New Landscapes: Teaching to Avoid Plagiarism in the Web Environment

Paul Darbyshire and Stephen Burgess

School of Information Systems, Victoria University, PO Box 14428, Melbourne City MC, Victoria 8001, Australia,

{paul.darbyshire, stephen.burgess@vu.edu.au}

ABSTRACT

The adoption of the Web by higher education as a research tool, source of information, and now as a replacement for the classroom itself has been a two-edged sword. While students now have access to vast amounts of information sources through the Internet, it seems that the flood gates have been opened for plagiarism from the Web. While there is no direct evidence that plagiarism is occurring more often since the introduction of the Web into classrooms, anecdotal evidence suggest this is so. Against this background, the credibility of online courses is often questioned, but this phenomenon is not restricted to the online classes only. Indeed the occurrence of plagiarism in online classes is no more evident than in the traditional classroom. While the Internet may provide the means of plagiarism for many, it is in itself not to blame. The Internet is part of a technological evolution we are experiencing in teaching which is forcing us to adopt many new paradigms. With easy access to the Internet, education is operating in a new landscape, and assessment procedures need to adapt to the landscape in order to survive. This paper represents a case study of a number of effective changes made to adapt assessment procedures to the new landscape at Victoria University, Australia.

INTRODUCTION

It is ironic that Universities have been instrumental in the development of the Internet and Web, and yet that instrument in turn, is precipitating many paradigm shifts back within the academic environment. Online learning is one of the major paradigm shifts to emerge from this new technology. Despite the research into the effectiveness of online learning, its credibility is often questioned because of the opportunities for online plagiarism. However, plagiarism seems to have become one of the more fundamental consequences of the advent of Internet technology into education, and is evident in both online and traditional classrooms. If the evidence suggests a rise in plagiarism over recent years then as academics we may need to take more fundamental steps to address it.

The Internet represents an evolution for information accessibility, and by its very nature, eases the process of accessing an over abundance of information. This can de-value the information retrieved and result in a lack of appreciation of the processes involved to produce it. The ubiquitous nature of the Web and the tools used to access the information greatly facilitate an environment in which plagiarism can emerge. It seems that education in the form of ethics classes and plagiarism awareness procedures do not deter the instances of plagiarism. If education is not the answer, then evolution must be. While detection mechanisms for plagiarism are important, these new frontiers also provide opportunities for innovative approaches to combating plagiarism. We need to redesign course structure, or at least assessment procedures to take into account the new landscape we are operating in.

This paper discusses how this may be achieved using two separate case studies of courses at in the School of Information Systems at Victoria university. In the following sections, some background information is given on plagiarism, followed by two different case studies where

innovative techniques are used to combat plagiarism at Victoria University.

BACKGROUND

There has always been plagiarism as long as we can remember, but recent discussions seem to indicate that incidents of plagiarism are increasing. The easy access of information via the Internet has been blamed for this perceived rise in plagiarism. However, while there is no direct evidence that plagiarism is occurring more often since the introduction of the Web into classrooms, anecdotal evidence suggest this is so. But is the Internet to blame? According to Tribe and Rendell (Tribe & Rendell, 2003), there were very few publications dealing with plagiarism prior to 1995, although by the year 2000 it seems to have become a very serious problem. Tribe and Rendell provide a number of explanations for this including student commitment, lifestyle, organizational skills and confusion.

While there may have been many factors contributing to the rise in plagiarism, the dates previously given correspond to the rise in prominence of Internet technology. Given the Internets ubiquitous nature, it seems to have become the tool of choice for committing these offences. Prior to the advent of the Web, plagiarism required some effort, with students having to spend many hours finding sources or at the very least, retyping someone else's work (J. Evans, 2000; Pean, 2000; Tribe & Rendell, 2003). What the Internet offers is the ability to find vast amounts of information very quickly with a good search engine and some key words. Worse still, with online sources such as e-Journals and online databases, students can copy and paste the material into their work processors and put their own name on it (McMurtry, 2001).

