



## Using e-resources and tools to update professional knowledge in the workplace

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Continued learning is vital for health practitioners to ensure they stay up-to-date with current developments in their field. This study examined a range of electronic information resources and tools that health practitioners use to update their professional knowledge and explored workplace access to these learning resources and tools. Survey method was used for data collection. A 4-page survey was sent to a random sample of 1067 Australian Medical Imaging Workers (MIWs) with 320 useable surveys returned. This study showed that ease of access to information resources is positively associated with increased frequency of use. This study also identified that there is widespread variation in access to electronic information resources and communication tools within the workplace. Issues reducing accessibility of electronic information resources and communication within workplaces must be addressed so that health practitioners can avail themselves of resources and tools that support them in updating their professional knowledge.

Keywords: health and medical databases, internet, online journals, professional learning

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### Introduction

The health care system is in a state of constant and rapid change as a result of the increase in scientific knowledge and rapid technological advances. To provide the best possible healthcare, health practitioners must continue to learn throughout their working life and this has been widely recognised across the health professions. The requirement for health practitioners to remain up-to-date with the changing knowledge base of their profession is now being formally recognised by health professions with the introduction of mandatory Continuing Professional Development (CPD) requirements for practitioners (Madewell, 2004; Maslin-Prothero, 1997; Weindling, 2001). To update professional knowledge health practitioners must have access to the information resources that contain the knowledge base of their profession.

The Internet is an important information source for health practitioners offering immediate access to the most current health and medical information. Web sites of professional, government, education and commercial organisations provide access to online journals, health and medical databases, practice guidelines as well as information on professional development activities (Bennett, Casebeer, Kristofco, & Strasser, 2004; Gilmore, Scott, & Huntington, 2008; Herrington & Herrington, 2006; Masters, 2008; Shanahan, Herrington, & Herrington, 2009). Health practitioners use Internet-based communication tools of e-mail and listservs to consult with colleagues nationally and internationally (Bennett et al., 2004; Herrington & Herrington, 2006; Masters, 2008; Shanahan et al., 2009). Teleconferencing and videoconferencing have also been identified as important communication tools for supporting professional development in Australia, with reported usage higher by rural practitioners than their metropolitan colleagues (Taylor & Lee, 2005).

While there are many electronic resources and tools available to health practitioners to support them updating their professional practice, factors limiting access have been identified. Recent studies demonstrate that access to the Internet in the workplace is not universal amongst Australian health practitioners. Herrington and Herrington (2006) investigated the use of the Internet to meet the professional learning needs of rural and remote health and education practitioners in Australia (n =1267). In this study access to the Internet was shown to vary both across and within health professions. Factors

identified in this study that limit access to the Internet included low numbers of computers with Internet access, imposed access restrictions such as no or limited access to external websites and lack of time during work hours to search for information. Other recent studies of Australian health professionals have also identified that access to the Internet in the workplace varies across geographic boundaries. In a recent study by Shaw and colleagues of Western Australian health practitioners, Internet access in the workplace was shown to vary across professions and geographic boundaries (Shaw, Lundy, & Larsen, 2006). In this study, whilst rural nurse practitioners reported higher levels of Internet access in their department (85%) than their colleagues in metropolitan locations (67%), this was not the case for medical practitioners, with all medical practitioners in metropolitan locations reporting departmental Internet access compared to 91% of their rural colleagues. Taylor and Lee (2005) also reported differential access to the Internet across geographic boundaries in their study of Australian occupational therapists use of ICT. In this study rural occupational therapists were shown to have lower levels of access to the Internet within their department (90%) than their metropolitan colleagues (96%).

