Determination of Factors which Impact on IT Students' Propensity to Cheat

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Abstract

There is a large body of research that indicates the practice of cheating amongst students in the tertiary sector is widespread. Various studies have also attempted to determine reasons why students decide to cheat, or not to cheat. Although some common factors have been identified, there are indications that the level of cheating varies across disciplines of study, suggesting that there may be factors in specific learning situations that have influence on a student's propensity to cheat. This paper reports on two studies, one which investigates the cheating practices of IT students and their attitudes toward cheating, and the other which investigates the work practices of IT students. These studies identify particular problems that IT students face in their learning and give insights into situations which can lead to poor learning practices and, in the worst cases, cheating.

Keywords: cheating, poor learning tendencies, IT discipline, computer laboratory classes

1 Introduction

The problem of tertiary students cheating is widespread and many believe it is endemic within our university system. As evidence of this, studies of undergraduate students over the last decade have found alarmingly high rates of cheating (Diekhoff, LaBeff, Clark et al. 1996; Newstead, Franklyn-Stokes and Armstead 1996; Holm 1998). Furthermore, there is evidence that the problem is growing. Diekhoff et al. (1996) in their 10-year follow-up study of 474 undergraduates found that cheating is on the increase, confirming a view held by others (Cole and McCabe 1996; Nowell and Laufer 1997). Reynard (2000) suggests a possible reason for this trend is not that the students are becoming more dishonest, but that the integration and use of technology in tertiary education are presenting students with new opportunities to cheat. Collectively these studies report a problem that is difficult to address and is of increasing concern among university educators.

Cheating undermines the integrity of our tertiary institutions and the qualifications that they offer. Education programs are designed to provide learning opportunities, experiences and outcomes for students. However, the widespread prevalence of cheating within the tertiary sector indicates that many students are not engaging in the learning processes as intended by the educators. If we assume that there are characteristics of learning environments that influence learning behavior then it is important to consider these when investigating cheating practice. A question of interest in this study is what are the factors specifically related to the IT domain that allow, encourage or discourage cheating. In this paper, results are reported from two separate studies that provide different perspectives on the problem of cheating in the IT discipline.

2 The Cheating Problem

Many strategies to deal with the problem of cheating in the tertiary sector focus on detection and enforcement of stringent punishments. Much effort has been put into procedures and mechanisms to detect cheating, however there is evidence that these are not effective. Haines, Diekhoff, LaBeff and Clark (1986) in their study of 380 undergraduate students found that, although over half the students admitted to cheating, only 1.3% of students had ever been caught. The problems educators face in the detection of cheating are further exacerbated by the reluctance of students to report occurrences of cheating (Barnett and Dalton 1981; Harding, Carpenter, Montgomery and Stenek 2001). Furthermore, there is evidence that relying on the threat of punishment as a deterrent is not effective. Several studies have found that fear of possible consequences is not a major factor in discouraging cheating (Franklyn-Stokes and Newstead 1995; Newstead, Franklyn-Stokes and Armstead 1996). Considering the findings from these studies it seems that it is necessary to search for alternative strategies to address this problem. Another approach, which some consider may be more effective, is to look at the situations in which students cheat and the reasons why they engage in these practices, with the view to

developing an "educational system that recognises and reinforces positive behaviors" (Odom 1991).

Many studies have investigated motivations for cheating. The most common reasons identified by students for engaging in cheating were lack of time to study or complete tasks and the desire to achieve higher grades (Franklyn-Stokes and Newstead 1995; Ashworth, Bannister and Thorne 1997). A frequently stated reason which students indicate will prevent them cheating is that they would be missing out on a learning experience (McCabe, Trevino and Butterfield 1999). Ashworth, Bannister and Thorne (1997) found that students are less likely to cheat on tasks that they see as valuable to their learning, however some see cheating as acceptable if it entails some form of learning. These studies present a complex picture and to gain a better understanding of cheating behaviour it is necessary to look at particular learning situations in which these practices occur.

