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Author(s): Malik, Gaurav; Kretsis, Mike.
Article title: Challenges and Success in Teaching Legal, Ethical, Social and Professional Issues to Computing Undergraduates
Year of publication: 2010
Citation: Malik, G. and Kretsis, M. (2010) 'Challenges and Success in Teaching Legal, Ethical, Social and Professional Issues to Computing Undergraduates',In Proceedings of the 15th Annual INSPIRE conference, 31st of March 2010, BCS London, London, UK.
Link to conference site: http://inspire.lboro.ac.uk/index.php

Challenges and Success in Teaching Legal, Ethical, Social and Professional Issues to Computing Undergraduates

Gaurav Malik[1], Mike Kretsis[2]

School of Computing, IT and Engineering,
University of East Lodon
London
E16 2RD
[1]gaurav@uel.ac.uk
[2]mike7@uel.ac.uk

Abstract

This paper discusses issues around the teaching of legal, ethical, social and professional issues (LESPI) to computing undergraduates. The inclusion of the above topics is mandatory for courses which seek accreditation from professional bodies in the UK such as the BCS and the Institution of Engineering and Technology. Coverage of these issues is important to create a generation of engineers who see how their profession impacts society and the responsibilities that society places on them. In the UK and abroad the rise of e-crime and the invasion of privacy have attracted the attention of the media which has brought these issues to the forefront. These issues in the past have been sidelined in core computing curricula. The challenge lies in delivering these topics to students on computing programmes who may not immediately see the relevance despite their higher profile. We will discuss the role professional bodies can play in highlighting these issues and raising the profile of the professional engineer. Specifically, the main research questions we address in this paper are:

How best to deliver LESPIs to computing students based on our experience over three years? What is the students' attitude to the "professional engineer"? What is the students' perception of LESPIs? Have students' attitude towards LESPI changed over the last three years?

By using end of module feedback and interviews with students we will demonstrate how they can be enthused about LESPI. We shall investigate how innovative teaching, experts and workshops can bring about this transformation.

1.0 Introduction

The development of a skills module within the computing degree programme at UEL was a consequence of both external and internal influences. The external influence in this case was the BCS from whom we are seeking accreditation for our courses. It is mandatory for courses which wish to have BCS accreditation to have coverage of LESPIs within the programme [1]. Research shows that many courses have have chosen to include LESPIs in their computing curriculum in order to gain professional body accreditation [2][3]. In addition to external influences the development of skills modules at UEL has also been driven from within the university. All programmes across the university, irrespective of their content, need to include a skills module[4].

Students across computing programmes at UEL study a level 2 module called "Professional Issues". The module is studied by an average of 150 students. The students who take this module are studying a wide variety of degrees ranging from Business Information Systems to Information Security Systems

This paper discusses the issues faced by the teaching team over the last three years. We will start by outlining the context of teaching ethics to computing students and ways in which we have tried to add make the course interesting to students. We will reflect upon students' perception of the module. Finally we will present our conclusions and outline future options and possibilities.

2.0 Why teach LESPI?

The teaching of LESPI is no longer reliant upon the personal interests of individual members of staff. Rather, it is a case of outside factors influencing on the curriculum. In most countries the inclusion of LESPIs in the curriculum has been lead by the respective professional bodies. In professions like medicine, law and accountancy, professional bodies have maintained a strict code of conduct and guidelines within which the members of their profession operate. In 1992 both the BCS and the ACM adopted a professional code of conduct for IT practitioners. As can be expected these codes of conducts have been through several revisions.

As in other areas the drive towards professionalism in computing has been lead by the BCS in the UK. Computing unlike law, medicine and accountancy does not require its professionals to have a "license" to practice. This can be attributed to several reasons, from the way the profession has developed to the hiring practices

of companies. This has made the notion of a "computing professional" challenging for the IT and computing professional bodies. This filters down to the students who study computing and IS who fail to see the relevance of LESPIs in their studies.

To lay the foundations of a new generation of computing professionals we need to start at the grassroots with the students themselves. This compounded with recent incidents highlighted in the media in the UK and abroad have raised the importance of LESPIs. Students living in the digital millennium are now faced with issues surrounding copyright and privacy on a daily basis. This has an impact on their general awareness of the importance of LESPIs.

With computing playing an integral part in the world we live in, the public now also sees the relevance of social and ethical challenges faced by computing professionals. Todd, Verbick and Miller [7] state the importance of ethics education for the 21st century workforce. Incorporating LESPI in the 21st century computing curriculum is no longer an option it is not a matter of if, but how.