It is difficult to establish the extent of plagiarism and other forms of cheating, nevertheless some rather alarming figures have been presented by various studies. McMurty (McMurtry, 2001), reports longitudinally where in 1998, 80% of a group of approx 3000 students admitted to instances plagiarism. This figure represented a 10% increase over a 15 year period where the same question was posed. Hamiln and Ryan report similar figures on instances of plagiarism with a group of over 2000 students (Hamlin & Ryan, 2003). Again, similar figures are reported by Selingo for engineering students, with 58& admitting cheating in 1964 which jumped to 82 percent in 1996 (Selingo, 2004). As with most of the studies, when confronted, most students claim ignorance of the seriousness of plagiarism.

One approach to this problem is to educate students about plagiarism, its various forms and to discuss this openly with students. This is often done in the wider setting of a subject on Ethics in their respective degrees. According to Buchanan (Buchanan, 2004), students themselves identify the need for such an ethics course, but of the students surveyed, plagiarism only ranked 2% as an area of concern. Many universities have an ethics course, or a component of ethics within their courses, and yet plagiarism continues to grow. The Faculty of Business and Law at Victoria University (Australia), requires each student to submit a signed declaration with each assignment stating that they understand the

university regulations on collusion and plagiarism. This does not seem to deter instances of plagiarism. All it does do it to remove ignorance as an excuse when caught.

Freedman (Freedman, 1998), points out that all great innovations inevitably have unexpected consequences, and suggests that academic faculty may be more to blame for the rise in plagiarism than students. We are now operating in a new landscape of technology and education, and not adapting to this landscape and anticipating the consequences will help foster the environment plagiarism thrives in. One of these reported consequences is that the Internet has bought with it and overabundance of information which has led to a lack of appreciation for the research process (D. Evans & Merhout, 2004). This lack of appreciation has inevitably led to copyright and plagiarism violations.

Given the new educational landscape we seem to be operating in, it is fair to ask if plagiarism seems to be more prevalent in online classes. This is frequently one of the many accusations levelled against online classes, but is often no bases on any evidence. Few comparative studies have been done, however in one such study, Grijalva, Kirklet and Nowell reported than in a single online class, plagiarism is no more evident than in a traditional class (Grijalva, Kerkvliet, & Nowell, 2003). This was attribute to the design of online courses which in many cases may reduce some types of cheating such as 'panic' cheating.

The literature seems to suggest that the way to tackle plagiarism is through the redesign of curriculum to account for the new landscape, and to consider carefully the design of assignments and their assessment (Freedman, 1998; McMurtry, 2001; Tribe & Rendell, 2003). In his article "Four Reasons to be Happy about Internet Plagiarism"; Hunt argues that the plagiarism phenomenon due to the new landscape is a good thing, as it is presenting challenges which we as academics will be forced to respond to (Hunt, 2002). The result will probably be a fundamental change in educational direction and assessment.

We outline here two vastly different techniques to combat plagiarism in two subjects offered by the School of Information Systems Victoria University, Melbourne Australia. Each take a different approach by concentrating on the learning required of the assessment tasks and combating plagiarism at a different phase of the task.

CASE 1: COMBATTING PLAGIARISM AND IMPROVING VALUE

This case discusses learning activities in the subject "BCO6653 Management of Information Technology," offered by the School of Information Systems, part of the M.Bus (Information Systems). The course format is a total of twelve subjects, usually taken over three semesters full time. BCO6653 is a core subject in this course, and one of the first subjects that students study. Enrolment in this subject ranges from 50 to 80 students per semester. Over 80% of these students are full-time overseas students. A number of these students do not have any prior working experience in information technology nor in management. The purpose of this subject is to introduce students to the issues faced by the manager of an information technology (IT) department.