Access to online journals has also been identified as variable. In a recent study by Veness and colleagues of Australasian Radiation Oncologists and Registrars examining attitudes toward evidence-based practice, one-third of respondents reported they had no access to journals through the Internet (Veness, Rikard-Bell, & Ward, 2003). The Kaufman-Wills Group (2005) investigated the access of scholarly journals available through the internet via the Association of Learned Professional and Scholarly Publishers (ALPSP journal  $n=7847$ ), Directory of Open Access Journals (journal  $n=1151$ ), HighWire Press (journal  $n=184$ ), and the Association of American Medical Colleges (journal  $n=103$ ) ( p. 26). This research targeted journals in medicine, science and technology and reported that access varied with journal publishers with a majority of journals from non-profit organisations (52 – 74%) allowing free access to original articles 6 – 36 months after publication whereas the vast majority (94%) of for-profit journals allowed delayed access to original articles solely via subscription ( p.40).

The literature shows that there are a variety of electronic information resources and communication tools that health practitioners use to update their professional knowledge. It is also evident that access to these e-resources and tools may vary across and within health professions. This paper explores e-learning by examining health practitioners perceived value of, their use of and their workplace access to a range of information resources and communication tools used to update their professional knowledge. The distinctive character of this study is that it seeks to explore multiple electronic information resources (internet, online journals and health and medical databases) and tools (email, listserv, tele- and video-conferencing) concurrently and this approach should help to provide a more holistic understanding of how and why health practitioners currently use electronic information resources and communication tools to update their professional knowledge.

## **The study**

### **The profession**

The health profession studied was Medical Imaging Workers (MIWs), which includes Radiographers, Radiation Therapists, Nuclear Medicine Technologists and Sonographers (AIHW, 2003). There were over 8000 Medical Imaging Workers in Australia in 2001 (latest available national data) and this occupation had experienced a 25% increase in workforce numbers between 1996 and 2001 (AIHW, 2003). Similar to other health professions, Medical Imaging is experiencing technological and professional change (AIR, 2004; SOR, 2007) and the need for MIWs to stay up-to-date with the changing knowledge base of their profession has been recognised (ANZSNMT, 2001) or mandated (MRPBV, nd; MRTBNZ, 2007; MRTBQ, 2003; AIR, 2004) by professional societies and registration bodies in Australia and internationally. This study is timely not only for the profession in view of the current focus on mandatory continuing professional development for MIWs worldwide, but for the human service professions generally.

### **Aim of the study**

The content of this paper forms part of a larger study investigating the information sources used by Australian MIWs to update their professional knowledge and practitioners' accessibility to and use of these information sources. This paper reports on MIWs perception of the value of, workplace access to and use of a range of online information resources and communication tools for updating professional knowledge.

## Methodology

Survey methodology was used to collect data for this study. In 2007, a questionnaire was mailed to a sample of 1067 Australian MIWs. The sample included 537 practitioners holding registration with the Victorian Medical Radiation Technologists Board (MRTB) using a 20% random sample and 530 practitioners holding registration with the Queensland MRTB (50% random sample of registrants with their addresses publicly available on the Queensland MRTB register). Due to funding constraints only one mail out was undertaken.

The questions of relevance to this paper were:

- Please rate the relative importance of the following (Internet; health and medical databases; online journals; tele- or video-conferencing) for updating your professional knowledge.
- On average, how often do you use the following (email; internet search engines; listservs; health and medical databases; journals; tele- or video-conferencing) to help you stay up to date in your professional area.
- Please rate your relative ease of access in your workplace to each of the following (Internet; health and medical databases; online journals; tele- or video-conferencing)

The survey data were entered into SPSS 17.0® and descriptive and inferential statistics were used for analysis. Percentages were used to describe survey findings. The collected data allowed for cross tabulations to be performed to determine if associations existed. Differences between groups were examined using chi-square analysis using Fisher's exact test.

