



# The impact of institutional surveillance technologies on student behaviour.\*

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## Abstract

Contemporary education institutions are increasingly investing fiscal and human resources to further develop their online infrastructure in order to enhance flexible learning options and the overall student learning experience. Coinciding with the implementation of these technologies has been the centralisation of data and the emergence of online activities that have afforded the capacity for more intimate modes of surveillance by both the institution and education practitioner. This study offers an initial investigation into the impact of such modes of surveillance on student behaviours. Both internal and external students surveyed indicated that their browsing behaviours, the range of topics discussed and the writing style of their contributions made to asynchronous discussion forums are influenced by the degree to which such activities are perceived to be surveyed by both the institution and teaching staff. The analyses deriving from this data are framed within Foucault's works on surveillance and self governance. This paper discusses the implications of this new mode of governance for learning and teaching and suggests areas of further investigations.

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## Introduction

The increasing sophistication and integration of information and communication technologies (ICTs) within everyday life has afforded the introduction of new modes of surveillance. For instance, the development of data mining, "spyware", and network analysis characterize new modes of technologically enhanced surveillance that transcend previous spatial and temporal barriers associated with surveillance methodologies (Marx, 2002).

The impact of surveillance within the collective post-September 11 psyche is one that unambiguously reinforces Lyon's (2001) description of the tension between safety and control, or what he terms the 'two faces of surveillance'. Lyon explains the justification of surveillance measures as a means for obtaining societal endorsement and hence subsequent integration. For example, the convenience afforded by the use of credit cards overrides any protestation

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regarding the recording of consumer transactions that occurs as a result. Similarly, the employment of video cameras in shopping malls for the stated purpose of consumer safety is generally considered an acceptable justification for the inclusion of an overt surveillance instrument. This public compliance and acceptance of surveillance technologies has afforded the introduction of unparalleled levels of both overt and intimate modes of monitoring (Koskela, 2000). Modes of surveillance have become more prevalent and the technologies employed have become increasingly specialized. While the general public have become more aware of the multitude of surveillance technologies in use, they remain relatively ignorant of the quantity and variety of information that is captured, analysed and stored (Marx, 1998). Sewell (1998) argues that the multi-manifestation of surveillance instruments within both the public and private domains, and the specialisation and complexity associated with these technologies, has resulted in a form of 'chimerical control' that has led to increased levels of self regulation and discipline among the general populace.

The educational environment has not been immune to the introduction of surveillance technologies that facilitate the coordination and governance of both staff and students. As Rose (1999) suggests surveillance technologies are "designed in to the flows of everyday existence" (p 234). For example, the classroom, playground, and examination all represent various modes of surveillance that serve to better produce a *known* student population. While the monitoring of student performance in education was previously seen to be overt through institutional observation of the classroom, playground and assessment practices, the introduction of Information and Communication Technologies (ICTs) has afforded the capacity to centralise data, thereby providing new opportunities for a more extensive (and intrusive) level of monitoring (Gale and Kitto, 2003). Clarke (1988) introduced the term *dataveillance* to describe the capacity for computer technologies to access previously disparate and disjointed data to invoke new modes of surveillance.

Within the education context, computer mediated modes of surveillance are often implemented with the expressed intent of facilitating reporting and advancing the teaching and learning agenda. At the same time, they also provide enhanced efficiencies of management for an increasingly diverse student cohort. Kitto and Higgins (2003) suggest that the integration of various online educational databases has enabled the capacity for governance of the education populace from a distance. The authors maintain that the data derived from surveilling user behaviours permits the various organisational layers (university, faculty and lecturer) to enact differing processes and actions from a distance, thereby enabling the application of disciplinary power in novel ways. Rose (1999) describes this aspect of governmentality as an 'advanced liberal' mode of governance (p 140).

This paper aims to examine the often complex and specialised nature of technologically-driven modes of surveillance, and whether they result in an alteration of student online user behaviours, so as to ensure adherence and compliance within the prescribed boundaries enforced by the institution. This paper reports on a study investigating the impact of these surveillance technologies on student online user-behaviours. The discussion concentrates on how user behaviour is altered when students are aware of surveillance techniques, and the degree of influence surveillance technologies have on user behaviour within external (off-campus) and

internal (on-campus) modalities. To address these questions the paper firstly frames surveillance within the higher education sector and then reports on the findings of a preliminary study. Finally, this paper suggests possible directions for future research.

