Is osmosis a viable pedagogy for teaching web and internet skills to non-IT professionals?

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Abstract

It is assumed that increasing use of and exposure to the web, internet and other information and communications technology (ICT) will give rise to increased levels of overall ICT literacy. Although it is undoubtedly true that basic computer skills (file management, word processing, etc) are improving and use of email and the web is increasing, it is not clear that an understanding of ICT-related issues such as security, data integrity, privacy, and confidentiality is increasing to an appropriate level to allow non-IT graduates to evaluate ICT use in their discipline. Furthermore it is not clear how the mere use of and exposure to ICT will by some form of osmosis facilitate a deeper level knowledge of ICT as it relates to professional practice, nor how it might engender discussion of the broader social context of ICT use. There needs to be a clear articulation of what professional ICT literacy means, the strategy by which ICT literacy will be improved for students in non-IT programs, and how ICT literacy will be addressed in professional practice by some form of on-going professional development.

Introduction

It has been asserted for at least the last ten years that incoming cohorts of tertiary students will be increasingly technically competent and computer literate due to their exposure to information and communication technology (ICT) from an early age. This assertion appears to be supported by data from computer skills surveys of incoming students. For example, over a period of 5 years, the computer skill levels of incoming medical students at the University of Melbourne were assessed by a checklist of computer-related tasks with which students felt comfortable (Kennedy, 2004). By 2003, nearly all incoming students reported the ability to perform basic computer operations, use a word processing package, and access the world wide web and email. A more comprehensive checklist to assess ICT access and literacy was developed as part of a DEETYA study of ICT skills of Australian tertiary students (Oliver and Towers, 2000). Although this study explored the broader meaning of ICT access and literacy and provided valuable demographic and usage information, the instrument they developed did not go beyond a checklist of the frequency of performing basic tasks, such as computer operation skills (eg file management, printing), computer application skills (eg word processing, spreadsheets), internet usage (eg web, email, discussion, file-downloads) and web usage (eg searching, bookmarking and using web information).
What is ICT literacy?

While there is no doubt that the basic skillsets identified by these checklists are critical to successful participation in secondary and tertiary education, the level of understanding of ICT required by graduate professionals (such as medical practitioners, teachers, nurses, lawyers, engineers and computer programmers) is at quite a different level from that required to use specific software applications and complete simple tasks with adequate proficiency. As professions continue to integrate ICT into their practices, there is an increasing need for professional practitioners to be able to assess and evaluate ICT not only in terms of utility and usability, but also in terms of the privacy, confidentiality, data integrity and ethical requirements of their specific discipline. The increasing use of the web and internet to facilitate access to resources at any time and any place brings with it a range of issues which are rarely dealt with in a formal classroom setting outside of computer science departments. The ability to evaluate web and internet technology in the context of specific professional discipline-based expertise requires an understanding of aspects of technology (eg information architecture, data encoding, data transfer, data storage and retrieval, network security etc) which are not generally included in basic computer skills training, and are unlikely be covered in any depth in training for particular software applications (including training for financial transaction software).

ICT and social context

The social context of ICT use is another issue requiring examination. The use of ICT to access online resources for both business and leisure irrespective of physical location leads to easy confusion between ownership and location of online resources (eg a document), ownership and location of the rendering device (eg a computer used to display the document), and identity of the person accessing the resource (which is dependent on method and user profile used to gain access the resource). For example, use of a virtual private network (VPN) client to access restricted business resources from an external site effectively makes the off-site computer a part of the trusted business network. This exposes the trusted network to whatever vulnerabilities exist for that external machine, including vulnerability based on its physical security. If people are not aware of the complexity of relationships between identity, security, access, user accounts and user profiles, they will not be able to configure their computers to use resources with appropriate regard for security and integrity. This becomes particularly problematic for professionals entrusted with sensitive data especially if they are oblivious to the ramifications of their behaviour (such as leaving copies of privileged information on shared computers, or having children using email and internet tools which are set to the parent's professional profile).

ICT and pedagogy

It is generally recognised that web and internet technology will play an integral part in future educational practice. Most universities have teaching and learning plans which highlight the central role of new technology in the definition of a 21st century university. For example, one of the nine principles guiding teaching and learning at the University of Melbourne [HREF5] articulates that "state-of-the-art information resources and electronic learning technologies are central to the development of
independent learners" and that "information and communication technologies are an integral part of the process of knowledge development and dissemination in all fields". Some implications for practice identified in the same document are that students will learn using state-of-the-art educational technologies and that independent, resource-based learning will be incorporated into all courses. One of the attributes of University of Melbourne graduates will be an "awareness of advanced communications technologies and modalities, sound working skills in the application of computer systems and software, and receptiveness to the expanding opportunities of the 'information revolution'". However, while the importance of technology in delivery of education is recognised, there is no clear articulation of how the use of state-of-the-art educational technologies will by itself imbue users with an understanding of the nature of the underlying technology other than by osmosis. Nor is there any clear statement of what form ICT literacy should take in the context of post-graduate professional practice beyond the standard rhetoric along the lines of familiarity with state-of-the-art new technology for the 21st century.

In the light of the prominent focus given to promoting the need for ICT literacy in tertiary education, it is interesting to note that at least 85% of Australian universities are currently using some form of centralised learning management system (LMS) to provide online learning resources and communication tools (Wise, 2004). For the most part, these LMSes are seen by institutions as an integral part of their strategy to enhance the quality of teaching and learning. One of their major features of LMSes is their ease of use, such that people with minimal computer skills can use them to create and participate in online courses. It remains a moot point as to how exposure to and use of educational technology specifically designed to require no understanding of its internal workings will somehow give rise to a deeper level understanding of the ICT on which it is based. It seems more likely that proprietary LMSes which shield the users from such information will create barriers to learning about ICT rather than promoting generalisable, transferable ICT literacy.

**Conclusions**

There seems to be a strong need to identify the relevant ICT expertise required for professional disciplines in addition to the explicit computing skills required for day-to-day practice. There is a need to articulate how we expect students to acquire this expertise at university (eg within their disciplines of study or in special ICT courses) and how they might have ongoing professional development in ICT appropriate to their practice. Particular emphasis should be placed on the areas of searching for and evaluating information on the internet, using communication tools effectively and securely, understanding appropriate protocols for electronic data transactions with a special emphasis on the implications of particular protocols for privacy, security, data integrity and confidentiality appropriate to the data being handled. There is also a strong imperative to understand the relevance of social context to the use of technology, and to inform and educate professional users about social context and the social implications of ICT use for their professional practice.

**References**


**Hypertext References**

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