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Overview of Instructional Technology Used in the Education of Occupational Therapy Students: A Survey Study

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Overview of Instructional Technology Used in the Education of Occupational Therapy Students: A Survey Study

Abstract
The purpose of this study was to explore the type of instructional technology (IT) master's degree level occupational therapy educational programs routinely use as a part of their lecture- and laboratory-based instruction. Surveying the administrators of 121 graduate occupational therapy programs in the United States, we found that the majority of the respondents identified their program as using IT in some form for lecture-based courses, with less inclusion of IT for laboratory-based courses. Hybrid instruction, with the majority of the content being delivered face-to-face and the remainder via online, were the trends among the respondents. The findings also indicated that the respondents' programs avoid certain IT, including synchronous online chat rooms or instant messaging, digital image collections, blogs or online journaling, Wikis, and audio/video podcasting. Few of the respondents said their programs had made a significant leap into implementing a larger online presence with instructional technology.

Keywords
instructional technology, occupational therapy education, online learning, higher education

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Instructional technology (IT) has been defined as the ability to share information using media-based technology (audio, text, video, image, etc.) to facilitate enhanced interaction between educators and targeted learners (Jedlicka, Brown, Bunch, & Jaffe, 2002). Furthermore, IT has been classically described as

> A systematic way of designing, carrying out, and evaluating the total process of learning and teaching in terms of specific objectives, based on research in human learning and communication, and employing a combination of human and nonhuman resources to bring about more effective instruction. (Commission on Instructional Technology, 1969, p. 27)

IT consists of both synchronous and asynchronous technologies. Synchronous technologies allow learners and educators to interact at the same time virtually, while asynchronous technologies allow learners to engage in educational activities at their preferred time based on the requirements of the course (Bastable, Gramet, Jacobs, & Sopczyk, 2010).

In a broader perspective, e-learning has been defined as "an Internet- or intranet-based and web-delivered teaching-learning system with or without face-to-face contact between the teacher and the learner" (Panda & Mishra, 2007, p. 326). Clark and Mayer (2016) defined e-learning as instruction delivered via a computer that is intended to promote learning. For the purpose of this article, IT is the multimedia-based building blocks that are organized around and implemented as a part of larger instructional modules or courses that are delivered using technological-based platforms.

While IT is being used in many different domains of higher education, the literature demonstrates that there is little impact on student performance between online and traditional courses in occupational therapy health education (Hollis & Madill, 2006; Jahng, Krug, & Zhang, 2007; Williams, 2006). This lack of impact may be due, in part, to individual learning preferences. Some students may enroll in online courses because they prefer that format, while other students may enroll in traditional face-to-face courses because they may not do as well with an online class format (Butler & Pinto-Zipp, 2005).

It has been reported that the perceived advantages of IT, according to students and instructors, include increased flexibility (primarily when using asynchronous technologies), convenience, and increased active learning (Hollis & Madill, 2006; Jedlicka et al., 2002). Doyle and Jacobs (2013) reported that students value IT in higher education, as it helps accommodate the learning process to their individual learning preferences and styles. Students' and instructors' perceived disadvantages of IT include the quality of instruction, the time and effort required to create online courses (some point out that it also requires extensive time and effort to create traditional face-to-face courses), the unpredictability of technology, and a lack of social support from peers and faculty (Hollis & Madill, 2006; Jedlicka et al., 2002). With decreased time in traditional classes with peers and professionals, there are concerns of decreased professionalism, educational reductionism, and

cultural imperialism (Steward, 2001). Some reports of feeling "like an outsider" resulting from limited contact with other students and staff can be compensated for with strong relationships between distance education students (Rogers, Mulholland, Derdall, & Hollis, 2011).

In entry-level occupational therapy educational programs, instruction delivered using e-learning resulted in (a) the enhancement of students' clinical reasoning during fieldwork rotations (Creel, 2001; Gallew, 2004; Murphy, 2004; Scanlan & Hancock, 2010; Thomas & Storr, 2005; Trujillo & Painter, 2009; Wooster, 2004); (b) the development of evidenced-based practice skills among postprofessional master's and doctoral students (Reynolds, 2010; Richardson, MacRae, Schwartz, Bankston, & Kosten, 2008); (c) advanced skills related to occupational therapy practice and the knowledge base of such (Richardson et al., 2008); and (d) teaching evaluation and intervention strategies for ergonomics in industrial rehabilitation (Weiss, 2004).