## Results

Of the initial 1067 questionnaires mailed, 39 were excluded due to incorrect addresses. A total of 320 completed questionnaires were returned with a response rate of 31.1%. This response rate is greater than other recent surveys of Australian MIWs (14.5 – 27.6%) (Cowell & Parkinson, 2006; Sim, 2000). Demographic data analysis showed that the respondent population was similar to the Australian population of MIWs for gender and area of specialisation. In this study 68.8% of respondents were female and this is in accord with Australian workforce data where females account for 69.2% of MIW workforce (AIHW, 2003). The percentage of respondents in each area of specialisation was also similar eg percent Sonographers in this study (16%) compared with Australian workforce data where Sonographers account for 17.4% of MIW workforce (AIHW, 2003). These findings provide indicators that the sample is comparable with the population of MIWs. Practitioners were split fairly evenly between the public (53.1%) and private (46.9%) sector with over half (55.4%) employed in teaching hospitals. The majority of respondents (56.6%) were employed in metropolitan locations with the remainder distributed across regional (28.5%) and rural and remote (14.9%) locations.

### Perceived value of electronic resources and tools

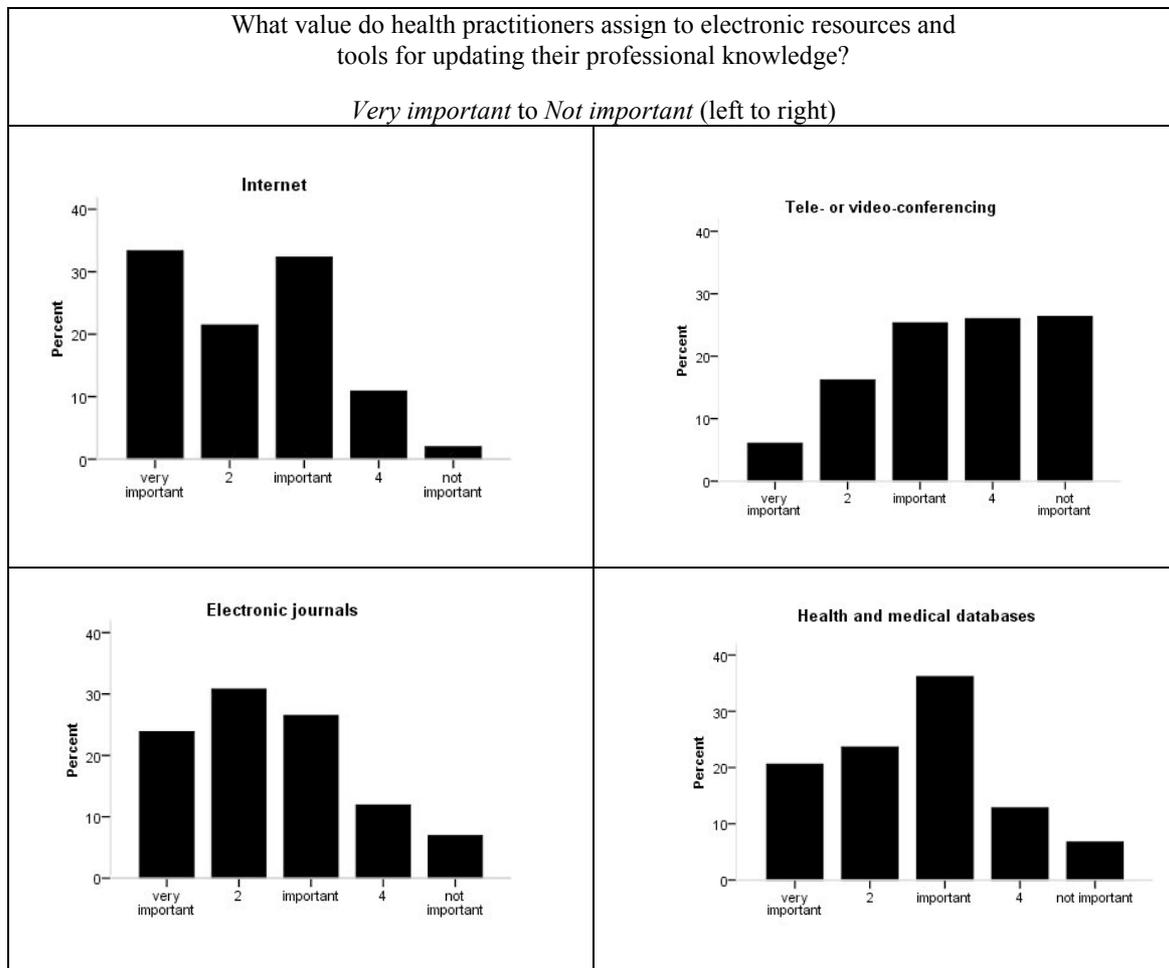
MIWs perceived value of four electronic resources, namely Internet, online journals, health and medical databases and tele- or videoconferencing, for updating professional knowledge is shown in Table 1. The data reveals that the vast majority of MIWs consider the Internet, online journals and health and medical databases to be valuable electronic resources for updating professional knowledge, with only 2%, 7% and 6.8% respectively describing the resource as *not important*. Teleconferencing and videoconferencing were considered less valuable with 26.4% of practitioners describing these as *not important* for updating their professional knowledge. Cross tabulations were performed to determine if rating of importance of tele- or video-conferencing was associated with geographic location (metropolitan, regional, rural and remote). Difference across groups was not significant for geographic location (Fisher's exact test =5.503, p=0.7) with 21% of rural and remote MIWs describing these as not important compared to 28% of their metropolitan colleagues.

