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Faculty Members' Communication Needs with Regards to Technology

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Abstract: Educators are interested in the impact of technology on education and are supported by regulatory bodies promoting technology standards, recruiters seeking teachers with technology skills, legislated technology in the curriculum, and a demand for a technology skilled workforce. In response to the interest in technology in education, and faculty members incorporating technology in their work, this study was launched to investigate the communication needs of faculty members. This qualitative study selected a convenience sample of 120 faculty and administrators. Using an interview guide, interviewers met with 100 participants. Data was transcribed and entered into a database for analysis. Findings reported were about technology in communication. Concluding statements report that participants use technology in their communication. Faculty members look to early enablers to share best technology practices.

Keywords: communication, faculty members, technology, e-mail.

Introduction

As technologies converge with the field of education, it becomes increasingly apparent that academic educators need to become conversant with the application of technologies in their communications to support both their discipline, and pre-service and in-service teachers.

Whether technology is used to increase opportunity for interaction and problem solving in the traditional classroom or in a distance delivered course, it is only when the technology becomes transparent that the physical distance between teachers and learners becomes insignificant. Rob values the ability of the educators to use technologies to not only reach out to learners and broaden their resources, but to simultaneously enhance their own quality of teaching and learning (Rob, 2012).

Working with Technologies

Working with technologies involves tools, techniques and processes (Bates, 2019). Bates' description of technology, based on reviews in the field and extensive consultations with stakeholders, is adopted for this study. Within this study "technology" refers to different pieces of equipment or tools such as electronic computers and calculators. Technology refers to the techniques or ways technologies are used or manipulated. Technology also refers to the purpose, use or application of the technology (Bates, 2019). As the study progressed, it became clear to the researchers that most, if not all participants were familiar with the term "technology," and this study's reference to Bates' description of technology as a tool, technique or process was upheld.

Andragogy, Constructivism

Technology can be used for communication, in research, and in teaching and learning. To support interaction, relevant content, and problem solving using technologies, attention is drawn to the

principles of andragogy and pedagogy. Educators working with adults can use technologies as tools to support critical thinking, interaction, and independent learning that are integral to the theories of andragogy and constructivism (Lane, 1996; Nedungadi et al, 2020). Principles of andragogy include the need for facilitated learning in a learner-centered environment with regard for individuals and their learning styles, relevant and applicable content, interaction, task-oriented exercises and opportunities for self-directed learning without loss of academic rigor. These principles of andragogy are recognised as key to constructivism (Boettcher, 2007; Niazi & Bakhtiarvand, 2020). Educators use constructivist principles to teach critical thinking, problem solving, collaboration and communication, and learners use constructivist principles when they apply their learning to their personal experiences and prior knowledge and when they learn to do for themselves (Crawford, 1998; Kálmán et al, 2020; University of Missouri-Columbia, 2020). Andragogy and constructivism are strikingly similar in that they both promote relevance of content, participation of learners in the design and implementation stages of a course, self – directedness, facilitated learning and the linking of resources to learners, reflection on experience and knowledge, and collaboration or interaction between instructors and learners and among peers to support problem solving and critical thinking. Educators need to learn to work with teams and use the technologies as vehicles for andragogy and constructivist principles to promote communication, interaction, and self-directed learning.

Systems View: Working Together to Use Technology

When learning about and using technologies, educators rely on the skills and expertise of many specialists to plan, develop and implement courses and work with the learners. Educators rely on the expertise and support of specialists to provide student, technical, media, instructional, audio, video, or administrative support in an inter-related and interdependent system (Karen et al, 2007; Knowlton & Nelson, 2002; Hattan & Lupo, 2020). Moore, supporting a systems view, challenges educators to move from perceiving instruction as individual work to seeing it as work with a team of specialists — "media specialists, knowledge specialists, instructional-design specialists, and learning specialists" (Moore, 1993, p. 4).

A systems view is important for educators to consider because all components are inter-related and interdependent and one change can have rippling effects (Moore & Kearsley, 1997; Reyna, 2019), thus, communication skills become critical. From a comprehensive review of the literature, Thach & Murphy report that educators using technologies require planning, communication and collaboration skills as they work with teams and support groups to develop and implement successful programs (Thach & Murphy, 1994).

Successful integration of educational technology demands professional development, infrastructure and methodology changes, and stakeholder involvement, as well as a partnering process that encourages planning for coordination and teamwork (Banathy, 1995; Ellsworth, 1997; Cobos & Ruiz-Garcia, 2020). A team approach is necessary in the instructional design and delivery of technology-mediated courses (Bates, 2006; Maldonado et al, 2018; Phuong, Foster & Reio, 2020). Learning and creating a technology-mediated course requires many different kinds of skills and experience from instructional designers, writers, media specialists, producers, technicians and support systems.