Although there is not a comprehensive list in the literature of the IT used, there is a consistent trend of using IT in entry-level occupational therapy education. Yet, the extent of and specifics related to the type and application of IT in entry-level occupational therapy programs is absent from the literature. Therefore, the purpose of this exploratory study was to allow the administrators of entry-level occupational therapy programs to identify and report the type of IT used in the lecture and laboratory portions of their curriculums.

Method

This study was conducted using a descriptive, quantitative survey. The survey instrument was developed as a collaborative effort among instructors and professors from multiple disciplines. The survey design took into account the instructors' current use of IT as well as their exposure to IT as undergraduate and graduate students (see Appendix). The finalized survey consisted of 13 questions related to the use of IT for lecture and laboratory-based courses in occupational therapy curricula. The survey also included eight demographic questions. Face validity was obtained with three experts in IT and design.

Convenience sampling was used to obtain the study's sample through a list of master's of occupational therapy programs (MOT) reported by the American Occupational Therapy Association's (AOTA) website in 2015. The researchers sent an email to the contact listed for each program and requested the program director's current email address and/or obtained the email addresses from the list of MOT programs contacted. A total of 121 MOT program administrators were invited to complete the survey. The deans, chairs, or program directors of entry-level MOT programs in the United States who had provided an email address on their individual web page were also invited to participate in the study.

Those programs not included on the list on the AOTA website or that did not provide a contact email address were excluded. The programs that had a current contact email address listed or an email address for the program administrator were

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sent an email to request participation in the survey. The invitations included a brief description of the study and a link to the survey on SurveyMonkey®. A reminder email was sent out to participants 15 days after the invitation to participate. The survey closed after 30 days.

Results

Of the 121 MOT programs and/or their program administrators who were solicited to take part in the study, 48 responded and completed the informed consent form. Of those 48 respondents, 27 completed each question on the survey, resulting in a 22% overall response rate.

Nearly all of the MOT program contacts and/or administrators who responded to all of the questions (N = 27) reported using some degree of online instructional materials. In addition, the respondents indicated that over the past 2 years, the majority of lecture-based courses remained face-to-face while being supplemented by some level of online interaction. As noted in Table 1, while many of the programs are not completely online (i.e., no face-to-face interaction), they are shifting toward the inclusion of completely online courses and/or are redesigning courses to reduce face-to-face interaction and increase online interaction.

Table 1

Distribution of Program Use of Online Instructional Materials in Lecture-Based Courses

	Number of Courses			
Type of Course	**0**	**1-4**	**5-7**	**8 or more**
Course completely online (no face-to-face interaction)	70.37%	22.22%	3.70%	3.70%
Decreased face-to-face and increased online interaction	37.04%	37.04%	7.41%	18.52%
Face-to-face interaction supplemented, but not decreased by, online interaction	10.34%	17.24%	3.45%	68.97%

This shift toward the inclusion of technology also carries over to those courses that are considered lab-based, with the majority of the respondents indicating that the majority of lab-based courses are now face-to-face instruction supplemented by online interaction. However, the data notes that there is less of a shift toward using e-learning IT in the lab-based classes. The specific percentages are noted in Table 2.

Table 2

Distribution of Program Use of Online Instructional Materials in Lab-Based Courses

	Number of Courses			
Type of Course	**0**	**1-4**	**5-7**	**8 or more**
Course completely online (no face-to-face interaction)	84.62%	7.69%	7.69%	0.00%
Decreased face-to-face and increased online interaction	66.67%	8.33%	16.67%	8.33%
Face-to-face interaction supplemented, but not decreased by, online interaction	6.67%	26.67%	33.33%	33.33%

Beyond simply looking at the number of courses taught that included IT, it is important to look at the type of instructional tools implemented by the programs. The survey instrument had a list of 17 potential tools that the programs may have used. In addition to asking about the type of tool used, the questionnaire asked the respondents to identify the frequency with which the selected instructional tools were used (e.g., daily, weekly, monthly, rarely, never, don't know). The research team chose to interpret the responses to these questions to mean that a higher level of usage showed a level of preference for the instructional tool while a lower level of usage showed the instructional tool was less popular. Based on this interpretation, Table 3 provides the five most popular and the five least popular instructional tools used in a lecture-based course. Of interest is that the responses provided concerning lab-based courses closely mirrored the list and responses for the lecture-based courses (see Table 3).