The frequency of cheating practice varies according to the type of cheating behaviour (Franklyn-Stokes and Newstead 1995). The rate of cheating in examination situations is generally low, and students see this a serious form of cheating. However, higher rates of cheating are reported with assignment work and class tasks, which students consider to be less serious forms of cheating (Franklyn-Stokes and Newstead 1995; Ashworth, Bannister and Thorne 1997). Le Heron (2001), in support of these studies, found little evidence of cheating on examinations, however proposes that cheating on coursework work is increasing. These studies suggest that strategies to curb cheating should focus on coursework cheating. However there is another concern here. If we assume that assignment and class assessment tasks are designed by educators to give students particular learning experiences then it follows that students who cheat on these tasks miss out on valuable learning experiences, which in turn will impact on learning outcomes. Students who engage in these practices are exhibiting poor learning tendencies in their worst forms.

In this study we were interested in investigating the cheating practices of undergraduate IT students. When exploring the cheating behaviour of students it is difficult to take a general view of the problem, as there is evidence that the extent and types of cheating vary across disciplines, with each learning context offering particular opportunities or pressures to cheat (Ashworth, Bannister and Thorne 1997). Therefore, to gain meaningful insights into the problem, it is important to understand the particular learning situations of the students. A search of the literature has found a scarcity of studies of the extent of cheating within IT courses, which is understandable, as it is a relatively new discipline. However there is evidence that problems exist in this domain. Nowell and Laufer (1997), in their study of 311 undergraduate business students, found that computer science majors were most likely students to cheat. In a survey of 891 undergraduate students from a range of disciplines, Lipson and McGavern (1993) found that 50% of the students felt that cheating is more likely to occur in computer programming subjects.

The research reported in this paper aimed to highlight the extent and type of cheating and to determine factors that contribute these poor learning tendencies of tertiary IT students. The most prevalent forms of cheating among IT students were determined and the particular characteristics of the learning environments that would encourage these behaviours were explored. It is intended that the results of this study will inform the next phase of our investigation, which will develop strategies for IT academics to address the problem of cheating within their discipline.

3 The Nature of the Research

The results of two independent studies, each using a different research paradigm, have been used to provide information for this research. The two studies enabled us to gain two different perspectives on the problem. Study 1 employs a positivist approach, using surveys and statistical analysis of quantitative measures on students' responses to cheating. Study 2 uses an interpretivist paradigm, collating qualitative data about what students say and do. No attempt is used to quantify the data in Study 2, but rather to gain a deep understanding of its meaning. Ethics approvals for these studies were gained from the Monash Standing Committee on Ethics in Research involving Humans (SCERH). Each study is described in detail below.

3.1 Study 1

This study aimed to determine cheating attitudes and behaviours of the undergraduate computing students within the School of Computer Science and Software Engineering (CSSE). A paper-based survey method was employed using a questionnaire designed by teaching and research staff in CSSE.

3.1.1 Sample

Students from subjects in each year level of undergraduate courses within CSSE were invited to participate in the study. A paper questionnaire was administered to the students in their tutorial classes or lectures near the end of second semester 2000. A total of 504 valid questionnaires were returned; the total enrolment in these subjects was 1037 students. The proportion of male to female students was approximately 2:1. Most of the students (96.5%) were studying full-time. The mean age of the students was 21 years with a standard deviation of 2.5 years. These proportions matched those found in the undergraduate population.

3.1.2 Survey Questionnaire

The questionnaires were anonymous. It was thought that this would elicit more honest responses from the students, especially on the questions that related to their own behaviour.

