E-LEARNING AND E-CHEATING

Karl O. Jones
School of Engineering
Liverpool John Moores University
Liverpool, United Kingdom.
+44 (0) 151 231 2199
k.o.jones@ljmu.ac.uk

Juliet Reid
School of Psychology
Liverpool John Moores University
Liverpool, United Kingdom.
+44 (0) 151 231 4166
j.m.reid@ ljmu.ac.uk

Rebecca Bartlett
School of Engineering
Liverpool John Moores University
Liverpool, United Kingdom.
+44 (0) 151 231 2253
r.j.bartlett@ ljmu.ac.uk

ABSTRACT
For students and academics alike, the Internet has become a valuable resource because of its potential to enhance the educational experience. While the Internet provides a cornucopia of information a wide range of subjects, it also offers its users a huge temptation. As the use of the Internet and digital media as educational tools has grown, University regulations on what constitutes academic impropriety have not kept pace, Hence, there is a need for a fresh look at definitions of cheating, and plagiarism in particular, with respect to electronic information.

Categories and Subject Descriptors
K.3.1 [**Computers and Education**]: Computer Uses in Education – *Computer-managed instruction (CMI), distance learning*

General Terms
Management, Documentation, Standardization, Legal Aspects.

Keywords
Academic impropriety, Internet, e-cheating, plagiarism.

1. INTRODUCTION
If a decision is made that a course is to be delivered through e-learning, then it would seem to follow that the assessment would also be 'e' based: if not then the ethos of the course is not being followed. This can introduce complications to course delivery. Administrating examinations to distance learners presents distinctive challenges. Holding a 'closed-book' examination on campus requires only a room and invigilators. In a distance-learning environment, this can cause inconveniences that might overcome the benefits of learning on-line. The Internet is an appealing resource for its potential to improve the educational experience for both traditional campus based students and distance learning students.

The existence of a wealth of information on a wide range of topics offers assistance, and at the same time, temptation. Connors [1] astutely observes that "*academics who once praised the Internet for giving students more access to information are now worried it is providing students with easy access to pre-written essays*". St. Omer [2] reported that 42% of a class had used a web-site as an information source for an assignment, and that "*the majority of students, having accessed information and music regularly, failed to understand that they had appropriated the work of another individual*". St. Omer also points out that often Internet material can be a source of misinformation – something that students rarely take time to reflect on. Certainly, the authors are aware of very few courses which explain to students the difference in provenance between material found in textbooks, journals and the like, compared to web pages, often created by individuals rather than organisations.

2. METHODS OF UNDERTAKING E-CHEATING
The most obvious form of e-cheating is straightforward copying 'cut and paste' from the Internet or electronic media (such as data CDs or software, e.g. Microsoft Encarta). Word processing facilitates plagiarism through its cut and paste facility, further the electronic storage of work offers the opportunity for various forms of academic impropriety including, collusion, replication, and falsification. Students can use the Internet to purchase or download work from web sites such as www.schoolsucks.com or www.cheathouse.com, which claim to have thousands of essays and reports.

It is also easier to cheat today, thanks to technology such as the Internet, wireless computers, and messaging devices (for example mobile phones). In addition to telephones with astounding features, technological advances have given us Instant Messaging (IM) in mobile phones, as well as IM-enabled calculators and Personal Digital Assistants (PDAs). This presents lecturers even more reason to be vigilant. The capability of IM allows students to send messages to other students across significant distances. This coupled with the availability of mobile phones equipped with quite sophisticated cameras, and students are provided with the opportunity to easily communicate examination questions and answers, including diagrams.

Developments in technology have provided new means for students to engage in practices not considered appropriate at University. It is not uncommon for students to use a laptop during lectures, ostensibly to "take notes". At the same time campuses are filling up with wireless networks, enabling students to connect to the Internet anywhere on campus. Thus lecturers cannot be certain that these students are just taking notes, rather than using email or surfing. Furthermore, there has been a huge increase in IM which is often taking place in the classroom. Students surfing and sending 'texts' during lectures is certainly a hindrance to their learning, but is not really a problem for the lecturer. The situation changes when one considers tests and examinations. The problem becomes even more complex when assessment is performed on-line when there is the potential and temptation for students to collaborate and to surf for answers.

3. STUDENT ATTITUDES ON E-CHEATING

The authors have undertaken a large-scale survey of student's views regarding the acceptability of a range of academic practices and self-reported experience of such practices. The survey considers students from three countries (United Kingdom, Bulgaria and Malaysia), and covers the fields of electronics, computing and psychology. Data was gathered using a questionnaire specifically authored for the study. The questions were generated from the existing literature on academic impropriety [3] and from the authors' personal experiences and beliefs about academic practices in their own domains. Questionnaires were distributed to students in lectures by academic staff. Participation was entirely anonymous and voluntary, and no incentives were offered. The survey items pertinent to e-learning, computers and the Internet have been extracted for presentation here. From all three tables, it can be seen that occasionally the three countries have similar responses, however overall there are significant differences between nations.