Table 3

Most and Least Popular Instructional Tools per Responses Provided

Most Popular Technologies	Least Popular Technologies
Presentation Technologies (e.g., PowerPoint, Keynote, Prezi, Captivate, Camtasia, Articulate)	Synchronous online chat rooms or instant messaging
Online access to student grades	Digital imagine collections
Online assignment or homework collection	Blogs or online journaling
Online library resources	Wikis
Learning Management System	Audio/Video podcasting

The respondents who answered the question about the barriers and obstacles to using online IT identified time as the greatest contributing factor. A lack of knowledge and access also played a role in determining if a program implemented online technologies. When looking specifically at lab-based courses, the largest obstacle is that the subject matter does not lend itself well to online instruction. Over 86% of the respondents noted that they had access to an IT resource center that provides support to faculty when implementing educational technology in curriculums.

Over 80% of the respondents rated IT as being moderately to highly effective tools for an entry-level MOT program. Only 13% of the respondents felt that IT was a "slightly effective" tool, and none of the respondents felt that the tools were not effective.

Discussion

This research was conducted to identify what types of IT are being used by entry-level MOT programs. Specifically, the researchers were interested in understanding which online tools are being used by programs in the various educational environments. As anticipated, it was found that most of the programs use online technology to access the program's learning management system, student grades, lecture materials, homework collection, and online library research tools. It was noted that some of the programs are also using

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clinical virtual simulations, online quizzes, and posting online lectures in limited numbers. Many potential instructional tools, however, are being used in limited amounts or not at all.

To extrapolate more than just the preferred technology tools, the research instrument also asked specifically about how frequently each tool is used in each type of learning setting. The results demonstrated that those in face-to-face lectures and laboratories use the instructional tools the most, with a clear delineation appearing between the lectures and the labs. This is noteworthy because the frequency would logically be expected to be higher in an online class or online lab, but instead the face-to-face courses are incorporating IT more often.

A lack of time was the barrier most often reported by the respondents as to why IT was not used. A few studies have shown that online courses are more time consuming to create and to teach, and that could be one reason that the respondents are less likely to include IT (Concannon, Flynn, & Campbell, 2005; Panda & Mishra, 2007). Other obstacles identified included a lack of knowledge and a lack of financial resources, which are similar obstacles to those found in Panda and Mishra (2007) and Phillips, Schumacher, and Arif (2016). These findings seem reasonable, as incorporating some of the more specialized tools does require additional knowledge and/or software to execute them properly. However, additional research should be done to determine the exact reason that more instructional tools are being incorporated into face-to-face courses rather than in those built in an online environment.

While the findings from this study are promising in that the respondents noted an increase in the use of technology in the classroom, there is room for improvement. As noted in the results section, the majority (87%) of the program administrators that responded identified IT as moderately to very effective. Only 13% felt that it is slightly effective, and no respondent felt that online technologies are not effective. In addition, over 86% of the respondents have access to an educational or instructional technology resource center on their campus that will aid in implementation and/or design of instructional technology tools for use in the curriculum. The current pattern of practice seems to reflect that, while few programs are embracing a fully online approach to occupational therapy education, there is a shift toward using more IT in both lecture-based and lab-based courses. This shift toward incorporation of IT is a strong move by graduate-level occupational therapy educational programs to make educational opportunities more flexible and accessible for students (Beldarrain, 2006; Concannon et al., 2005; Gee, 2015; Panda & Mishra, 2007). Ultimately, occupational therapy entry-level education may be on the back end of the e-learning and IT movement, which may have an impact on student interest, retention, faculty workload, and productivity (Panda & Mishra, 2007; Phillips, Schumacher, & Arif, 2016). Yet, the most detrimental aspect of the absence of such is that programs may not be able to design and deliver content that is both universally accessible and flexible to one of their key stakeholders: the students who prefer and expect e-learning as a

routine part of their educational experience (Concannon et al., 2005; Gee, 2015; Phillips et al., 2016).