Specifically, the subject aims for each student to:

- Be familiar with current research and developments in information technology management;
- Be familiar with important management issues in managing information technology;
- Understand the information management approach, its nature and importance
- Be able to apply relevant methods and techniques to better manage information resources;
- Have applied a relevant method or part of a method to an organisation or part of an organisation and prepared a report;
- Plan and prepare a substantial research paper on a designated topic; and
- Have critically reviewed research papers, presented the evaluations and lead group discussions on the evaluations.

In order to do achieve these objectives, the subject is based around a number of major issues that are examined in each of the two major learning activities (assignments). The number of issues covered varies slightly from semester to semester. Many of these topics are covered in other subjects in the course. An important component of this subject is that it concentrates upon each of the topics in relation to how they affect the manager of an IT department in an organisation. Students are constantly reminded of this as they prepare their assessment tasks for the subject.

How do we facilitate a student's appreciation and learning of the various current issues in the management of IT? We design learning activities around the concept of constructivism. The application of constructivism in teaching means that a student's learning is based on the degree to which the subject content is made meaningful to the student with respect to the student's world view; that in order for a student to learn, he/she must be able to personally construct meaning from the subject content. In other words, the subject will mean something to the student if the student is supported in constructing meaning for it. This 'meaningfulness' is evident if students feel a 'need-to-know':
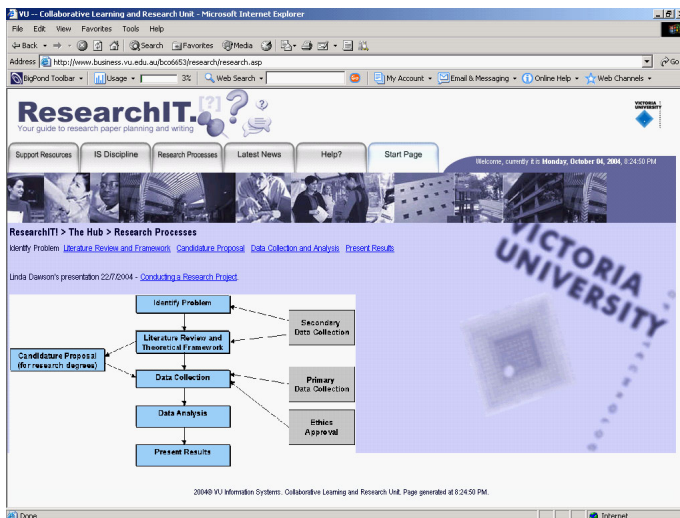
When students feel this need-to-know, they try to focus on underlying meaning: on main ideas, themes, principles or successful applications...students needing to know will naturally try to learn the details as well as making sure they understand. When using the deep approach in handling a task, students have positive feelings: interest, a sense of importance, challenge, even of exhilaration. (Biggs, 1999).

It can be argued that developing this 'meaningfulness' involves encouraging the student to participate and interact, at an intellectual level, with the material presented. One way this can be done is through the structuring of learning activities that pose an IT management-based question or problem to a student. It is argued here that facing a relevant problem will motivate the student to look for information that will help answer the problem. The students then assess the relevance of the information and communicate what they have found. Applying this technique can be an effective strategy in facilitating a student's learning of 'management of IT' issues. The assessment of the subject is divided into two major learning activities.

Both major learning activities/ assignments involve students selecting one of the major topics and investigating it at some depth. Students prepare a paper for the first learning activity. The paper is based upon 'theory' and 'practice'. For 'theory', the students have to search the online databases (such as ABI Inform or Business Source Premier) for materials to prepare a 'mini' literature analysis. At this stage they have had the value of selecting 'peer reviewed' journals over web sites found using a search engine explained to them. For the 'practical' component, each semester the students have to relate what they have discovered in their literature analysis to a 'real' application. In recent semesters these have included the use of case studies in each of the major areas or reference to materials gathered from 'online' magazines for IT managers (such as www.CIO.com). In this way the students are introduced to the notion of gathering the best research in the area from peer-reviewed publications and comparing it in some way to actual practice. The students are tutored in researching materials, preparing literature reviews and case studies using a school website set up to encourage these practices within the school, Figure 1.