## Surveillance and Higher Education

In the educational sphere, students from the earliest stages of schooling are subjected to a diversity of techniques of surveillance. These techniques of control facilitate the production of a manageable and obedient population (Barrow, 1999). The application of these various forms of disciplinary technologies, such as the rules of attendance and operation, class timetables, fragmented academic disciplines and examinations, produce a normalised subject (Foucault, 1977). For instance, Foucault (1977) argues that processes such as examinations have enabled a categorisation of the student body. In essence, the examination merges both a normalising judgement with surveillance into a singular technique (Dreyfus and Rabinow, 1982). The examination operates not only to establish a taxonomy of scholastic achievement but to ensure a measure of surveillance and hence, pedagogical homogenisation of the institutionally-accepted curriculum. In a similar capacity the introduction of ICTs has also merged a normalizing judgement with surveillance (dataveillance) techniques through the storage and tracking of user data such as enrolment details, grades, access rights and online behaviours.

While surveillance has often been reported in terms of a growing dystopia, the affordances of new surveillance opportunities as a result of the integration of ICTs are also framed within the context of developing and enhancing teaching and learning practices. For example, Palloff and Pratt (1999) advocate the pedagogical value of actively monitoring forum contributions, as a means of facilitating the development of a learning community. Similarly, Morris et al. (2005) demonstrated the relationship between online user-behaviour and academic performance. The employment of these forms of ICT mediated surveillance enables the identification of students who may require additional scaffolding and support. Marzo, et al. (2002) maintained that the application of surveillance technologies that capture and analyse student user-behaviour (navigation, sites visited, frequency, etc.) can be used to inform practitioner reflections, thereby enhancing both future curriculum design and the subsequent integrated learning activities. Regardless of the positive or negative connotations associated with surveillance, the introduction of ICTs has added an additional level of complexity regarding the inherent capacities of these technologies for surveillance and the associated regulation of disciplinary power within these educational contexts (Kitto & Higgins, 2003).

The adoption of ICTs within educational institutions has resulted in the implementation of a series of policies and regulations designed to enforce institutionally accepted behaviours regarding the use of technologies. Although these policies and regulations provide a framework of authorised activities, these instruments of governance also serve to identify deviant behaviour, hence the implementation of the technology and associated activity allows for the regulation of behaviour and more intimate forms of surveillance. Kitto (2003), in adopting Foucault's notions of bio-power and the Panopticon within educational contexts, suggests that it is not only the social interactions translated through power relations that enact a form of surveillance and therefore, an

imposed level of self regulation and discipline. Kitto maintains that the relationship between student and the specific technology also produces a form of 'technologically-mediated objectification'. A clear illustration of this is found in individual student cards that contain specific identifiers such as an assigned student number which indicates various administrative rights to access institutional services such as the library, internet access and subject enrolment. Further examples of technologically-mediated objectification can be found within other communication based software such as discussion forums that are often a core learning and teaching resource associated with current learning management systems (LMS).

The integration of discussion forum software into the teaching and learning domain acts to authorise individual participation through the acceptance of the specific enrolment and student name criteria, as ratified through the central institutional database. This mode of student objectification permits a level of governance and therefore, the enactment of regulatory power. Additional and more individualised objectification is applied through the monitoring and subsequent interpretation of the posted contributions. Donath (1999) maintains that as a result of the absence of visual and auditory cues within Computer Mediated Communication (CMC) environments, there is an emphasis on the textual artefacts to form an understanding of the author's identity. Hence, student contributions to a class discussion forum are examined and classified by both peers and teaching staff in order to form an associated identity and subsequent categorisation for future recognition.

At Queensland University of Technology (QUT) Australia, the surveillance mechanisms in operation are evident through the tracking, storing and analysis of student interactions occurring within specific locales, such as the discussion forum. Additional forms of surveillance are present in all user interactions that are undertaken with the institution's administrative and student support software and the in-house proprietary learning management system - OLT. The OLT software has implemented surveillance capabilities that capture, store and analyse all student published interactions. These interactions with the prevailing technology include CMC contributions, individual text-based reflections and uploaded and downloaded files. Consequently, the manner in which QUT staff and students adopt OLT technologies is subject to the institution's authorised user behaviours and by the mechanisms of surveillance that are enacted. Policies of 'acceptable' technology use are regularly brought to staff and student attention and serve to ensure that deviant activities are rapidly identified and appropriate levels of disciplinary action are enforced when such behaviour is found to have occurred. Within the domain of CMC, surveillance mechanisms are enabled through the recording and subsequent analysis of the communicative episodes, such as chat logs, forum contributions, and the capacity for teaching staff to manually or automatically approve all student forum contributions prior to release.