Limitations

Forty-eight respondents started the survey, but not all of them answered all of the questions. Also, the survey was only sent to program administrators, who may or may not have a comprehensive view of the courses that are being taught (e.g., it is possible that the technologies were being used but the program administrator was not fully aware of this). Oh and Park (2009) reported that the age of faculty may be a contributing factor to their confidence and personal perception of skills for designing and implementing an online course. This study did not explicitly explore the age of the respondents, and this could be a contributing factor of who is and is not using these technologies. None of the survey questions explored how the technologies were being used or any of the interactions with the IT between the instructors and the students. For example, if courses were implemented completely online, what technology would instructors use to communicate with students? We also have no information about student performance on competency-based assessments to determine if these technologies are being used effectively.

Conclusion

Overall, the findings from this study provide occupational therapy educators a glimpse into the instructional practices and preferences related to IT as a part of entry-level professional education. It is clear that occupational therapy educators have embraced the use of IT as a part of their pedagogical delivery, given the multiple institutional opportunities. Yet, there continues to be perceived barriers among some faculty regarding the type of IT used and how it can best be used to train highly qualified entry-level professionals. It is evident that IT and e-learning are instructional mechanisms that are now embedded in how students consume education. The key for occupational therapy professionals is to align the appropriate IT with specific content to determine which concepts can be delivered and integrated to the most effective method of e-learning delivery.

Future Research

Additional research is needed to determine which IT offer the most educational value for programs and students, as well as how to better provide programs and instructors with the necessary knowledge to best use the technologies available and to negate the obstacles of lack of knowledge and time. Additional research may also be needed to determine how many programs are actually accessing and using the educational and IT resource centers that are available on their campuses. Failure to access these valuable IT and e-learning resources may prevent the programs from reaching their full potential to deliver education to students.

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Appendix

Instructional Technology Survey of Graduate Degree Programs in Occupational Therapy Education

1. Educational or instructional technology resource centers are campus or department resource centers that provide assistance and support in the design, development, use, management, and evaluation of process and resources for learning. Often, the resources include audiovisual media and various forms of technology, including, but not limited to, computerized delivery. Does your institution have an educational or instructional technology resource center on campus for faculty to access?

Yes
No
Unsure
Other (please specify)

2. In the event that your institution does not have an educational or instructional technology resource center, does your institution have an educational or instructional technology resource consultant on campus for faculty to access?

Yes
No
Unsure

A lecture-based course is defined as a course where students learn content via face-to-face, discussion, and question and answer type formats (see Questions 3 through 6).

3. How many lecture-based courses were taught in your program in the last 2 years? (Please use whole numbers)

4. Over the past 2 years, approximately how many lecture-based courses did your program teach in each of the following ways? (Please mark one answer for each)

Types of courses taught. Online instructional technology can be used in any of the following three ways:

- To support a course delivered totally online (i.e., with no face-to-face contact at all).
- To replace some face-to-face time with time spent working online (a primarily/partially online or hybrid course).
- To supplement or enhance an unchanged face-to-face course.

5. Over the past 2 years, approximately how many lecture-based courses did your program teach in each of the following ways? (Please mark one answer for each)

0 1-4 5-7 8 or more

- Totally online course (no face-to-face interaction).
- Decreased face-to-face and increased online interaction.
- Face-to-face interaction supplemented, but not decreased, by online interaction.

Types of courses taught. Online instructional technology can be used in any of the following three ways:

- To support a course delivered totally online (i.e., with no face-to-face contact at all).
- To replace some face-to-face time with time spent working online (a primarily/partially online or hybrid course).
- To supplement or enhance an unchanged face-to-face course.

6. For lecture-based courses, please indicate which type of online instructional tools your program implements in your entry-level master's degree program.

Daily Weekly Monthly Rarely Never Don't Know

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- Presentation technologies (e.g., PowerPoint, Keynote, Prezi, Captive, Camptasia, Articulate)
- Online access to student grades
- Online quizzes
- Online assignment or homework collection
- Synchronous online chat rooms or instant messaging (e.g., AIM, Skype, Google Chat)
- Asynchronous class discussion (e.g., discussion board/forum)
- Online library resources (including e-reserves)
- Digital image collections (e.g. Flickr, Artstor, Tumblr, Instagram, etc.)
- Blogs or online journaling (Blogspot, Livejournal, Blogetry, Edublog, Wordpress, Tumblr, etc.)
- Wikis (e.g. Google Sites, Wikispaces, WebPaint)
- Audio or video production
- Clinical virtual simulations or games
- Audio or video podcasting
- Video conferencing with remote expert/participants (GoToMeeting, Skype, Adobe Connect, Collaborate)
- Posting online lectures (e.g., narrated slide show with audio & video)
- Learning Management System (e.g., Moodle, Blackboard, etc.)
- Cloud-based storage (Google Drive, DropBox, iCloud, etc.)