It is important that students are encouraged to access these materials from wherever is convenient (Home, school, work or even an Internet café). To us it seems easier to embrace these technologies rather than try to avoid or restrict them. To avoid plagiarism, we modify the particular 'practical' task to be performed each semester. This way, students are unable to use work from previous semesters, or even download 'typical' papers from the Internet as they never exactly match the topic being covered. In addition, we require students to only include material of the highest quality (from peer reviewed journals) in the assignment. We even supply them with a template that requires them

Figure 1. Web Page for Instruction on Research Paper Writing

to list the registration number of the article from the particular online database they are using (eg Business Source Premiere or Emerald). If students wish to use other materials (such as books or even other Internet sources) they are required to get permission from one of the lecturers. If they suggest a site which is unsuitable (for instance, a proprietary site) the limitations of such a selection are explained. When a student submits an assignment that includes online references that are not approved those sections of the assessment are assessed as if there is no supporting reference at all. Most students soon get the idea and stop using Google as their first port of call for assignment research!

The second learning activity involves students conducting interviews with IT managers on selected issues – but also involves a literature analysis. By this time of the semester, the standard of literature analysis submitted is quite high, being original work based upon high quality references and well crafted.

CASE 2: COMBATING PLAGIARISM BY TESTING SPECIFIC TASK KNOWLEDGE

This case discusses learning activities in the subject "BCO3345 Object Oriented Systems" offered by the School of Information Systems as part of the undergraduate Bachelor Business (Information Systems). BCO3345 is an elective subject which primarily focuses on Object Oriented programming in Java. For assessment, the subject has a final exam component worth 60% and an assignment component worth 40%, which is earned by the accumulative score of three semester assignments. The subject is usually taken by a mix of part-time and full-time students, with the full-time students accounting for approx 80% of the numbers. At least 50% of the students are usually overseas students where English is not the first language. Due to the Faculty and School prerequisite regulations, this subject can be undertaken with only an introductory programming concepts subject having been previously undertaken.

Plagiarism on the assignment work has always been a problem, partly due to the lack of English skills of many of the students, and partly due to the lack of programming background due to the course structure. Plagiarism occurs mostly between the students in the same class, but also often enough from available sources on the Internet. When detected, plagiarism is dealt with, however, not all cases are detected (or can be conclusively proven). Anecdotal evidence suggests that assignments scores are artificially high in many cases. We needed a method which allowed the students to work together on the assignments (particularly the overseas students) and yet, which allowed us to test the individual learning from the assignment itself.

In Semester 2, 2001, we trialed a method for three consecutive semesters which helped us to achieve these goals. The students were given 3 assignments each semester, with each assignment requiring them to build software using particular techniques to achieve desired goals. The students were instructed that they could work individually or with others, but the assignment was not to be submitted. Instead, after the due date for the assignment had passed, the students would be given a small multiple choice test in the next class after the due date. These tests were specifically designed to test the knowledge the student should have gained during the course of doing the assignment.

For example, in one assignment, the purpose is to create many objects during the course of running a small simulated banking system. The objects were all to be stored in one Java Vector and then a mechanism constructed to retrieve specific objects from that Vector. In Table 1, a sample question is shown from the assignment test.

During the course of the assignment, the students could consult with their lecturer, tutor, or work with any other student. The student could even opt to not do the assignment if they wished. However, all students were warned that while they could get help from any source, they should be familiar with all aspects of the assignment solution, as the knowledge they should have accumulated would be tested. Three different copies of each test were made, with the order of the questions and the alternatives for each question different on each test. Each student had a different version that the person on each side of them when it was undertaken. This method was trialed on all three assignments for a period of three semesters and then compared to another three semesters where standard assignments were set then individually graded. The results are shown in Table 2.