### Frequency of use of electronic resources and tools

MIWs frequency of use of three communication tools (email, listserv and tele- or video-conferencing) and three information resources, namely Internet; online journal and health and medical databases for updating professional knowledge is shown in Table 2. It can be seen that email is the most commonly used communication tool with 42% of MIWs using it on a daily basis. Other communication tools of listserv and tele- or videoconferencing are not widely used as the majority of responding MIWs reported that they had not used these tools (64% and 71% respectively). There is widespread use of a range of

information resources across the profession. The World Wide Web is the most frequently accessed resource by MIWs with almost half (48%) undertaking web searches at least weekly. Online journals (87%) and health and medical databases (71%) are used by the majority of MIWs with their use being less frequent than Internet searching for updating professional knowledge.

**Table 1: Perceived value of electronic resource for e-learning**



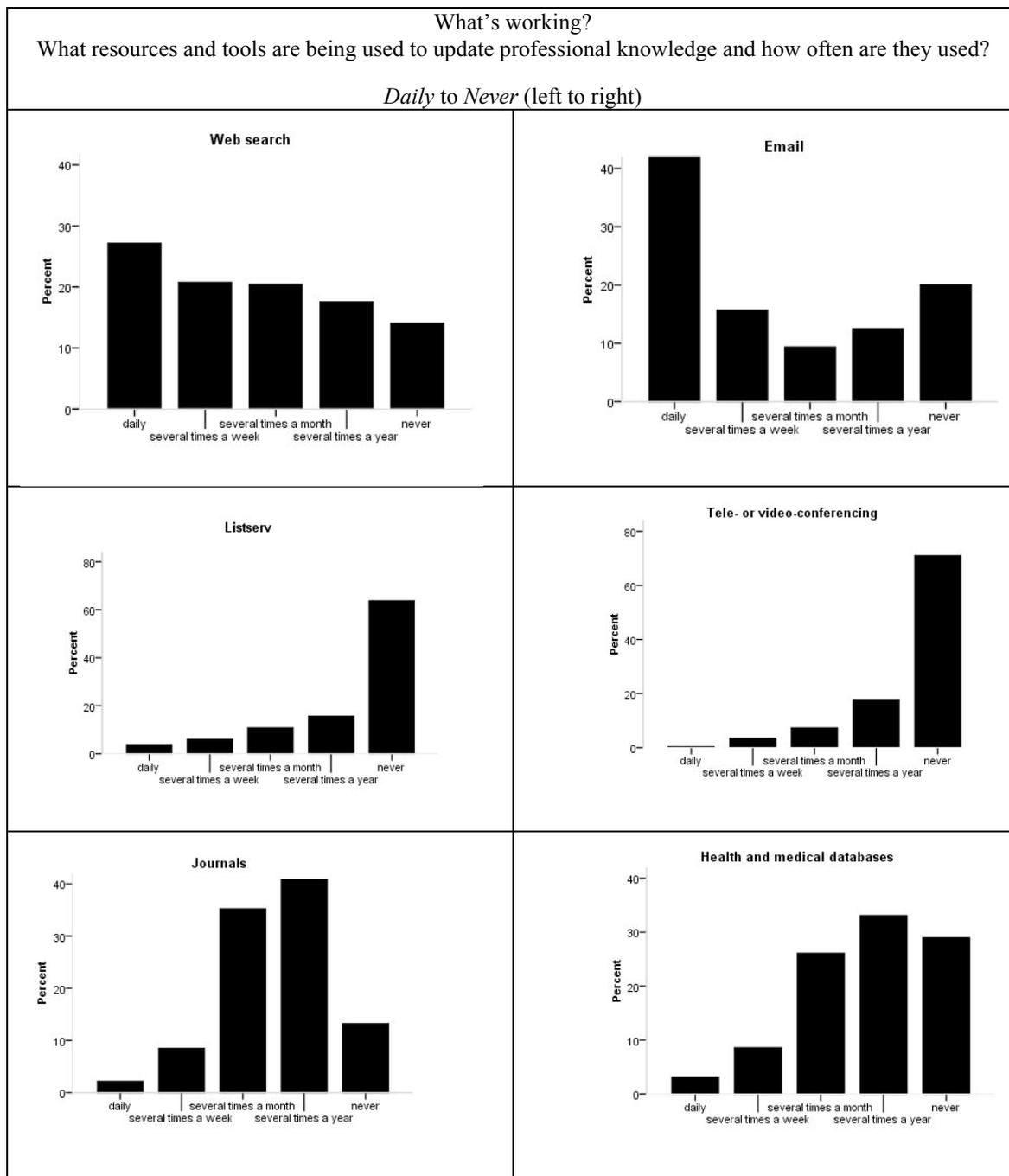
**Access in the professional workplace to electronic resources and tools**

The ease of access to Internet, tele- or video-conferencing, online journals and health and medical databases are shown in Table 3. The data reveals that the majority of MIWs have some level of workplace access to each of these resources and tools. The most accessible resource to MIWs was the Internet as 89% of practitioners reported that they had some degree of access to the Internet in their workplace. Almost half (46%) of practitioners described their access to the Internet in their workplace as *very easy*. However, not all MIWs were afforded with such easy access to the Internet with 11% of practitioners