3.0 Pedagogical principles of teaching LESPIs

Our attempts to encourage engagement are informed by the ideas of constructivism, examples of which include Dewey's theory of Social Activism [9] and Vygotsky's Theory of Scaffolding [10]. Central to constructivist approaches to learning is the idea that learners construct knowledge (and reality) for themselves by actively engaging with concepts and information in their environment. As part of this active learning process, meaning is developed on the basis of experience and inquiry [11]. A constructivist approach requires that situated learning, social negotiation and multiple perspectives as learning strategies are adopted to assist the learner in his or her quest for knowledge [12].

Wahl[13] refers to the characteristics of active leaning strategies as presented by Bonwell and Eison [14].

- Students are involved in active learning activities such as writing, discussing, and reading rather than passive activities such as listening.
- Emphasis is placed on exploration of attitudes and values.
- Emphasis is placed on higher order thinking skills such as analysis and evaluation,
- Group centred learning.

These issues have been discussed in length in the academic community. Work carried out ColdWell and Goold [3] make references to Wahls work.

The teaching of LESPIs, unlike other computing subjects, is driven by the students themselves. A group of students vocal in their expression of LESPI is certainly

more engaging than a passive group. With students on this module coming from a wide variety of backgrounds the teaching team has also found variance in how students interpret and regard LESPIs. In workshops and interviews the teaching team has experienced wide variation in students' interpretation of LESPIs. There is some evidence to suggest this is related to their country of origin. Further research is needed to establish this connection..

4.0 Module Content and Delivery

The structure of the Professional Issues module at UEL is governed, to a large extent, by the rules and regulations laid down by the University's Academic Framework. In common with the vast majority of modules at undergraduate level, the Professional Issues module is a 20 CATS (Credit and Accumulation Transfer Scheme) points module which requires 200 hours of study time. The module consists of 12 weeks of teaching, followed by one week of revision and finally a two week period in which the module examination will fall. The module has been running in its current form since 2007 with typically 150 students per cohort. A significant number of these students are international. The module is delivered by two full time members of staff, one of whom has been teaching the module since its inception. Both full time members of staff have worked in the IT industry as well as having extensive teaching experience. The full time members of staff are supported by part-time members of staff, some of whom also have experience of the IT industry. The teaching staff are complemented by a number of guest speakers, all of whom currently work in the IT industry and who discharge a range of responsibilities from promoting the role of professional bodies such as the BCS to ensuring that corporate web sites are fully accessible to disabled people..

Each week students attend a two hour lecture, delivered by either the full time members of staff or one of the guest speakers. Students also attend a two hour seminar or tutorial each week which is run by a combination of the full and part time staff. The module is essentially split into two largely self-contained but related parts. For the first five weeks, the module content focuses on employability issues. In the lectures, the students are introduced to the processes and problems associated with gaining a job in the IT industry. For the remaining part of the module, the content focuses on the LESPIs. Certain issues such IT law and the role of professional bodies will be covered each year. Coverage of other LESPI-type issues will vary from year to year depending on what is topical and which guest speakers are available. Tutorials during the second part of the module typically involve group discussions relating to LESPI-type issues. In many cases, students will be posed an ethical or legal problem and will be asked to decide what course of action would be most appropriate in the circumstances. Students are expected to fully justify their chosen course of action. One such discussion is the monitoring of emails. Students are asked to imagine that they were network administrators and that they have been instructed by their line manager to read the emails of fellow employees. The purpose of this action is to determine whether or not the email system is being used for personal use. The employees whose emails will be read have not been warned or informed in any way that such monitoring will take place.

Students are asked to decide what ethical course of action would be appropriate and whether there are any legal implications of monitoring emails in such a fashion. This particular issue always generates significant debate amongst students. Some will maintain that ultimately the employer has the right to monitor emails. Others will argue that there is an important issue of privacy at stake and that employees should therefore at least be given some advanced warning of the monitoring process.

The students' learning is supported by a virtual learning environment from which they can download course notes and find links to a variety of information relevant to employability in the IT industry or LESPI issues. Discussion forums are also available which allow the free exchange of ideas between both students and staff.