The survey questionnaire contained questions to determine:

- demographic information

- students' rating 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
- students' responses to cheating behaviour in other students
- students' opinions of staff and University attitudes to cheating

A set of 18 scenarios describing different cheating situations was devised by staff in CSSE. These ranged from mild to serious forms of cheating. The scenarios were referred to as questionable work practices, so as not to prejudice the students' judgement of their acceptability. The scenarios ranged from mild to serious forms of cheating. In addition, two scenarios were included that were not considered by staff to be cheating, but were included to encourage students to discriminate between the practices. A copy of the Questionable Work Practices survey form with the full description of the scenarios can be found elsewhere (Dick, Sheard and Markham 2000).

3.2 Study 2

Study 2 aimed to determine features of the IT domain that lead students to adopt particular learning tendencies. For this study students provided written descriptions of their engagements in assignment work or programming tasks that they worked on in their computer laboratory classes. The written descriptions were collected from two groups of undergraduate first year students studying programming within the School of Computer Science and Software Engineering (CSSE) and the School of Information Management and System (SIMS). This group formed a subset of the students surveyed in Study 1.

3.2.1 Sample

The first group of students in this study was learning the C programming language in the first year of a Computer Science degree. Nineteen students volunteered to participate in eight 2 hour workshops that covered frameworks for analysing their learning behaviours. In the study, seven students (four males and three females) provided written descriptions.

The second group was studying the Visual Basic (VB) programming language in the first year of an Information Management and Systems degree. These students were exposed to learning concepts and frames, to discuss and analyse their learning as part of their course. Of the 140 students enrolled, 132 students submitted a description of their engagement in a VB programming task as part of a hurdle requirement for that unit.

3.2.2 Written Descriptions

Students were expected to write two case descriptions based on incidents where their engagement in a task or part of a task left them with a powerful impression of successful or unsuccessful learning. Insights were sought into their engagement in tasks provided. Students were provided with frameworks to analyse and describe their own learning so that rich data could be gathered on complex factors and issues. It was intended that the study would reveal insights into the nature of student learning in the programming context, and the teaching practices that directed their learning in the IT domain. The students were given the following five stimuli questions to help them plan and develop their written cases:

- What are conditions for learning?
- Describe when you have adopted a surface/deep approach to learning?
- What meta-cognitive strategies do students use?
- When are poor learning tendencies adopted?
- What are the factors inhibiting quality learning?

This qualitative approach ensured that rich data was collected on complex interrelated factors and issues, enabling *thick descriptions* of their accounts. This method of collecting data was particularly successful, in terms of the richness of the data gathered. Extracts taken from the students' written cases are used to inform the discussion section of the paper.

4 Results

Results of Study 1 are presented in this section. Results of Study 2 are reported in the Discussion section and are used to inform and provide insights into the data obtained in Study 1.

4.1 Extent of Cheating Practice and Acceptability of Scenarios

The students were asked to consider 18 different scenarios, each describing a questionable work practice. For each scenario they were asked whether they had done it, whether they personally knew someone who had done it, and how acceptable they felt the practice was. For the ratings of acceptability a 5-point Likert scale was used, where 1 indicates *acceptable* and 5 indicates *not acceptable*.

The ten most frequently practised scenarios are shown in Table 1 and are presented in decreasing order of frequency of admissions of practice. An interesting pattern can be observed which shows a similar decreasing order of frequency of knowledge of others cheating. It is interesting to note that these scenarios all describe practices of cheating in class tasks and assignment work. These are also the most acceptable practices as rated by the students. For example, scenario 7, *Copying material for an essay from a text book*, was rated as having a high level of acceptability.