reporting they had *no access* to the Internet in their workplace and a further 10% describing their level of access as *not easy*, the lowest point on the 5-point likert scale. MIWs who reported they had *no access* to the Internet within their workplace, as a percent of the total respondents from the demographic variable, came from the private health sector (14%); non-metropolitan locations (regional 14% and rural and remote 15%); non-teaching work environments (non-teaching hospital 24% and stand alone clinic 17%) and area of specialisation was Radiography (14%). Cross tabulations were performed to determine if ease of access to the Internet was associated with the above organisational or geographic factors. Difference across groups was significant for work environment (Fisher’s exact test =34.451, p=0.000) and area of specialisation (Fisher’s exact test =40.249, p=0.000).

Electronic journals were accessible to the majority (87%) of MIWs in their workplace. Ease of access was heterogenous across the profession with only 20% of MIWs describing their access to online journals in their workplace as *very easy*. In contrast, one-quarter of practitioners reported they had either *no access* (13%) or their access to online journals was *not easy* (12%). MIWs who reported they had *no access* to e-journals within their workplace, as a percent of the total respondents from the demographic variable,

came from the private sector (20%); non-metropolitan locations (regional 19% and rural and remote 19%); non-teaching work environments (non-teaching hospital 24% and stand alone clinic 17%) and their area of specialisation was Radiography (14%). Cross tabulations were performed to determine if ease of access to e-journals in the workplace was associated with the above organisational or geographic factors.