Table 1 presents the percentage level of student engagement in cheating, while Table 2 indicates the frequency of students considering the listed act as either unacceptable or highly unacceptable, finally Table 3 reports student views on processes and systems. Except for two figures, the results given in Table 1 are extremely high. In fact all the figures are too high considering that they relate to how much cheating is being conducted. It is not surprising that the three results for "*Cutting and pasting material from a website into an assignment without crediting the source*" are the highest for the three sample sets. This supports the premise that the Internet is a valuable source for students engaging in academic impropriety. It is a little surprising that the responses for "*Cutting and pasting material from an electronic journal into an assignment without crediting the source*" and "*Copying some sentences out of a journal article into an assignment without crediting the source*" are very similar, which suggests that the material content might be more important than its ease of access. Students are even willing to take information from the hard-disk of a computer, which is likely to have been left by their classmates: this could lead to accusations of collusion which the originator of the work is not aware of.

From Table 2 it can be seen that there is a significant difference between the results for "*Mailing an Internet site/discussion forum for help with an assignment*" and the other items, further the three sample sets have close similarity in values. For the other items in Table 2, between only 42% and 70% of students consider the acts to be unacceptable. This would indicate that there is much work to be undertaken in educating students about what is acceptable practice in University.

Considering the results given in Table 3, it is shocking to see that few students from the UK and Malaysia consider that "*Tutors know how to identify internet sites used by students*", which is significantly different to the views held by students in Bulgaria. These views seem to be supported by the responses to "*Tutors are not willing to check sources to establish plagiarism*". Almost half of the Malaysia and Bulgaria samples, and nearly a third of the UK sample, agree with the statement "*Material on the web is open access and so you do not have to credit the source*". While this is clearly untrue, it does offer a rationale for student actions.

While surveys such as this show that from 47% to 81% of students believe that "*Most plagiarism goes undetected*" and that from 28% to 51% consider that "*Tutors know cheating goes on but are not motivated to address it*", then there is a need to encourage academics that it is important to detect instances cheating. Furthermore, with responses of 7% and 22% of students agreeing that "*The penalties for plagiarism are serious*" along with 42% and 54% considering that "*The University takes little action even when cheating is established*", suggests that University administration must penalise those who are found guilty of cheating acts. There are some glimmers of hope: for Universities in Bulgaria with 54% of their students agreeing that there are serious penalties for plagiarism, while for the UK only 18% of students think that the University is lenient on cheats.

It is obvious that students are aware that "*Cheating does not help your academic development*" with responses between 73% and 88%, although it is clear that they still engage in cheating activities, with between 25% and 50% thinking that "*Cheating is a risk worth taking*".

4. APPROACHES TO PREVENTION

Technological developments have provided novel ways for students to engage in academic impropriety, at the same time they have presented lecturers with ways of catching cheats, from the complicated to the simple. Selingo [4] reported how 50 engineering students were caught cheating after their submitted spreadsheet files had the properties checked revealing that the same computer created them all. The Internet is not only a resource for cheating students, academics can exploit its potential for detection. Powerful search tools and specialised detection services that allow keyword or phrase searching across millions of documents, enable academics to target suspect assignments. Furthermore, the proliferation of identical material on the web provides a greater opportunity to locate copied material: one does not necessarily have to identify the source the student used, evidence that it is not original is sufficient proof.

Reisman [5] suggests that for online examination Universities should "*lock down the desktops to prevent the installation of IM clients*" and block e-mail services. This action has a number of drawbacks. In relation to distance learners, one cannot travel to every student's computer to ensure compliance, while for campus-based examinations it has no effect on IM devices, such as mobile phones. Furthermore, it does not address wireless computer networks. Currently the only effective solutions would appear either to ban the use of all electronic equipment or to employ jamming techniques. The latter may seem extreme however simply switching off a campus wireless network does not prevent resourceful students from creating their own wireless computer network. Furthermore, one should also consider infra-red communication between devices.

Some approaches to detection include:

- Generally available search engines or metasearch engines (e.g. www.google.com or www.metacrawler.com). Although considered by many as the only tools required, they do have significant drawbacks: they are not foolproof, since students may pick-and-mix their sources; they are time consuming and may take multiple searches; and they are not necessarily accurate. Finally, search engines can only explore a small proportion of the whole web: the content of password protected and database sites remain concealed
- Collusion detection (www.copycatchgold.com) looks for copying across a cohort
- Analysis of structure and content of document by comparing with a central database (www.turnitin.com)
- Writing Style Analysis (www.plagiarism.com) is based on individuals having their own writing style
- Computer program detection (www.cs.berkeley.edu) which compares programs within a cohort.

The amount of time academics spend producing e-learning materials needs to be replicated in developing an assessment strategy that minimises the opportunity for cheating. When creating assignments, academics need to be fully aware of electronic resources available to students, and structure the assignment to allow students the opportunity to locate, retrieve and interpret information rather than requiring regurgitating the material. Assignments that require higher order thinking skills are less likely to encourage cheating.