	Scenario	N	Have practised personally	Know someone personally	Acceptability of practice	
			%	%	Mean	SD
1.	Two students collaborating on an assignment meant to be completed individually	498	46.8	67.4	2.6	1.2
2.	Showing assignment work to a lecturer for guidance	498	35.2	53.4	2.1	1.1
3.	Copying the majority of an assignment from a friend's assignment, but doing a fair bit of work yourself	494	30.5	45.6	3.0	1.2
4.	Submitting a friend's assignment from a past running of the subject	500	28.7	44.0	3.1	1.3
5.	Resubmitting an assignment from a previous subject in a new subject.	498	28.2	38.1	2.6	1.3
6.	Posting to an Internet newsgroup for assistance	498	23.2	36.9	2.0	1.1
7.	Copying material for an essay from a text book	492	19.6	30.1	3.9	1.1
8.	Copying material for an essay from the Internet	496	18.9	27.9	3.7	1.1
9.	Not informing the tutor, that an assignment has been given too high a mark	497	17.5	26.3	3.1	1.4
10.	Being given the answer to a tutorial exercise worth 5% by a class mate if the computer you used has problems	499	10.6	32.2	3.9	1.2

Table 1 Students' self reporting of cheating, knowledge of others cheating, and ratings of acceptability of cheating practices.

4.2 Reasons for Cheating

Students were asked to consider 14 different factors and indicate the likelihood of each factor causing them to cheat. A 5-point Likert scale was used, where 1 indicates *not at all* and 5 indicates *highly likely*. The six most likely reasons are shown in Table 2 and are presented in decreasing order of the likelihood of the reason causing cheating.

	Reason	Likelihood of causing cheating		
		N	Mean	SD
1.	Not enough time	486	3.1	1.5
2.	Will fail otherwise	481	3.1	1.4
3.	Too great a workload at university	485	3.0	1.4
4.	Can't afford to fail	480	2.7	1.4
5.	Assignments are too hard	481	2.7	1.4
6.	Afraid of failing	480	2.7	1.4

Table 2 Factors that could cause cheating

4.3 Reasons for Not Cheating

Students were asked to consider 10 different factors and indicate the likelihood of each factor preventing them from cheating. A 5-point Likert scale was used, where 1 indicates *not at all* and 5 indicates *highly likely*. The three most likely reasons are shown in Table 3 and are presented in decreasing order of the likelihood of the reason preventing cheating.

	Reason	Likelihood of preventing cheating		
		N	Mean	SD
1.	Pride in your work	475	4.1	1.1
2.	Want to know what your work is worth	477	4.1	1.2
3.	Can get good marks without cheating	481	4.0	1.0

Table 3 Factors that could prevent cheating

5 Discussion

5.1 Insights into Reasons for Cheating

The results of Study 1 show the extent of cheating of IT students and the important factors that influence their cheating behaviour. Examination of the results in Table 2 show that the six highest rated factors which could cause cheating relate to the themes of *time pressure*, *failure* and *difficulty of work*. This agrees with what has been found in other studies and suggests these are common areas of difficulty for the students. From Table 3 it can be seen that the three highest rated reasons that could prevent cheating are personal factors that relate to students taking responsibility for their work. This also agrees with findings of other studies.

As shown in Table 1, the most prevalent forms of cheating were practices relating to assignment work and class tasks. These were also the most acceptable forms of cheating according to the students and were the practices that the students claimed, from personal knowledge, were the most prevalent. These results agree with findings from other studies and indicate that cheating practices relating to assignment work and class tasks are areas that should be explored in any efforts to reduce the occurrence of cheating. We therefore explored the findings of Study 2, which investigated learning experiences of IT students working on coursework, to gain further insights into cheating behaviour.

5.2 Gaining a Deeper Understanding

The information gathered from students in Study 2 highlighted particular learning experiences of IT students. In contrast to Study 1, which presented students with a list of predefined cheating factors to rate, Study 2 required students to give open-ended responses describing their learning experiences. Therefore, it was interesting to find that, in their written cases in Study 2, students frequently made references to the predefined factors listed in the survey of Study 1 that were rated as most likely to cause cheating.

Analysis of data from Study 2 revealed two broad-based themes of *internal* and *external* factors that explain the pressures that may cause students to adopt poor learning behaviours. Internal factors we define as personal factors over which the student has control and tend to be discipline independent. External factors are those factors imposed on the students and usually depend on the environment in which they work. Similar definitions are given by Forsyth, Pope and McMillan (1985) and Weiner (1986, as cited in Deci and Ryan 1987).