As the introduction of online learning environments into mainstream education intensifies, the use of collaborative focussed software such as CMC will also demonstrate an increased level of incorporation (Taylor, Pillay, & Clarke, 2004). However, discussions concerning the introduction of these online collaborative practices among contemporary education institutions have predominantly focussed on the affordances of the technology in contrast to any authentic connection to the pedagogy (Burnett & Dawson, 2005). One question that now remains to be addressed is how the introduction of ICTs and their inherent surveillance capacities has impacted

on the learning behaviour of the student cohort. This study aimed to investigate the impact of surveillance on student online user-behaviour within the context of such overt modes of surveillance embedded within the institution. Specifically, the study addressed the questions:

- what is the impact of surveillance on student online user-behaviour when accessing university facilities for internal and external cohorts;
- is online user-behaviour modified according to the students' awareness of the surveillance technology; and
- What is the impact of surveillance on student online user-behaviour when participating in class discussion forums for both internal and external cohorts?

## Methodology

First, the study sought to gauge the degree to which both internal and external students studying Early Childhood Education were cognisant of the modes of surveillance that operate within the universities online facilities. Secondly, the study aimed to assess the extent to which students perceive they change their online behaviour as a result of institutional surveillance techniques. Thus this investigation attempted to ascertain the degree of cognisance amongst internal and external university students regarding the institutional policies pertaining to information and communication technologies and how this level of student understanding influences user behaviours.

Thirty (30) internal students and twenty three (23) external students currently undertaking Early Childhood studies in the Faculty of Education, Queensland University of Technology, were presented with a seven-item Likert survey. The survey specifically addressed students' awareness of two prominent surveillance instruments within the university online information systems –the Information Facilities Policy which details the student requirements for access to University technologies; and the reporting systems within the Online Learning and Teaching (OLT) system which provides students and academic staff access to faculty developed learning content and activities. The survey also assessed the degree to which students perceived they modified their individual user behaviour (1-4 Likert scale) as a result of their level of understanding of the two surveillance instruments. Student user behaviours examined included internet browsing, range of topics discussed using computer mediated communications, and writing style adopted within the unit or broader university domain. While the survey instrument was delivered during class for all internal students, the external student cohort was notified via email of an analogous online version accessible via the teaching unit's OLT site.

## The Information Facilities Policy

The Information Facilities Policy is an enterprise policy specifying the institutional accepted behaviour for both students and staff when accessing University technologies such as computer labs, internet, library resources and the OLT system. The policy requires students to obtain a student username and password before access can be authorised. Once this is obtained all

student Internet activities are monitored including sites visited, size of downloads, session times and duration as well as content uploaded.

## Online Learning and Teaching System

The OLT system was initially implemented to provide staff and students with additional online supplementary resources, such as lecture materials in a flexible delivery model. The ensuing evolution of learning management software has resulted in OLT echoing the standard commercial developments in the field, so that the system currently has the capacity for rich interactive online experiences through the incorporation of CMC, integrated media, group work areas and enhanced design and navigational aids. A component of the development has been to monitor and capture staff and student interactions in order to focus financial and human resources in areas of most demand and to predict future patterns of user behaviour. Recent evaluations regarding OLT usage confirms the popularity of the discussion forum resource among QUT teaching staff and students. At an enterprise level (whole University) staff incorporated an average of 1.8 forums and 3.9 topics per Unit of study (OLT evaluation Jan- May 2005). Table 1 (overleaf) illustrates the number of discussion forum and discussion topics embedded within OLT units at both a faculty and enterprise level. The degree of incorporation of the discussion forum within the Faculty of Education indicates that the resource provides a valuable communication link between both staff and students and peer to peer interaction between students.

Although the discussion forum is heavily utilised (in comparison with QUT enterprise data), some academic staff raised concerns regarding the publication of potentially inappropriate contributions and postings of misinformation, leading to student confusion. For example, inappropriate personal messages are often a precursor to flaming which can often be avoided through appropriate netiquette and Academic intervention. This prompted the development and integration of an optional approval stage for all contributions to the forum. The investigation of the influence of this facility on student behaviour provides valuable insights into the impact of increasing degrees of surveillance techniques when comparing the Information Facilities Policy with the discussion forum approval process. This study surveyed students undertaking a unit of study where the academic staff member included the discussion forum approval process as a component of the learning and teaching activities implemented for the unit.

Faculty	Number of forums / Unit	Number of topics / Unit	Total number of Units
Built Environment and Engineering	0.84	1.79	888
Business	1.44	2.71	639
Creative Industries	1	2.98	474
<b>Education</b>	<b>3.12</b>	<b>5.04</b>	<b>599</b>
Humanities and Human Studies	1.76	2.79	177
Health	0.84	2.28	549
Information Technology	0.83	2.92	421
Law	6.11	14.09	327
Science	0.24	0.68	647
<b>Enterprise</b>	<b>1.79</b>	<b>3.92</b>	<b>4247</b>

**Table 1:** The average number of forums and topics per OLT unit in individual QUT faculties and at an enterprise level.