**Table 2: Frequency of use of electronic resources and tools for e-learning**

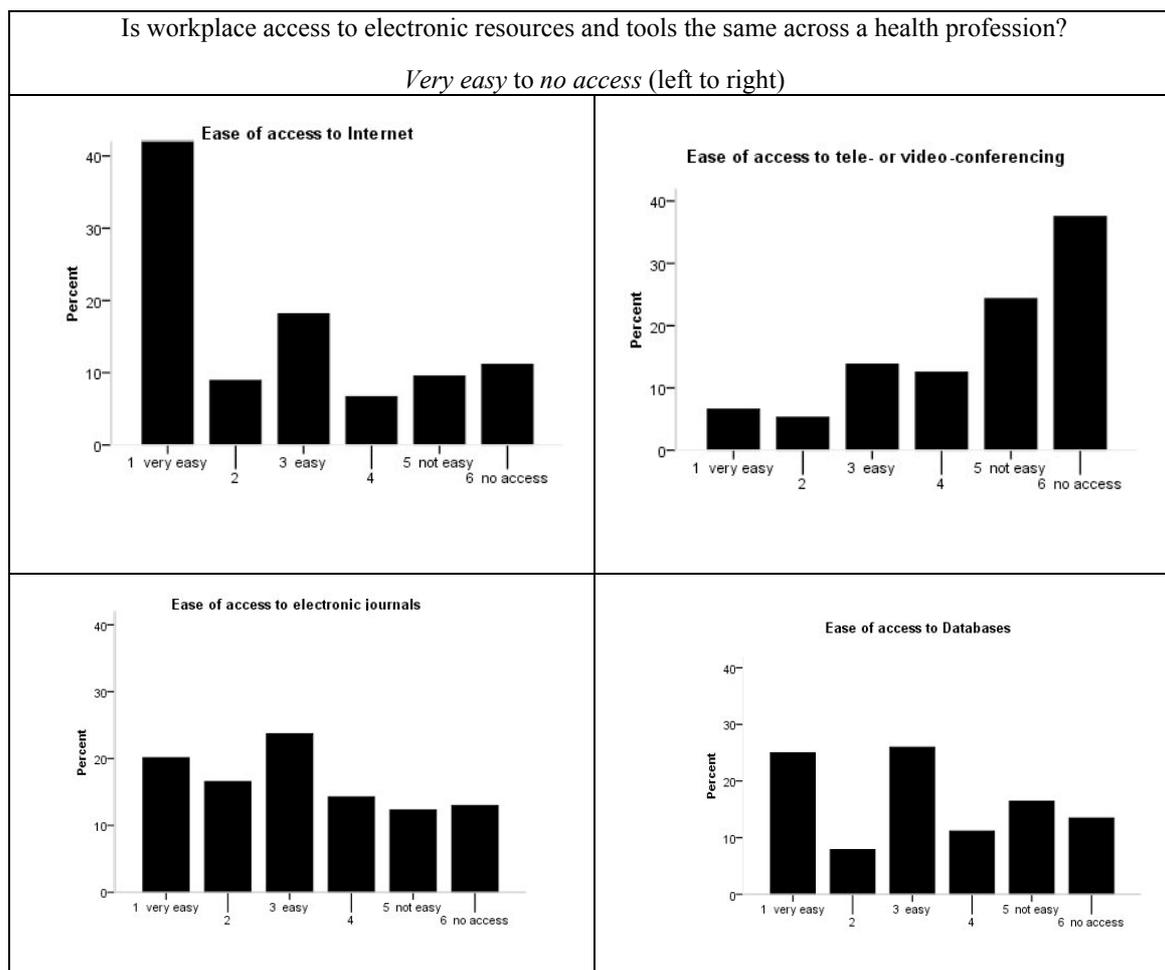


Difference across groups was significant for health sector (Fisher's exact test =19.817,  $p=0.001$ ), work environment (Fisher's exact test =45.017,  $p=0.000$ ) and area of specialisation (Fisher's exact test =27.858,  $p<0.03$ ).