5.2.1 Internal Factors

The following snippets from students' written descriptions highlight various internal factors that resulted in poor learning behaviours.

Poor time management

"I felt I was wasting my time and that time could have been used more productively ... With all this time wasted I was unable to complete the exercise within the given time frame…"

"Sometime I found myself running out of time to complete my task …"

Lack of preparation

"Most of my time was spent to trying to understand what exactly I had to do to finish the tasks off in the designated time period. I think greater preparation for the class would avoid such a powerful incident of unsuccessful learning."

Lack of skills to find resources

"I was unable to find information in the usual places. This included lecture notes which provided little help in doing the exercises and I was left confused and not knowing where or how to start the question … In addition my class mates were no help either as they were just as confused about the exercise as I was, if not more."

Unwillingness to follow recommended good practice

"I had little patience to spare at the moment with exams approaching like a mad dog to a piece of meat and ten billion other projects/ assignments/ pracs to complete – none of which were easy, mind you. However, I decided to do the best I could on this prac, but I would not devote any large amounts of time to problem solving or de-bugging – I just could not afford to at that moment."

Inability to seek appropriate help

"I came to the conclusion that I needed to seek help. There was no way I could think of to solve the problem. It was a definite dead end. The only person who I could think of was an older friend who had quite a bit of experience with C programming. I described my problem to him and gave him the project sheet to look at. 'You need pointers.' he stated. 'What?' I answered. 'Pointers.' he re-stated, 'What?' I answered, 'We haven't done them yet.'"

Low intrinsic interest in subject

"As I've foretold earlier, I don't have a great interest in VB, that would make me strive harder to learn it 100%."

The above comments give insights into learning situations in which IT students felt under pressure and the personal factors that caused these. The students indicated that they were having problems completing set tasks and expressed their concern about their learning experience. Their comments gave an indication of poor learning strategies however they did not, in these examples, indicate that they had taken any measures that could be defined as cheating. This is not surprising however as these students were not anonymous and therefore we would expect that they were not likely to admit this behaviour under these circumstances.

5.2.2 External Factors

Highlighted also in Study 2 were the following external factors which students indicated caused difficult learning situations. In contrast to the internal factors these provide more domain specific reasons for poor learning behaviours.

Equipment failure

The IT discipline is relatively young and ever-changing in comparison to other disciplines. Students have found an inevitable part of working with new and groundbreaking technology is that often the equipment may not be fully tested and as a result may be malfunctioning. A couple of students commented:

"It looked not very hard, just followed the step and finish the activity. But we still met the problem that was the step asked us to find the folder and save it at a: drive, but however the computer we used at the time a: drive was not working… It cost us a lot of time for saving the folder at a: drive."

"After spending almost an hour and a half on a task I find out that the file I was working on was corrupted, the result of that: crashed computer, complete lose of the task (file) and wasted time."

Software problems

With the constant new releases of software it can be difficult to keep up with version updates and ensure that the software is configured appropriately for the operating system it is run under:

"Unfortunately I was unable to do this because the appropriate software had not been correctly loading onto the computers and/or the network. This resulted in spending most of the session trying to work out other ways in which we could complete the required exercises. Unfortunately this couldn't be achieved, as the uninstalled components were essential parts for the exercise."

"… It wasn't even a very big mistake, like one misplaced instruction or something, but because the SPIM emulator 'MIPS' was so unwieldy, it took me close to 2 hours to find the fault, which would not have been found with commenting. I don't feel like I learnt anything of value, except that MIPS is incredibly frustrating."

"It was the Week 9 activity on Help files. The tutorial sheet, had quite clear instructions on how to complete the requirements. The only problem was that the programs didn't actually work. This, however, I didn't find out until I had fiddled with the activity for a couple of hours. This was both a very frustrating and annoying experience. At the end of the studio session I had not completed the activity and had spent most of my time trying to get it finished. Although it wasn't directly my fault that I couldn't finish it, I still felt that I had not achieved what I should have from the activity. This was one of the most frustrating experiences I have had with Visual Basic."