## Statistical analyses

Data garnered from the external and internal cohort was analysed using the software package SPSS for Windows © (Vers 12.0.1) incorporating a non-parametric statistical test. Due to the reduced sample population non-parametric statistics were incorporated to ascertain areas of significance between the sampled population. The non parametric statistical analysis employed in this study was the Mann-Whitney U test.

## Results

### *Student awareness of surveillance*

The preliminary results indicate a significant difference ( $p < 0.05$ ) in student awareness (internal and external cohorts) of the two investigated modes of surveillance – the Information Facilities Policy and the ability for academic staff to approve forum contributions prior to release. Ninety four percent (94%) of all students surveyed ( $n=53$ ) indicated an awareness of the Information Facilities Policy while forty six percent (46%) ( $n=52$ ) indicated that they were aware of the ability for academic staff to approve or disapprove forum contributions (Figure 1).

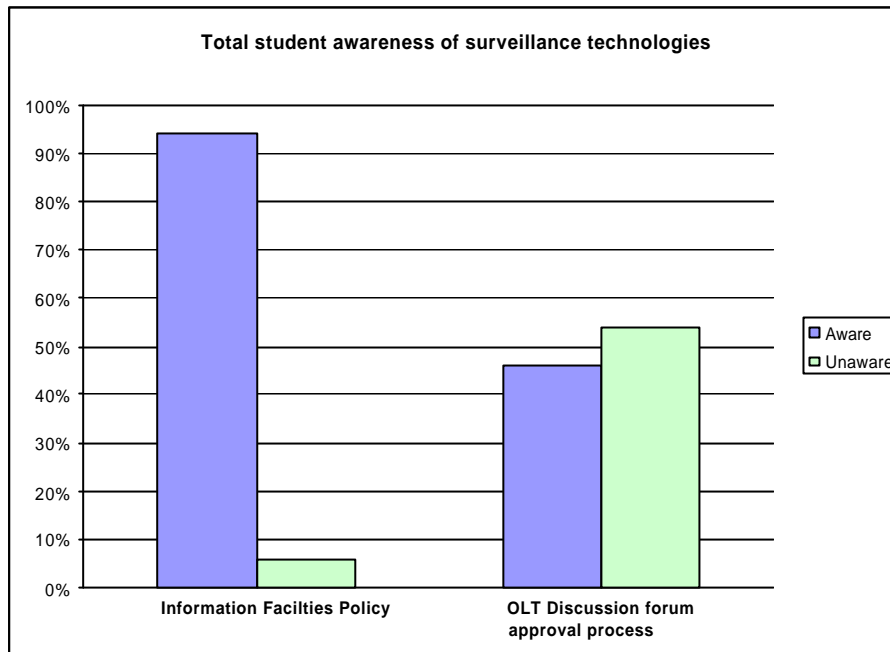


Figure 1: Student awareness of surveillance techniques employed within the university

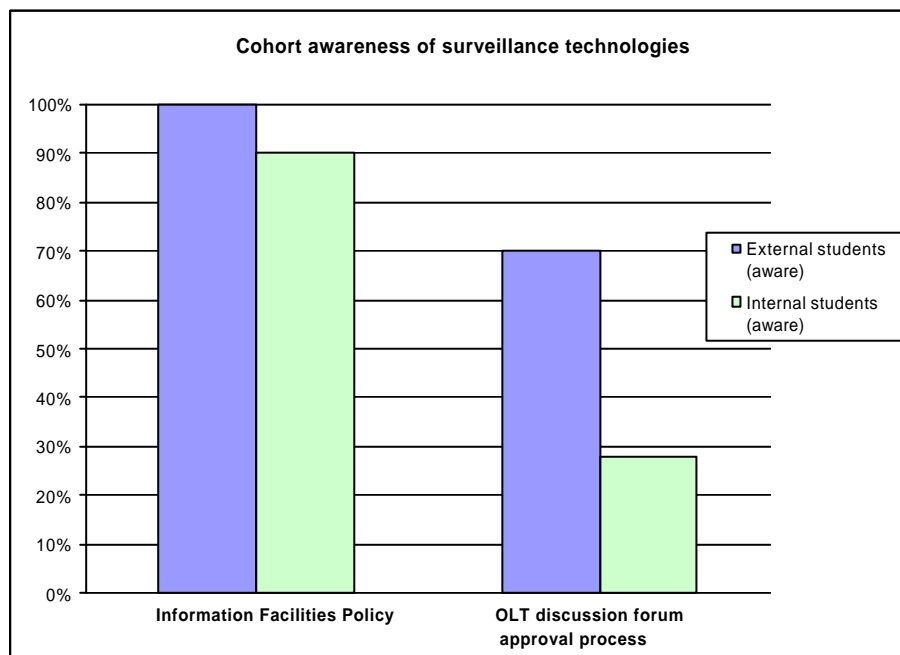


Figure 2: Cohort awareness of surveillance techniques employed within the university