The shaded bottom portion of the data in Table 2 represents those semesters where the specific assignment tests were used. In some cases, over the three year period, the total assignment component of the subject was worth a different percentage. All the figures displayed in Table 2 were after the data was adjusted so the total assignment score represented a score out of 40. The Avg. Score represents the student average score out of 40 marks for all three assignments. The Std. Deviation is the standard deviation of the sample, and the Avg. Deviation is the average of the absolute deviations from the mean.

As can be seen from the data in Table 2, most obvious feature is a lower average accumulated score for the assignments administered using the new methodology. We believe that this represents a more realistic representation of the students grasp on the assignment material. The standard deviations and average deviations tend to be higher for the new methodology, indicating more variance in the assignment scores. An analysis of the pass rate for the subjects indicated no significant difference over the two assignment scoring techniques.

The challenge when constructing the test questions is to not include general knowledge questions, but test only specific learning outcomes of the assessment task. Setting the assignment requires no more effort than before, but obviously extra effort is required in constructing the multiple choice test to test the specific knowledge gained in performing the assignment. However, this is then offset by the reduction in time required for grading.

CONCLUSION

The advent of the Internet into higher education has had many profound effects on teaching paradigms and pedagogies. Unfortunately, all great innovations have unwanted side-effects, and it seems that ease of plagiarism is an unanticipated side-effect of the Web. While it's unclear whether cases of plagiarism have indeed risen since the advent of the Internet, it has increased the ease with which plagiarism can be conducted. Many academics and indeed many institutions concentrate on the detection of plagiarism and follow-up procedures, however simply making students aware of plagiarism and of the penalties does not seem to be the answer.

It seems that an evolution in procedures for assessment tasks may be underway, and as academics we should view the Internet as a tool to be

Table 1. Sample Question to Test Specific Assignment Knowledge

The following code relates to the next 2 questions. Examine it and answer the next two questions. This code assumes the Vector bankObjects is created elsewhere, and the sample classes from assignment 1 have been used

```
static Savings anothermethod(long aid) {
    Savings a;
    Object o;
    int i;

    for (i = 0; i < bankObjects.size(); i++) {
        o = bankObjects.elementAt(i);

        if (o instanceof Savings) {
            a = (Savings) o;
            if (a.getAccountNum() == aid) return a;
        }
    }
    return null;
}
```

11. Which of the following do you think best describes the purpose of this method?

a. To see if a Savings object with accountNum field equal to the parameter exists
b. To retrieve and return a Savings object which has the given accountNum
c. To return a Boolean value equal to true if the Savings account exists
d. To return a *null* value

Table 2. Analysis of Assignment Data from 6 Semesters

Subject Run	Avg. Score	Std. Deviation	Avg. Deviation
Semester 1 1999 (26)	28.700	6.000	4.475
Semester 2 1999 (28)	28.489	6.715	5.518
Semester 1 2003 (27)	27.692	6.820	4.915
Semester 2 2001 (56)	23.616	6.625	4.725
Semester 1 2002 (36)	23.443	6.429	5.144
Semester 2 2002 (41)	25.289	7.064	5.522

used rather than an adversary aiding and abetting plagiarists. Plagiarism occurs for many reasons, and there are many things we can do combat this. We are operating in a new landscape and traditional assessment methods are open to abuse in this environment. This paper has discussed two case studies where different techniques were used in the prevention plagiarism. Both of these thwarted plagiarism during different phases of the assessment task process, and both were successful in their own way. Any required effort to combat plagiarism by concentrating on changing the assessment process is to the benefit of the student and the education process.

REFERENCES

Biggs, J. (1999). *Teaching for quality learning at university: what the student does*: Society for Research in Higher Education and Open University Press.

