelihood of exam cheating. The authors found that there were only limited effects on the likelihood of plagiarism, (which is one way of completing written assignments in a hurry). However these findings may not be so directly relevant to programming assignments. Lack of organisational skills and self discipline do seem to be a major factor for those programming students who we see trying to complete work in doomed last minute bursts. If these students feel they have worked very hard on a project and that they would have completed it if only they had had more time, there may be a feeling that using someone else's work to complete the assignment is justified.

7.1.3 Mass Education

Mass education, I suggest, is education done on the cheap without admitting the shift in standards from the previous pattern of elite education. There has been a rapid shift to tying funding and institutional survival purely to student numbers, the policy crudely but accurately termed "bums in seats". This I see as a recipe for cheating. Reduced lecturer contact, more funding pressure on students since the state is unable to fund the greater numbers involved, less contact with the process in which students produce the product on which we assess them and reduced time available to staff for detailed marking are all potential contributors to increased cheating. More and more of our students have part time jobs, recent New Zealand material on part time work and homework suggests that students with part time jobs get by on far less than the official hours of prescribed coursework, but at a detriment to their academic achievement.

To fund our departments are we letting in students who are simply not up to the course demands? We have inherited an academic framework from a time only 20 – 30 years in the past when far fewer students went on to tertiary education. Higher education was strongly concentrated within an elite top 10 – 15% of society's intelligence range. The standards and courses were established to fit that level. We have now moved to higher education for a much broader group, say 40% of the population. Have we retained standards that are simply inappropriate? Do we encourage a wider range of students, tell them that their careers depend on their success and then set standards that guarantee some will fail? The response, in terms of cheating, seems drearily predictable.

7.2 Contributions to Cheating from the Class Environment

I have argued above that some factors predisposing cheating are not within the lecturer's control. However we can still ask are there ways in which lecturers make cheating more likely? I suggest the following:

- Course quality – If the course is seen as poor with material which is outdated and / or irrelevant to the student's needs and interests then students may take cheating less seriously. Michaels and Miethe (1989) suggest an attitude along the lines of "they pretend to teach and we pretend to learn".
- Mismatched standards – Are we teaching to standards that are beyond the reach of those we admit to our courses, or are we teaching to standards that suit our students but do not qualify them for their goals? Either seems to be a way of increasing the likelihood of cheating.
- Emotional distance – do we indicate that we do not care about our students achievements and values?
- Lack of enthusiasm for subject – do we indicate that the subject is uninteresting / unimportant or that we ourselves get by with a fairly limited understanding of the subject?
- Cheatable assessments – Are we asking for material that can be rote learnt, giving programming assignments that have standard answers, concentrating on does it work rather than does the student understand it, marking in such a way that cheating is easy.
- Do we set conditions that make cheating likely? For example, "Do not discuss your assignment with anyone except your lecturer." Discussion is natural, we are not in a position to supervise compliance with the requirement, I suggest the main effect is to make cheating happen as a result of the conditions we set.
- Overloading students – do we teach and assess in such a way that the course load is reasonable over all the courses the student is currently doing? How can we adjust the official total of hours that should be worked outside of class with the actual number of hours available, given students' part time work commitments etc. It seems to me that striking disparity between official requirements and what is actually possible or actually happening is another way of increasing the probability of cheating.

- Do we create a focus on passing rather than competence? If we suggest to students that passing the course is a goal in itself and focus on "How do you pass?" rather than "What do you need to know in industry?" we create an environment in which cheating is a way of meeting the given goal.

8. HELPING CHEATS PROSPER

I do not want to catch cheats, I want students to learn. Similarly I want to make learning more likely – a different focus from making cheating less likely. We have established that the part of the student's environment under the lecturer's control has only some influence on the likelihood of cheating. What we will look at in the concluding section of this paper are ways in which we can make cheating less relevant while attempting to promote learning. I find that the approaches given appear to work for me but they are open to the question of whether they lead to damaging spoon feeding?