Examination of student cognisance of the two surveillance technologies revealed that the entire sampled external cohort (100% n=23) were aware of the Information Facilities Policy. The internal cohort revealed a similarly high percentage of cognisance with ninety percent (90% n=30) of internal students noting that they were aware of the policy. With regards to student awareness of the forum approval process, seventy percent (70% n=23) of the external cohort

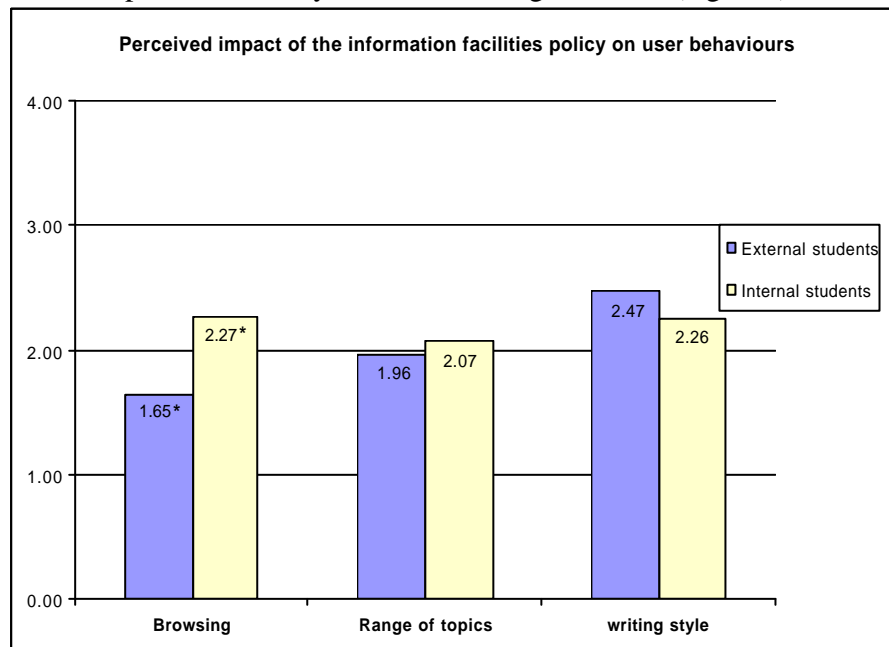
were cognisant of the ability for teaching staff to approve student forum contributions, while in contrast, a mere twenty eight percent (28% n=29) of internal students were aware of the approval process (Figure 2).

### *Perceived impact on student behaviour*

The study also sought to investigate the perceived impact of the various techniques of surveillance on the student use of the university online facilities. To evaluate this impact on user behaviour, two levels of surveillance, the Information Facilities Policy and the OLT discussion forum approval process, were examined with respect to the adopted modality of the sampled cohort and level of awareness.

### *Impact of the Information Facilities Policy*

The impact of the Information Facilities Policy on student browsing behaviour indicated that students alter their behaviour to a small degree when using university facilities. When comparing the modes of enrolment, the external student cohort (mean=1.65) were significantly ( $p<0.05$ ) less inclined to alter their perceived browsing behaviour than their internal peers (mean =2.27), (Figure 3). Examination of the impact on the range of topics discussed within CMC environments as a result of the information policy revealed that the entire sampled population altered their perceived behaviour to only a small degree (mean = 2.01). Interestingly, no significant difference emerged when comparing the two cohorts (Figure 3). Similarly, investigation of the impact of the Information Facilities Policy on student writing behaviour within the online environment indicated that students alter their writing style to a small degree (mean = 2.4). No significant difference emerged through a comparison of the two cohorts (internal and external) and the impact of the Policy on student writing behaviour (Figure 3).