The assessment of the Professional Issues module consists of three components, an examination, a group based project and a short piece of individual work. The examination is closed book and lasts for 90 minutes. It contains four questions. Students must answer two of these questions. The questions are designed to test the students understanding of the LESPI issues. Typically each question covers more than a single topic thereby ensuring that the students must address a range of issues in order to pass the examination. The group based project and individual work are designed to assess the extent to which students have considered their chosen profession. Students are encouraged to reflect on their past and the steps they need to take to enter the IT profession. The intention is that students should be able to evaluate their own job applications as a result of their experience of the group based project. The individual piece of work requires the creation of a personal development plan (PDP). Students are asked to outline their career aspirations and to identify the skills that they need. At the end of the PDP, students are expected to produce an action plan which clearly identifies activities, with start dates and durations, which will enable the students to gain the skills they need and ultimately to realise their ambitions.

5.0 Enthusing students in LESPI

Student participation is a useful indicator of their interest in a subject. The use of guest speakers has helped to engage the students and to keep the module topical. Over the last three years we have invited speakers from both inside and outside the university. These include colleagues from the School of Law who have delivered a guest lecture on the legal issues which face computing professionals. Their emphasis was less on specific IT legislation and more on the role that computing professionals can play in the workforce. Laws in the computing area are well defined and understood, the stipulations laid down by the Police and Justice Act, Computer Misuse Act, Data Protection Act have clear guidelines on the areas they cover.

Laws such as the Disability Discrimination Act(1995) are less specific in their interpretation. It is here that we have held debates and encouraged students in

lively discussions. Through these means we have encouraged students to think beyond the classroom..

In addition to the speakers from the School of Law a number of individuals from outside organisations have also addressed our students on issues such as accessibility. We have had speakers from EmployAbility and AbilityNet. Speakers have shown how screen readers and a variety of technologies which help them use their computer. This personal A 2 hour session from him achieved a lot more than any books or exercise could have done.

Getting outside speakers to come and speak to students is challenging. We approached several organisations and had luke-warm to no response to our requests. Due to the way university timetabling is done we have very limited timeframe to invite, organise and schedule outside speakers.

By using a external speakers who bring with them specialised knowledge and personal experience we can expose students to LESPI.

We have attempted to use role play to dramatise situations related to Professional Issues. We concentrated on professionalism and career. We have followed this with discussions and debate. While we cannot claim success in the same away through the use of video clips [15] the dramatisation got students excited and interested in the subject. It is very similar to using movies as reference. Movies like *Enemy of the State*, *The Net*, *Sneakers* raise issues around privacy.

Our attempt has been to make the academic content more interesting and accessible to the students.

6.0 Student Evaluations

Student feedback is collected by using an end of module questionnaire. Students are asked to rate their overall experience of the Professional Issues module and are given 4 options, Very Satisfied, Satisfied, Dissatisfied and Very Dissatisfied. In addition students are able to comment on both the positive and negative aspects of the module. An analysis of the student feedback is shown below.
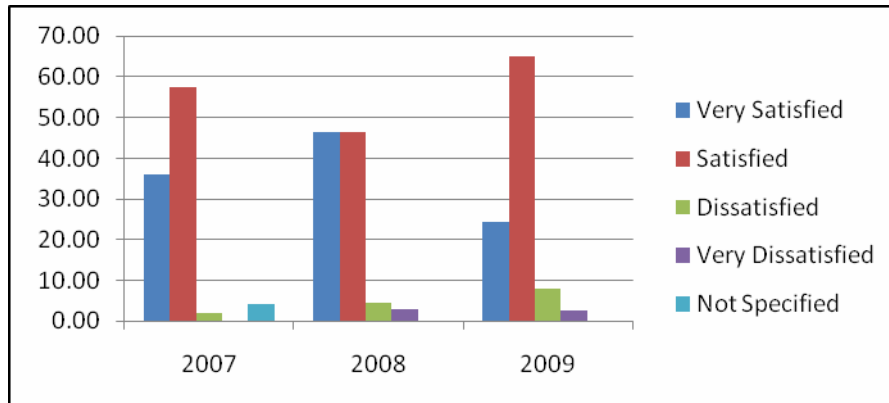
Figure 1:Survey of student feedback

The overall satisfaction rates of the students have remained fairly consistent. The vast majority of the comments received over the last three years were of a positive nature and some examples of these are included below.

- I'm more aware of the aspect of disabilities
- I know more about what is ethical and what is moral
- Being introduced to legislation gave an insight into real life situations
- Taking part and presenting in 'live simulations' during seminars helped my understanding
- The module gave me a broad view of how strict the law is concerning IT.
- We got to know the BCS code of conduct
- Lectures about legislation and ethics are very informative
- The module taught us how to behave professionally, applying ethical and legal issues.
- I developed a good understanding of the computing profession.
- I developed an awareness of the legal and illegal aspects of computing
- I found the presentations by people not from outside the university very interesting.
- I found the module very educational; I improved my CV and gained an understanding of my responsibility as an IT professional.