9. SUGGESTIONS FOR AN ENVIRONMENT WHERE CHEATING IS LESS RELEVANT

- Make discussion between students legitimate. "Discuss your work with each other and with your tutor, but do not do someone else's work." I see discussion between students as a vital part of learning, of generating enthusiasm, of giving students ownership of ideas and of reducing workload, (mine included). I also see it as inevitable.
- Reserve the right to get students to explain their work to the tutor to clarify whether they understand the work they have handed in. "You can be asked to explain your work." I do not much care if the work is totally the student's, I do care if they understand it and can use the ideas involved. Unfortunately time pressure means that this is often an empty threat.
- Try enforcing regular progress on long assignments. "Your progress will be checked weekly, if you do not make regular progress during your assignment, you will receive one warning, continued lack of progress will mean that your work will not be marked." More work for me but I get to see students working, get to talk about what they are doing so I have an impression of their level of understanding. It gives me a framework for discussing students problems with their work. Without such a framework I find many students are reluctant to approach me with work that has flaws. This approach also prevents the sudden emergence of A+ work just before the deadline. It also spreads student workload so they have a reasonable chance of passing instead of suddenly discovering they have to cram 45 hours of work into three coffee filled days and nights. I usually find that having used this to establish a pattern of steady work I can relax the requirement as the deadlines get closer.
- Give relevant examples that cover the basic concepts for an assignment. I try and provide plenty of examples. I will give assignments that have an element of modifying existing work. I discuss practical ways of approaching assignments in class. Extra programs that illustrate potential problem points in an assignment are supplied, often by email. However I find that weak students can have problems with applying the examples.
- Consider staged assignments. We have experimented with assignments given out in small stages with model answers supplied after each stage as a potential basis for the next stage. The smaller the stage the more precise feedback I can provide within an acceptable marking load. I still find this tends to overload me.
- Discuss hacking and give students guidelines for recognising unproductive work. Also give them legitimate lifelines for getting reasonably prompt help on problems when they get stuck. "If you get stuck for more than 20 – 30 minutes, do not hack away making no progress. Stop, send someone an email describing your problem, go and work on an assignment for another course. Your tutor's email is xxxxxx, I check this at least once a day during the week." This works with some students only. Murphy's law states that poor students never have a clear enough picture of the problem to describe it succinctly in an email. The other point is that even good students can get caught up in a hacking cycle.
- Rapid distribution of relevant information about assignments. I use the student emails as a mailing list. At times, questions, usually from the brighter students who are working ahead, indicate trouble spots in an assignment that students cannot reasonably be expected to solve. I can email students explaining solutions to such problems before they get stuck. Again some of the students having most difficulty simply find extra information confusing.
- Create a responsive class atmosphere. I am poor at remembering student names. I take a class photo with

a digital camera, drop it into a Word document and get students to come up and type in their names and email in a table that matches the rows in the photo. I find first name conversation makes the class more responsive. I also work very hard to foster student questions in class – praise, thanks, checking that my answer covers what they wanted. I am never, ever, sarcastic about students' code mistakes, I tend to point out that I have made similar mistakes. I get students to check my code as I show it and give praise and thanks for spotting my truly unintentional bugs.

- Make exams possible to swot for (without giving away the answers). I like open question, closed book exams. The majority of the exam questions I use are about understanding programming theory, not about code. I give the students a bank of say 60 questions at least a month in advance. They are told the exam will consist of say 10 of these as they occur in the question bank. I make an exception for the few programming code questions where I point out that the exam question will differ from the example in some details but will use the same principles. My aim is relatively focussed and productive study on the student's part.
- Place an emphasis on understanding rather than simply working code. I tend to give advanced assignments that ask for students to write some original code but also to provide a report explaining the principles behind the code. "Write an explanation of what you have done so that it would be useful to an experienced programmer who has not met these techniques before".
- The clarity of textbook and classroom explanation and the availability of good examples and reference material is important. One of the factors in cheating seems to be where students are supporting each other and the most accessible working examples they possess consist of the assignment material they are working on. In effect can the resource materials available be used by the students in a teaching role? And is the average level of understanding in the class sufficient to allow students to explain points to each other rather than relying on "I don't really understand it but this sort of works".
- Is the size of the assignment too large? We are looking at a rule of thumb which asks can a C type student get a C pass in this material in a number of hours equal to the credits the assignment is worth. It is very, very hard to adjust to how slow inexperienced programmers are. It is also the poorer programmers who are likely to spend vast amounts of time frustrated by minor stumbling blocks and as the frustration level builds up so does the temptation to cheat.

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