5. DISCUSSION

The wholesale use of computers and the Internet in the curriculum demands a new look at cheating in general and plagiarism in particular. Since the Internet is always going to be a source of temptation for students to engage in academic impropriety, it falls on academics to minimise the opportunity students have. There are numerous ways to address this issue in terms of traditional campus-based students; however, the options reduce with respect to distance learning students.

One obvious approach is to design coursework assignments such that the answers are not readily available on the Internet. This is not always an easy task, as it requires significant time to ascertain the potential material readily available on the Internet for any given assignment topic: remembering that information on the Internet is in constant flux. Then the academic must produce a question that allows students to utilise Internet material without direct copying.

With respect to students plagiarising material from the Internet, of particular concern is the lack of reliability in the information since there is no formal refereeing system. If students are 'taking' web-based material how can they be certain it is correct!!

The results of the survey of students from three nations reveal that there is a considerable amount of cheating going on. Moreover, students appear to have views that cheating is an acceptable activity.

6. CONCLUDING REMARKS

Fundamentally, Universities need to create a climate that discourages academic impropriety, while students need to take responsibility for honest behaviour. For anyone who is not concerned about instances of academic impropriety, Ryan [6] provides an interesting statement:

> *"Often lost in the discussion of plagiarism is the interest of the students who don't cheat. They do legitimate research and write their own papers. They work harder (and learn more) than the plagiarists, yet their grades may suffer when their papers are judged and graded against papers that are superior but stolen material. Students have a right to expect fairness in the classroom. When teachers turn a blind eye to plagiarism, it undermines that right and denigrates grades, degrees and even institutions." (Ryan, 1998, p.1)*

Plagiarism is alive and well on campuses and in cyber-space. Nevertheless, academics should take some solace in the fact that while the internet is a useful resource for plagiarists, it is also an excellent tool to use against them. The range of academic impropriety acts is limited only by students' imagination and their ability to utilise technological advances.

7. REFERENCES

[1] Connors, M. Cybercheating: the Internet could become the newest battleground in academic fraud. The Muse. 1996. Available online at *ursa.uregina.ca/~carillon/Sept12.96/feature/feature1.html*. Last viewed April 2006.

[2] St. Omer, I. Potholes in the Information Highway: The Internet and Plagiarism. ASEE/IEEE Frontiers in Education Conference, Reno, USA. pp. F4F-7 – F4F-8. 2001.

[3] Jones, K. O., Reid, J.M.V., Bartlett, R.J. & Vassilev, T. Student Perspectives on Cheating: UK and Bulgaria. *Proceedings of 19th International Conference on Systems for Automation and Engineering Research.* Varna, Bulgaria. pp.177-182. 2005.

[4] Selingo, J. The Cheating Culture. PRISM Online. 2004. Available online at *www.prism-*

magazine.org/sept04/feature_cheating.htm. Last viewed April 2006.

[5] Reisman S. Keeping Technology at Bay in the Classroom. IEEE Computer Society: IT Professional September/October. 63-64. 2005.

[6] Ryan, J. Student plagiarism in an online world PRISM Online. 1998. Available online at www.asee.org/prism/december/student_plagiarism_in_an_online.htm. Last viewed April 2006.

Table 1 Self-reported experience of Academic Impropriety (% Frequency Engagement).

Item	Bulgaria	Malaysia	UK
Mailing an Internet site/discussion forum for help with an assignment	16.2	36.2	26.4
Copying material found on the hard drive in the computer room/library into an assignment	16.2	28.6	5.5
Cutting and pasting material from an electronic journal into an assignment without crediting the source	10.8	40.8	18.7
Cutting and pasting material from a website into an assignment without crediting the source	19.4	51.3	31.9
Copying some sentences out of a journal article into an assignment without crediting the source	8.1	46.7	15.4

Table 2 Student Attitudes to Academic Impropriety (% Frequency Unacceptable).

Item	Bulgaria	Malaysia	UK
Mailing an Internet site/discussion forum for help with an assignment	29.7	25.8	22.2
Copying material found on the hard drive in the computer room/library into an assignment	54.1	50.0	70.8
Cutting and pasting material from an electronic journal into an assignment without crediting the source	61.1	45.8	59.8
Cutting and pasting material from a website into an assignment without crediting the source	67.6	54.0	64.3
Copying some sentences out of a journal article into an assignment without crediting the source	64.9	42.4	57.9

Table 3 Student Opinion on Academics, University and Procedures (% Agree/Strongly agree).

Item	Bulgaria	Malaysia	UK
Tutors are not willing to check sources to establish plagiarism	61.1	35.4	29.6
Most plagiarism goes undetected	81.1	59.8	47.0
The penalties for plagiarism are serious	54.1	22.9	7.3
Tutors know how to identify internet sites used by students	63.9	23.0	19.3
Tutors know cheating goes on but are not motivated to address it	51.4	45.3	28.0
Cheating does not help your academic development	86.5	88.5	73.5
Material on the web is open access and so you do not have to credit the source	48.6	46.6	27.7
The University takes little action even when cheating is established	54.1	42.9	18.3
Cheating is a risk worth taking	35.1	50.5	25.6