Cumulative nature of programming

A particularly interesting feature of study in the IT discipline is the cumulative nature of the task of learning to program. This means that students rarely have an opportunity to shelve a topic. Therefore, if a student has a tendency to miss classes, or lacks persistence to solve an immediate problem, this can have severe consequences for their understanding and may entice other poor learning behaviours:

"Not going to the Seminars and some of the studios this semester has really put me behind in learning the rest of the VB programming. I have found that without going to the studios, trying to catch up on the VB is very hard. "

Lack of appropriate resources

When designing tasks, academics sometimes make a false assumption that students have access to the appropriate resources or possess the skills to find the appropriate resources:

"I tried using the Help facility but this was difficult to understand and did not really help me at all. I borrowed the recommended textbooks from the library, but couldn't find the information I was looking for. I searched the internet for information but this was difficult given that when I initially entered "Visual Basic programming" as a search, Google returned 417,6000 sites for information. So I did try to be proactive with the task but was thwarted at every turn. This only added to the woe of trying to complete the activity and get it done on time."

"No matter where I looked (I even ventured into user-unfriendly, unchartered waters of the MS Website in my quest for a solution to this puzzle) I could not find any method of connecting the help file to a button… It appeared that due to a fault in the technology that part of the lesson could not be done."

"…looking over the lecture notes, they still didn't help and at that point I thought I'd cheat and ask my friend for help. Instead of explaining to me, my friend basically gave me the code …"

Poor classroom management

Students working on exercises in computer laboratories can become stuck on a problem and unable to progress further without help. Having to wait a long time for help can be a source of discouragement:

"My second alternative for help was the tutor but he was already busy with other people, I was unable to get help for 30 minutes."

Poorly designed tasks

Academics design tasks with the best of intentions, yet sometimes simple mistakes in an exercise can lead to frustrating experiences for our students:

"One hour before the prac, in the class, the lecturer points out that the code provided has a mistake in it. Simple, but deadly."

"I knew how to do the prac - I could see it ticking over in my head, but I at least needed to get it working to get a pass grade. That was also frustrating - all of my energies went toward 'marks' instead of 'learning'. It would have been an invaluable prac, but as it was, I walked away with naught but a headache."

"When I got into the prac and tried to run the program, I got an error message like "Error in 0x7808" which, as far as I could see wasn't an address that was being used by either my program or the SPIM emulator. I asked the tutor for help, but we were all needing help, so his time was limited, and as MIPS is such a low level language, problems don't just jump out like they do in C. He suggested that I step through the program, in which the program executes one line at a time, as the user presses 'Enter'. It was a drag, but after 45 mins of messing around, it didn't look like I had much choice. So I started."

Ready availability of solutions

If students are given tasks for which solutions are readily available to copy from textbooks or lecture notes they are tempted to take short cuts and avoid the intended learning experience:

"I had managed to get the first four questions working simply by copying sections of the code from my lecture notes. I didn't really understand what was happening to the frame pointer, stack pointer, parameters and return values."

"After a good fifteen minutes, the underlying sense of it all was not sitting quite nicely as I would have hoped. The sample code seemed to be making sense, but I was struggling to gain an overall picture. I considered spending more time looking at my notes. But time was running short and I had a prac to finish. In the hope that my actually implementing the code would concrete the concrete, I dove straight into it… but hit the ground very quickly. Now I was getting impatient. 'That's it', I thought, 'I will do this the crude way. I will copy the notes.' So that is precisely what I did."