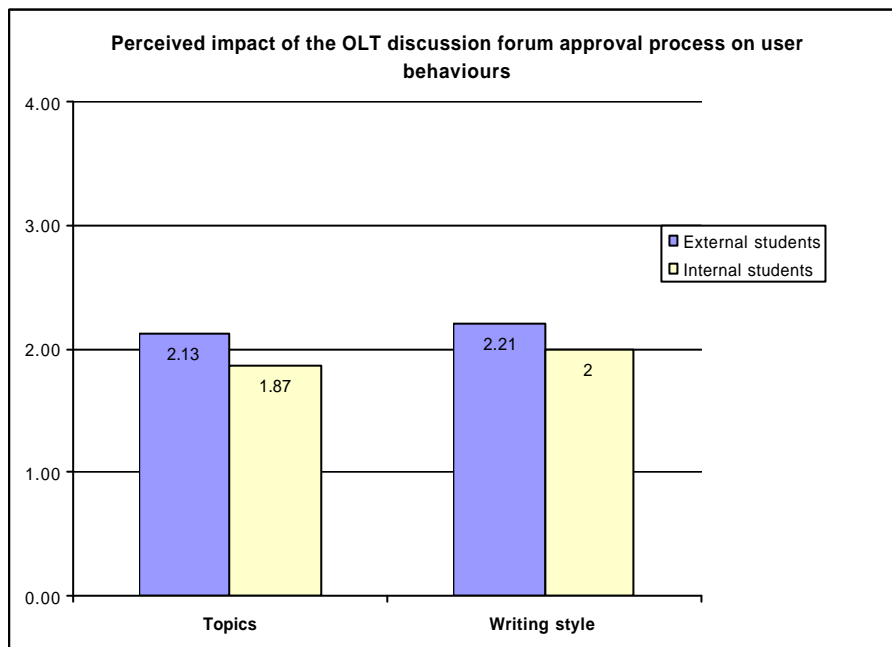


**Figure 3:** Impact of the Information Facilities Policy on student user behaviours.

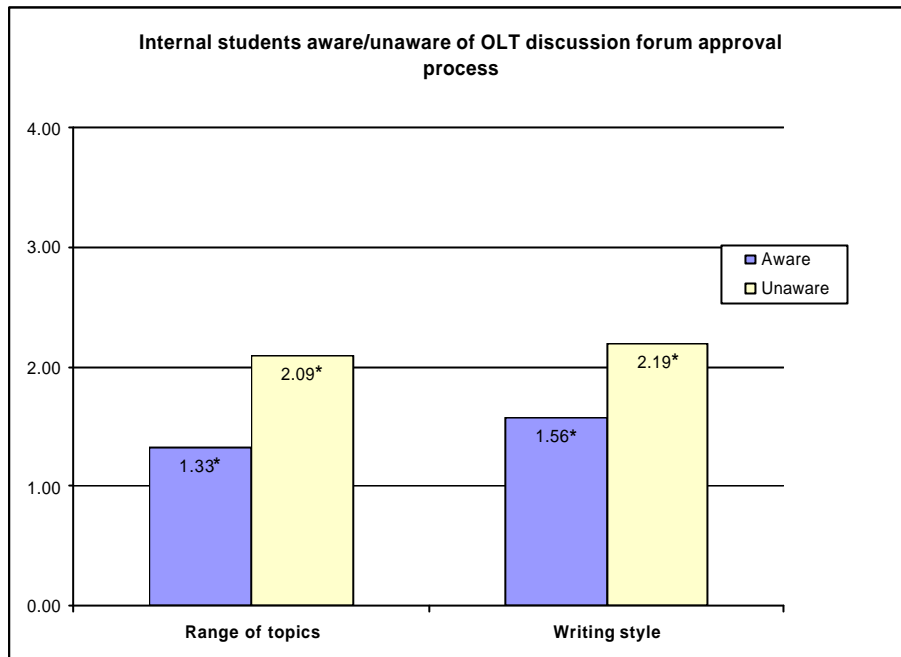
\* indicates a significant difference at  $p<0.05$  using a Mann-Whitney 2 tailed statistical analysis.

*Impact of the OLT discussion forum approval process*

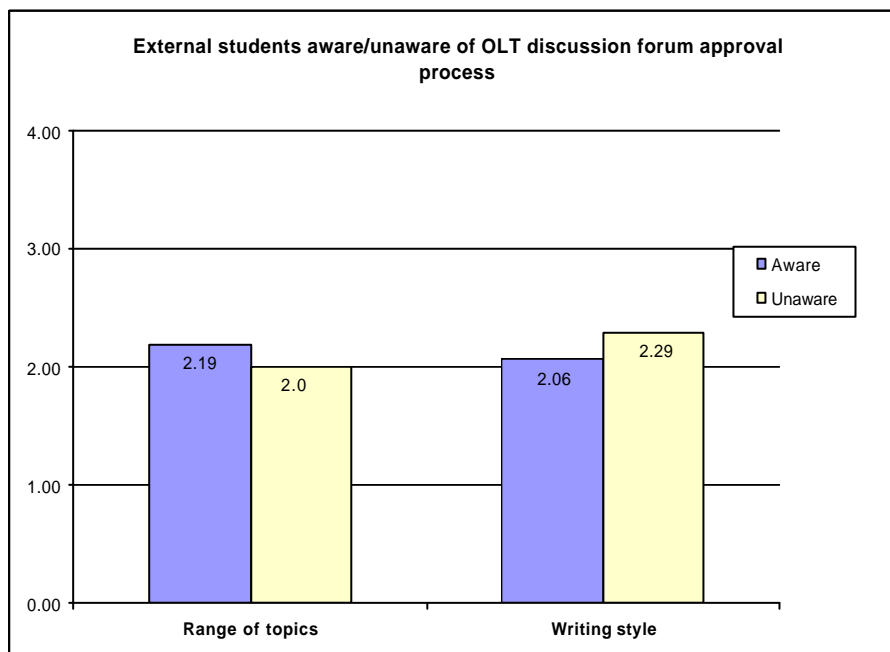
An examination of the impact of the OLT discussion forum approval process on topics discussed and the perceived change in writing style indicated that all students alter their user behaviour as a result of the implemented surveillance instrument. Students noted that the range of topics discussed and writing style are altered to a small degree as a result of the approval process (mean = 2.00 and 2.09 respectively). Comparison between the external and internal cohorts reveals no significant difference as a result of the discussion forum approval process (Figure 4). However, examination of internal students aware of the process and those unaware indicates that students unaware of this mode of surveillance alter their range of topics and writing style significantly ( $p < 0.05$ ) more than their cognisant peers (Figure 5). A similar investigation between external cognisant and unaware students indicates no significant difference in the degree of perceived change to user behaviour (Figure 6).