The majority (86%) of MIWs reported that they had workplace access to health and medical databases. Again ease of access to databases was quite variable with only 25% of MIWs describing their access to health and medical databases in their workplace as *very easy*. Thirty percent of MIWs reported they had either *no access* (14%) or their access to databases was *not easy* (16%). Difference across groups was significant for health sector (Fisher's exact test =33.804,  $p=0.000$ ) and work environment (Fisher's exact test =49.180,  $p=0.000$ ). Almost one quarter (24%) of respondents from the private sector and 29% of

respondents from non-teaching hospitals reported that they had *no access* to health and medical databases in their workplace.

**Table 3: Access to electronic resources and tools for e-learning**



Tele- or video-conferencing was the least accessible tool to MIWs. Over one-third (38%) of practitioners reported that they had *no access* to these communication tools in their workplace.

### **Influence of ease of access and use of electronic tools and resources**

Cross tabulations were performed to determine if ease of access in a workplace was associated with frequency of use of electronic resources and communication tools by MIWs. The results are shown in Table 4. It can be seen that a higher percentage of MIWs use electronic resources and communication tools when they describe their access as *very easy*.

### **Discussion**

This study has explored a range of electronic information resources and communication tools used by health practitioners to update their professional knowledge. In this study it has been shown that the majority of MIWs value electronic information resources for updating their professional knowledge. Comments by MIWs indicated that they value electronic resources as it provided them with easier and quicker access to the information they were seeking. Their comments included

The more online I can find then the better because I tend not to have time to go to libraries and look up things.

I get the hard copies of four or five journals but in being a member you also have electronic access ... You know it takes them a month to send a journal from the US... So I actually read it all online a month before I actually get the hardcopy.

This research has shown that the vast majority of MIWs had some level of workplace access to a range of electronic information resources and communication tools. Ease of access was shown to vary across the

profession and according to the information resource or communication tool being investigated. It was apparent from this study that not all MIWs are afforded with easy access to electronic information

**Table 4: Influence of ease of access against frequency of use of electronic tools and resources by MIWs**

What's working and why?			
Does workplace access influence frequency of use of e-resources and tools?			
	Fisher's exact test	P value	Difference in experience of MIWs
Use of email (n=313)	72.644	p ≤ 0.001	61% of MIWs who rated their access to the Internet within their workplace as <i>very easy</i> were daily users of email compared to 10% of MIWs who rated their access to the Internet within their workplace as <i>not easy</i>
Undertake Internet searches (n=307)	100.789	p ≤ 0.001	46% of MIWs who rated their access to the Internet within their workplace as <i>very easy</i> undertook Internet searches daily compared to 13% of MIWs who rated their access to the Internet within their workplace as <i>not easy</i>
Read journals (n=306)	37.640	p ≤ 0.005	67% of MIWs who rated their access to electronic journal within their workplace as <i>very easy</i> read journals at least several times a month compared to 42% of MIWs who rated their access to the electronic journals within their workplace as <i>not easy</i>
Undertake health and medical databases searches (n=298)	104.644	p ≤ 0.001	70% of MIWs who rated their access to databases within their workplace as <i>very easy</i> undertook database searches at least several times a month compared to 21% of MIWs who rated their access to the databases within their workplace as <i>not easy</i>

resources and communication tools within their workplace. For example between 11% and 29% of MIWs indicated they have *no access* to the Internet, electronic journals or health and medical databases within their workplace, with a further 10-16% of MIWs rated their ease of access, as *not easy*, the lowest point on the 5-point likert scale. This demonstrates that for many MIWs these electronic information resources are not readily accessible in their workplace. The implication is that a large proportion of MIWs will not be able to harness the benefits of these electronic information resources and access current health and medical information to support their professional practice and provide the best possible healthcare.