7. A laboratory-based course is defined as a course where students apply content presented in lecture-based courses in a hands-on, procedural fashion. How many laboratory-based courses were taught in your program in the last 2 years? (Please use whole numbers)

8. Over the past 2 years, approximately how many laboratory-based courses did your program teach in each of the following ways? (Please mark one answer for each)

0 1-4 5-7 8 or more

- Totally online course (no face-to-face interaction)
- Decreased face-to-face and increased online interaction
- Face-to-face interaction supplemented, but not decreased, by online interaction

9. For laboratory-based courses, please indicate which type of online instructional tools your program implements in your entry-level master's degree program.

Daily Weekly Monthly Rarely Never Don't Know

- Presentation technologies (e.g., PowerPoint, Keynote, Prezi, Captive, Camptasia, Articulate)
- Online access to student grades
- Online quizzes
- Online assignment or homework collection
- Synchronous online chat rooms or instant messaging (e.g., AIM, Skype, Google Chat)
- Asynchronous class discussion (e.g., discussion board/forum)
- Online library resources (including e-reserves)
- Digital image collections (e.g. Flickr, Artstor, Tumblr, Instagram, etc.)
- Blogs or online journaling (Blogspot, Livejournal, Blogetry, Edublog, Wordpress, Tumblr, etc.)
- Wikis (e.g. Google Sites, Wikispaces, WebPaint)
- Audio or video production
- Clinical virtual simulations or games
- Audio or video podcasting
- Video conferencing with remote expert/participants (GoToMeeting, Skype,
- Adobe Connect, Collaborate)
- Posting online lectures (e.g., narrated slide show with audio & video)
- Learning Management System (e.g., Moodle, Blackboard, etc.)
- Cloud-based storage (Google Drive, DropBox, iCloud, etc.)

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10. For the courses in your master's degree entry-level program, please identify which electronic instructional technology is used with the different types of instructional delivery.

Face-to Face-Lecture	Face-to-Face Laboratory	Distance Lecture
Distance Laboratory	Online Lecture	Online Laboratory

- Presentation technologies (e.g., PowerPoint, Keynote, Prezi, Captive, Camptasia, Articulate)
- Online access to student grades
- Online quizzes
- Online assignment or homework collection
- Synchronous online chat rooms or instant messaging (e.g., AIM, Skype, Google Chat)
- Asynchronous class discussion (e.g., discussion board/forum)
- Online library resources (including e-reserves)
- Digital image collections (e.g., Flickr, Artstor, Tumblr, Instagram, etc.)
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- Clinical virtual simulations or games
- Audio or video podcasting
- Video conferencing with remote expert/participants (GoToMeeting, Skype, Adobe Connect, Collaborate)
- Posting online lectures (e.g., narrated slide show with audio & video)
- Learning Management System (e.g., Moodle, Blackboard, etc.)
- Cloud-based storage (Google Drive, DropBox, iCloud, etc.)

11. To what degree does each of the following act as a barrier or obstacle to your program fully using online instructional technologies?

Large Degree Moderate Degree Small Degree Not at All Not Applicable

- Lack of the students' technical skills
- Lack of knowledge of how to effectively integrate technology into formal instruction
- Lack of technical support
- Lack of financial support
- Lack of time
- Difficulty keeping up with changes with technology
- Lack of access to technology enhanced labs or classrooms
- Lack of rewards or incentives for tenure
- Unreliability of technology
- Copyright or intellectual property issues
- Inadequate student access to technology
- Lack of models or examples of effective uses of technology
- Lecture content does not lend itself to online instruction
- Laboratory content does not lend itself to online instruction

12. How effective do you think online instructional technology is for fostering the development of declarative knowledge related to the following?

Very effective Moderately effective Slightly effective Not at all effective Don't know

- Pediatric Practice
- Mental Health Practice
- Neuro-rehabilitation Intervention
- Gerontology
- Physical Dysfunction

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13. How effective do you think online instructional technology is for fostering the development of procedural knowledge related to the following?

Very effective Moderately effective Slightly effective Not at all effective Don't know

- Pediatric Practice
- Mental Health Practice
- Neuro-rehabilitation Intervention
- Gerontology
- Physical Dysfunction