**Figure 4:** Impact of the OLT discussion forum approval process on student user behaviours with no significant difference observed between external and internal cohorts.



**Figure 5:** Examination of the impact of the OLT discussion forum approval process on internal student user behaviours with students unaware of the OLT process altering their user behaviour significantly more than their more cognisant peers. \* indicates a significant difference at  $p < 0.05$  using a Mann-Whitney 2 tailed statistical analysis.



**Figure 6:** Examination of the impact of the OLT discussion forum approval process on external student user behaviours with no significant difference arising between cognisant and unaware students.

The results of this study are limited by the number surveyed and the restrictions associated with the quantitative data. The study does however indicate that student behaviours are influenced by techniques of surveillance. Additional qualitative and quantitative investigations are required to further substantiate this hypothesis.

## Discussion

Higher education institutions have focussed substantial resources, both financial and human, on implementing new technologies as a means of promoting and enhancing contemporary pedagogical practices (Burbules and Callister, 2000). While the literature has predominantly sought to extol the virtues of online technologies to support and supplement student learning episodes, there is a paucity of literature examining how the implementation of ICTs has altered the relationship between both the institution and student and the lecturer and student (Kitto, 2003). The findings from this initial study indicate that both university surveillance measures and academic monitoring of student online discussions does influence student user-behaviours. Of particular note was the disparity in awareness regarding the surveillance instruments and the degree of perceived alteration of user-behaviour depending on modality of study and an individual's awareness of the surveillance techniques.

The disparity occurring between the observed levels of student cognisance of the two surveillance instruments was surprising given that all surveyed students had their contributions monitored and approved by academic staff prior to release. Monitored discussion forums result in student contributions being ratified before release. Therefore, all student postings receive an automated confirmation message noting, "The resource has been added but requires approval by a website administrator before it can be displayed".

A possible suggestion for the differences in levels of student awareness is that the terminology used in the confirmation message has resulted in a lack of transference of understanding that the website administrator is analogous to the teaching staff responsible for the unit. Further investigation into the number of posted messages to ascertain overall use of the forum by the student cohort revealed 222 messages (12/04/05) within 5 weeks of the unit. Given that it is unlikely that the students surveyed are unaware of the contribution approval process, an alternate explanation is that students have not equated the approval process with the unit teaching team.

The overwhelming student awareness of the Information Facilities Policy is possibly a result of the fact that students are required to acknowledge the policy prior to the administration of their username and password. In addition, when student passwords are regularly updated, students are required to once more acknowledge the presence of the policy before their new password is accepted. It is also interesting to note that external students have a greater awareness of the various university policies that govern the use of technologies including student forum contributions (Figure 2). The increased cognisance among the external cohort may be attributed to the delivery of all study materials via the OLT site resulting in a greater reliance on the online environment. Unit content for the internal cohort is delivered through participation (passive or active) in on-campus lectures and tutorials.

All students indicated that browsing behaviour, range of topics and writing style is influenced by the various modes of surveillance. Those students that are unaware of the surveillance technologies further restrict and confine their online behaviours. This indicates that students with less awareness of regulatory aspects report more change. Foucault's (1977) notion of disciplining and managing a population through modes of surveillance, would suggest that students enact their own forms of self-regulation as a result of institutional panoptic technologies. Foucault's (1977) notion of the Panopticon could explain the degree to which students perceive the potential for ICTs to generate a generic, virtual and omnipresent observer, and consequently alter their behaviour as a result of this perception.