It is interesting that in this study geographic location was not shown to influence MIWs workplace access to electronic resources such as the Internet, e-journals and health and medical databases. In contrast, this study has highlighted organisational factors such as health sector, work environment and practitioner area of specialisation as influencing the ease of access MIWs have to electronic resources and tools in their workplace. Whilst further research is needed to better understand how organisational factors are influencing workplace access to e-resources, one contributing factor could be that Australian Government Health Information Portals such as Clinicians Health Channel (Victorian Government), Clinicians Knowledge Network (Queensland Government) and Clinical Information Access Program (NSW Government) restrict access to practitioners employed in the Public Sector (Gosling & Westbrook, 2004; Hall, 2008; Keppell et al., 2001).

This research has also shown that frequency of use of electronic resources and tools to meet professional learning needs was positively associated with increased ease of access within the workplace. This finding indicates that workplaces can proactively support practitioner engagement in professional learning by increasing the accessibility of electronic information resources and communication tools to practitioners within their workplace. The finding that frequency of use of journals and health and medical databases was positively associated with increased ease of access within the workplace may be of interest to the many health professions where practitioners are being urged to increase their use of evidence-based information sources (McClusky, 2003; Metcalfe et al., 2001; Nail-Chiwetalu & Ratner, 2006; Newman, Papadopoulos, & Sigsworth, 1998).

Workplace culture and heavy work pressures contribute significantly to lack of access to electronic information resources for professional purposes. For example, in Herrington and Herrington's (2006) survey of professional use of the Internet, teachers nominated access problems such as a lack of time to go online (e.g., 'access and time are the factors – it's another add on to another crammed and busy daily

schedule'). Similar to other professions, MIWs operate under heavy work pressures and practitioners identified that they had very little time to access resources during work hours. As one practitioner commented

Just having the time to actually sit down and read through that information, cause normally you have other tasks you need to carry through. It's always the last thing you might do at the end of the day or during a quite period or when there are not many patients.

Whilst the move toward electronic access creates the opportunity for workplaces to provide remote access to electronic journals, the majority of MIWs practitioners (81%) reported that they were not able to remotely access electronic resources (e.g. e-journals and databases) available in their workplace, from home. Practitioners identified that professionally relevant information resources could be made more available through the facility of remote access to workplace resources with comments on questionnaires such as

Access from home would be desirable, e-access through work is excellent but time to sit and read only comes when at home

Access limited to work yet no time available to use during work hours

As the vast majority of MIWs had Internet access at home (90%), remote access to workplace resources would clearly be a useful feature. MIWs consider their workplace to be an important access conduit to the electronic resources they need to update their professional knowledge.

Depends on the support of the management in the workplace. If they support Internet access / database of journal then I can access the Internet & journals online and can get relevant information most conveniently.

This study has limitations associated with postal survey methodology such as low response rates and the unknown characteristics of non-respondents. Whilst demographic analysis for area of specialisation and gender showed that the respondent population was similar to the Australian population of MIWs caution should be adopted when extrapolating these results due to the response rate (31.1%) of the postal survey.

## Conclusion

Continued learning is vital for health practitioners to ensure they stay up-to-date with current developments in their field. This research provides a dataset from one professional group of health practitioners, MIWs, providing insight into their value of, workplace access to and use of electronic information resources and communications tools for updating professional knowledge. So what electronic resources and tools do these health practitioners use to meet their professional learning needs? This study has shown that MIWs use electronic resources such as the World Wide Web, online journals and health and medical databases to update their professional knowledge. So what is working? This study has shown that frequency of use of electronic resources and tools to meet professional learning needs was positively associated with increased ease of access within the workplace. So where does the future lie? By acting upon organisational factors that have been shown to influence equity of access to electronic resources in the workplace and also the greater provision of remote access to workplace resources will better support practitioners meeting their professional learning needs.

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