Group work

Group work in IT lends itself to a different set of hurdles. There is often a wide range of abilities and experience in computing classes, especially in first year, which means groups may have students with very different capabilities. This can result in very uneven contributions to a team effort project:

"during group activity. I didn't, I was a bit shy, didn't participate a lot and I let my group members do all the work. I helped a bit of course but I know that if I had to do that work by myself I would have done it much better."

Demands of other subjects

The demands of other subjects can often generate cognitive overload in novices. For a student studying two programming languages, although the concepts may be similar, the details and syntax of the language can leave them overwhelmed. Students see this as a source of frustration, not beneficial to their learning experience, and something that is beyond their ability to manage and control:

"I take Java 1 as my other subject and having to learn 2 programming languages at the same time can be rather confusing. At one point of time, I got totally mixed up between the 2 languages and I was about to decide to leave on it … Java 1 tutes were always after my studio session, and I really felt difficult to be able to cope well with both at the same time. I had to sacrifice the quality of my performance and VB was unfortunately it."

5.2.3 Propensity towards Cheating

In the accounts of their work on assignments and class tasks in the previous section students described various poor learning experiences that they attributed to external factors. In many of these cases the students gave indications that they had cheated or were tempted to cheat. This is in contrast to the learning problems caused by internal factors where there were no admissions of cheating. An explanation of this can be found in a study by Forsyth, Pope and McMillan (1985) who, in an attributional analysis of students' reactions after cheating, found that students are more likely to admit to cheating when they can excuse their behaviour by external factors. It is also interesting to note that a couple of students indicated that they valued the learning experience gained from the set tasks, and they regretted any steps they took to avoid this by, for example, copying an exercise out of a book or using a friend's work.

6 Implications of Findings

The information drawn from these studies has provided evidence of widespread cheating within the IT discipline and given valuable insights into particular learning situations of IT students which lead to poor learning behaviours and, in the worst cases, cheating. When we consider that almost 80% of the students in Study 1 admitted to having practised at least one form of cheating out of 18 different scenarios presented to them, the extent of the cheating problem becomes evident. Analysis of the data in Study 1 showed that the most common forms of cheating amongst IT students were practices relating to assignment work and class tasks. These were also the most acceptable forms of cheating according to the students and were the practices that they reported were most prevalent. These findings agree with other studies and indicate that cheating practices relating to assignment work and class tasks are areas on which IT educators should focus in any efforts to reduce the occurrence of cheating. If we assume that assignment and class assessment tasks are designed by educators to give students particular learning experiences then it follows that students who cheat on these tasks miss out on these experiences, which in turn will impact on learning outcomes. Students who engage in these practices are exhibiting poor learning tendencies in their worst forms.

Deeper insights into the cheating behaviour of IT students were found in Study 2. When describing poor learning

experiences while working on computer laboratory exercises or assignment work, students indicated that there were occasions when they had considered cheating as an option and in some cases gave instances of having cheated. The students indicated that internal factors such as low interest, lack of skills or poor time management could create pressures that are strong factors in causing cheating behaviour. However, of more interest in this study are the external factors which were identified, as these indicate the pressures that are created by specific characteristics of the IT learning environment and are areas which educators can focus on in efforts to curb cheating. The external factors identified in this study that will result in poor learning behaviours and cheating are related to the nature of programming, poor task design, lack of resources, and software and equipment failure.

7 Conclusions and Further Work

Evidence from our studies suggests that the IT discipline offers particular opportunities or pressures for students to engage in cheating behaviour. However, students also showed evidence of wanting to take responsibility for their learning and engage in tasks that they saw as important to their learning. It is important therefore to assist students to develop strategies to manage the internal factors that lead to poor learning tendencies. It is also important for educators to address external factors which are caused by characteristics of the learning environments they provide for students. The understanding of the difficulties faced by students working in an IT learning domain gained from this study will inform the next phase of our investigation. This will devise strategies that IT academics can employ to minimise students' propensity to cheat within their discipline. This is a different approach to that taken by many institutions that focus on detection and enforcement of stringent punishments to address the problem of cheating.

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