Whilst feedback was mostly positive, a number of issues areas of improvement were identified by the students some of these areas are listed below:

- the material of the course is superfluous if you have, as I do extensive commercial experience in IT. There should be an opt out of this module for prior work experience.

- I think the lectures could have been improved by having a greater focus on the legal aspects of the course.
- More outside speakers would be welcome.
- This module is more suited for business students rather than computing students.
- More speakers from different companies could have improved the module.

As can be seen from the feedback some students still perceive LESPIs to be irrelevant to their studies. What we can also see is that the students appreciate external speakers. Most students see the module in helping them develop as computing professionals.

7.0 Conclusions

This module has been delivered in its current form over the last three years. The successful teaching of LESPIs requires engagement with students through innovative means. We have seen positive trends in students' attitudes towards LESPIs over the last three years through the use of external speakers and role plays. Through the positive students feedback we can conclude that we have managed to keep the students engaged and excited about LESPI.

We would like to make use of collaborative tools like wikis to allow for student engagement off campus. We have had limited success with discussion forums on our virtual learning environment. The use of role play and videos to gather student feedback is something else that we will be looking at.

Further research is needed on the long term effect the module has made on the students. We also need to research if cultural backgrounds make a difference on students interpretation of LESPIs.

8.0 References

1   BCS. (2010). Accreditation criteria. Retrieved Jan 10th, 2010, from BCS: http://www.bcs.org/server.php?show=nav.7067
2   ACM. (2008). Curriculum guidelines for undergraduate degree programmes in information technology. Retrieved November 20th, 2009, from Association for Computer Machinery:
      http://www.acm.org/education/curricula/IT2008%20Curriculum.pdf
3   Goold A, Coldwell J, Teaching ethics in a virtual classroom, Proceedings of the 10th annual SIGCSE conference on innovation and technology in computer science education, pp 232 -236, Caparica, 2005
4   UEL. (2005). The Skills Curriculum. Retrieved Jan 10th, 2010, from University of East London: http://www.uel.ac.uk/qa/skills.htm
5   Lejk M & Deeks D, An introduction to systems analysis techniques. Addison Wesley 2002, ISBN 0-201-79713-5

6   EthicComp 2001, "Teaching Computer Ethics to IT Students in Higher Education: An Exploration of Provision, Practice and Perspective," Centre for Computing and Social Responsibility, De Montfort University, Retrieved Jan 10th, 2010,. URL: http://www.ccsr.cse.dmu.ac.uk

7   Todd K, Verbick T, Miller M, Ethics education in the microchip millennium, proceedings of the 29th annual ACM SIGUCCS conference on User services (SIGUCCS '01), pp271-274, New York, 2001

8   DeWitt J, Cicalese C, Contextual integration: a framework for presenting social, legal, and ethical content across the computer security and information assurance curriculum, proceedings of the 3rd annual conference on Information security curriculum development (InfoSecCD '06), pp 30 – 40, New York, 2006

9   Campbell, J. (1995) Understanding John Dewey: Nature and Cooperative Intelligence. Open Court Publishing Company, pp.38-45

10 Vygotsky, L. S. (1978) Mind and society: The development of higher mental processes. Cambridge, MA: Harvard University Press.

11 McPherson, M. and Nunes, M. B. (2004) Developing innovation in Online Learning – an action research framework. London: RoutledgeFalmer

12 Nunes, J. M. and Fowell, S. P. (1996) Hypermedia as an experimental learning tool: a theoretical model. Information Research News. 6(4), pp.15-27

13 Wahl, N. YAATCE - Yet Another Approach to Teaching Computer Ethics, proceedings of 30th SIGCSE, pp 22-26, New Orleans, 1999.

14 Bonwell, C. and Eison, J. Active Learning: Creating Excitement in the Classroom, ASHE-ERIC Higher Education Report No 1 Washington DC, George Washington University, 1991.

15 Yamanoue T, Nakanishi M, Nakamura A, Fuse I, Murata I, Fukada S, Tagawa T, Takeo T, Okabe S, and Yamada T, Digital video clips covering computer ethics in higher education. proceedings of the 33rd annual ACM SIGUCCS conference on User services (SIGUCCS '05), pp456 – 461, New York, 2005