Buchanan, E. A. (2004). *Ethics and Students in the Information Professions: A Survey of Beliefs and Issues in Information Ethics Coursework.* Paper presented at the Innovations Through Information Technology, IRMA '2004, New Orleans, USA,

Evans, D., & Merhout, J. W. (2004). *Impacts of IT on Human Behavior in Library Settings.* Innovations Through Information Technology, IRMA '2004, New Orleans, USA,

Evans, J. (2000). The New Plagiarism in Higher Education: From Selection to Reflection. *Interactions, 4*(2) http://www.warwick.ac.uk/ETS/interactions/vol4no2/evans.htm.

Freedman, M. (1998). Don't Blame the Internet for Plagiarism. *Education Week, vol Nov 25 1998.* http://www.edweek.org/ew/1998/14freed.h18

Grijalva, T., Kerkvliet, J., & Nowell, C. (2003). *Academic Honesty and Online Courses*Retrieved 30/9/2004, 2004, from http://oregonstate.edu/dept/econ/pdf/cheat.online.pap6.pdf

Hamlin, L. S., & Ryan, W. T. (2003). Probing for Plagiarism in the Virtual Classroom. *Campus Technology (Syllabus), vol May 2003.* http://www.campus-technology.com/

Hunt, R. (2002). *Four Reasons to be Happy about Internet Plagiarism.* Teaching Perspectives, St. Thomas University, New Brunswick, CANADA Retrieved 29/9/2004, 2004, from http://www.stu.ca/~hunt/4reasons.htm

McMurtry, K. (2001). e-cheating: Combating a 21st Century Challenge. *The Journal, vol 29 # 4.* http://www.thejournal.com/magazine/vault/A3724.cfm

Pean, H. (2000). Virtual Fake Outs. *Student.Com, vol Mar 18 2000.* http://www.student.com/article/plagiarism

Selingo, J. (2004). The Cheating Culture. *ASEE Prism Magazine, vol Dec 1998 # 14,* 1. http://www.prism-magazine.org/sept04/feature_cheating.htm

Tribe, D., & Rendell, C. (2003). *Meeting the plagiarism challenge.* Paper presented at the Complexity, creativity and the curriculum, 5th Annual LILI Conference, Jan 2003, University of Warwick, UK, http://www.ukcle.ac.uk/lili/2003/papers/tribe.html.

Related Content

Science, Ethics, and Weapons Research
John Forge (2018). *Encyclopedia of Information Science and Technology, Fourth Edition (pp. 3205-3213).*
www.irma-international.org/chapter/science-ethics-and-weapons-research/184031

Adaptive Hypermedia in Education
Vehbi Turel (2018). *Encyclopedia of Information Science and Technology, Fourth Edition (pp. 2357-2368).*
www.irma-international.org/chapter/adaptive-hypermedia-in-education/183949

Personalized Course Resource Recommendation Algorithm Based on Deep Learning in the Intelligent Question Answering Robot Environment
Peng Sun (2023). *International Journal of Information Technologies and Systems Approach (pp. 1-13).*
www.irma-international.org/article/personalized-course-resource-recommendation-algorithm-based-on-deep-learning-in-the-intelligent-question-answering-robot-environment/320188

Empirical Investigation of Critical Success Factors for Implementing Business Intelligence Systems in Multiple Engineering Asset Management Organisations
William Yeoh (2009). *Information Systems Research Methods, Epistemology, and Applications (pp. 247-271).*
www.irma-international.org/chapter/empirical-investigation-critical-success-factors/23479

Application of Improved Sparrow Search Algorithm in Electric Battery Swapping Station Switching Dispatching
Qingsheng Shiand Feifan Zhao (2023). *International Journal of Information Technologies and Systems Approach (pp. 1-21).*
www.irma-international.org/article/application-of-improved-sparrow-search-algorithm-in-electric-battery-swapping-station-switching-dispatching/330421