The manner in which the Panopticon has been altered by advances in technology has been outlined by Zuboff (1988) around what is termed as the 'information panopticon'. Of particular note to this study is Zuboff's contention that contemporary modes of surveillance utilising electronic methods are now exempt from spatial and temporal constraints that previously restricted more traditional notions of the panopticon. Where Foucault's notion of self-regulation was enacted through panoptic architecture, the implementation of ICTs and their inherent surveillance capabilities has resulted in a panopticon divorced of any visible structural requirements.

While surveillance instruments are often implemented as a means to enhance workflow, accountability and safety, Mason, et al (2002) points to potential individual and collective disempowerment in cases where populations have high degrees of surveillance. However, Lyons (2001) proposes that the 'two faces of surveillance' ensures that emerging resistance directed at increased surveillance, ironically produces powerful and productive counter discourses that serve as justification for continued surveillance. This has clearly been the case in terms of concerns raised in relation to internet paedophilia and the widely endorsed increased monitoring by the state of Internet traffic. In this case, it would appear that the general populace overwhelmingly supports compromised levels of privacy and security so as to achieve a more rapid identification of paedophilic behaviour. Although media coverage focuses on breakthroughs in identifying potential deviant behaviour, it is important to note that the specialist knowledge required to understand how such surveillance is enacted within the online environment is not commonly understood. Similarly within educational contexts, while students may be aware of a range of modes of surveillance operating, there is no real understanding of how such specialist data analysis is conducted. It is fair to suggest that this results in minimal resistance and significant acceptance and compliance amongst the student body. Thus, while students may be unaware of the precise surveillance instruments implemented by the institution, the Information Facilities Policy and academic approval of forum contributions do impact upon aspects of student self regulation and discipline.

In relation to the two surveillance instruments, the results of this study also indicated that the external student cohort were more inclined to alter their writing style in comparison to their browsing behaviour or the range of topics discussed within the online forum. Hampton and Wellman's (2000) study of a networked residential neighbourhood entitled 'Netville', provides an interesting parallel with respect to the constraints of written communication. The authors

stated that residents did not discuss via the neighbourhood online forum a recent house fire that occurred prior to occupation. The neighbourhood conversations occurred verbally when the researcher encountered the residents within the 'Netville' community. Goldhaber (2001) provides a plausible explanation for the self imposed regulation of the written communication in noting that textual forms of computer mediated communications such as email are more prone to misinterpretation than face to face communication. When potential misunderstandings through interpretation of the written message, are combined with the current litigious nature of contemporary society, it is understandable why students significantly alter their writing style when conversing with a relatively unknown cohort of other students. Hence the greater degree of self-regulation among the external student cohort with regards to the alteration of their online communication. Additional care and attention to messages posted to the forum decrease the possibility of misinterpretation and hence the occurrence of possible confrontations. A preliminary examination of the forum contributions (n=54) posted, indicates only 3 observed spelling mistakes and relatively minor comments pertaining to humour or personal contexts. This cursory examination further illustrates the constraints students impose when discussing unit concepts. A detailed discourse analysis may lead to further understandings of the reasons why students self impose writing constraints.

## Conclusions

As universities invest more heavily in developing their online infrastructure in order to enhance flexible learning options and the overall student learning experience, there is clearly the potential for unobtrusive modes of surveillance to impact on the teaching and learning experience. This study offers a preliminary investigation into the impact of particular modes of surveillance on student user-behaviour and indicates that students unaware of the specific surveillance measures enacted by the institution undertake a high level of self-regulation. Surveyed students indicate that their browsing behaviours, the range of topics discussed and the writing style of their contributions made to asynchronous discussion forums are influenced by the degree to which such activities are perceived to be surveyed by both the institution and teaching staff. The implications of this new mode of governance for teaching and learning relate specifically to ensuring students are cognisant of surveillance techniques, the boundaries in which the policies operate and in the manner asynchronous discussion forums are integrated within the pedagogical framework designed by teaching staff.

New virtual spaces such as the discussion forum successfully bring together disparate entities within localities that are removed from the traditional singular time and space dimension of the classroom. This paper has argued that such spaces radically alter the manner in which educational governance is played out. The paper suggests that as teaching staff in the Higher Education sector increasingly use a variety of technologies to better understand the student populations, more attention must be given to the manner in which online discussion forums efficiently construct new subjects that are both 'productive' and 'docile'. This study demonstrates that despite the elimination of established disciplinary mechanisms of educational governance occurring within traditional teaching environments, the discussion forum increasingly serves as an effective alternative mechanism of producing the known student subject. Additional

investigation is called for in relation to comparisons of student contributions to discussion forums implemented without the academic approval process, and the impact of other forms of online technologies such as email, chat rooms (with and without logged transcripts) and participation in collaborative tasks facilitated through integration of online resources.

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