Knowlton and Nelson identify design specialists, support people and colleagues that come together in a professional development environment to design "technology-based solutions" (Knowlton &

Nelson, 2002, p. 1); Maloy and Perry reveal a need for instructors to work in an interdisciplinary environment (Maloy & Perry, 1991); Hardy and Olcott warn instructors of the movement from an autonomy individual (independent) teaching environment to a team approach (Hardy & Olcott, 1995); and Thach and Murphy challenge everyone involved in distance education to be ready for collaboration, yet to respect individual, group and institutional integrity (Thach & Murphy, 1994). With an interest in the dynamics of small groups, Bennis states that "none of us is as smart as all of us" (Bennis, 1997, p. 35) and that we need facilitators or facilitation skills to help us work together to be more productive. Although our communication skills are aided and abetted by technologies such as e-mail, we still need to have empowerment or participative management skills to work with groups (Bennis, 1997). Recognizing that no one knows all of the interesting uses or possibilities of integrating fast-changing technologies with instruction, Knowlton and Nelson, and Bates suggest educators need to learn to work with teams to develop and deliver a quality learning product and an environment to facilitate higher-order thinking (Bates,2006; Knowlton & Nelson, 2002).

Problem Statement and Research Questions

The accelerated development of technologies and its application to the field of education prompted Olcott and Wright to present an institutional framework to remind us that we need to renew our commitment to our most important resource — our faculty (Olcott & Wright, 1995). As a commitment to our most important resource, the purpose of this study was to investigate the communication needs of faculty members with regard to technologies. Through the following research question, the study investigated the perceived communication needs of faculty members moving from a traditional to a technology mediated learning environment:

- What do faculty members need in order to make technology an integral part of their communication process to enhance delivery of instruction, and to facilitate development of knowledge, skills and abilities?

Significance of the Study

As Jonatan et al (2018) contend that little research is available on how faculty members want to participate in professional development opportunities regarding technologies integration in their communication process, this study was significant because its findings provided the basis for understanding the basic needs of faculty members and issues integral to the process of integrating technologies in their communication. This study also impacted groups of people who received information from the study to inform policy and administrative procedures with regard to integrating technology in the communication process of faculty members to enhance delivery of instruction and to facilitate development of knowledge, skills and abilities.

Literature Review

Technologies are integrated into business, industry and education and are rapidly changing the way we learn, work, live and think. As technologies open up advanced avenues of communication, and new opportunities for interaction, critical thinking, problem solving and access to resources worldwide, educators need to prepare to explore the resultant impact on their role (Snart, Carbonaro & Goodale, 2001; Isa & Julia, 2020).

Collaboration and interaction among students, and between students and the instructor are vital links to constructivism and this "need for interaction is so well documented that it is practically a given" (Hillman & Gunawardena, 1994 as cited in Siantz & Pugh, 1997, p. 2; Rogers, 2000). If a critical predictor of learners' motivation or intention to persist is instructor-learner interaction and if a critical predictor of learners' satisfaction in courses is learners' perception of interaction, then educators using the technologies need the skill to facilitate interaction. The results of Pearson's study that a significant relationship exists between learners' intention to persist and learner-instructor interaction has implications for instructors (Pearson, 2004). It is a strong indicator that interaction strategies need to be implemented to positively influence motivation of learners. From a survey of current practitioners, Kochery (1997) reports the most frequently mentioned training need was for help with facilitating interaction and feedback during interactive television courses. Fulford and Zhang's theory of cognitive speed helps explain this phenomenon (Fulford & Zhang, 1993). If people speak at 125-150 words per minute and the mind can process information at twice that rate, then listeners only need to use half their capacity to comprehend. Using their remaining capacity, listeners are open to outside distractions and internal conversations or "renegade thought patterns." Fulford & Zhang's cognitive theory is important for educators to consider when working with learners in a virtual classroom. Educators need to engage learners (listeners) by involving them in conversations and discussions with the instructor and among other learners and with the content, and by using a variety of hands-on, audio, and visual activities.

Although the findings in Fulford & Zhang's study provides strong evidence to support the need for two-way communication for learners' motivation and satisfaction, they note that this is not always possible. They ask what happens in learning experiences where it is impossible for all learners to interact because of variables such as the class sise, time, technology, content, or type of presentation. Fulford & Zhang reference the findings of Kruh & Murphy (1990) and Yarkin (1983) for answers. The findings suggest that it is the learners' perception of interaction that correlates to satisfaction.

The perception of "vicarious interaction" is the interaction that happens internally and silently, where learners respond to questions, agree with answers, and ponder experiences to themselves. Yarkin provides yet another key anticipated interaction linked to positive attitudes and recall of facts. When questions and encouragement to answer are thrown around like a ball, learners remain alert because they are not sure where the ball will land. To encourage interaction, Willis suggests the use of advance organisers; practice sessions using the technologies, electronic journals for feedback, open office hours, management of discussions, and use of on-site facilitators as the instructor's eyes and ears (Willis, 1995). Willis encourages the use of technologies to provide feedback because learners are motivated to continue with the course if they have frequent contact with the instructor (Willis, 1995). Anderson and Garrison challenge educators to participate in professional development to learn to implement learning activities that will take advantage of the interactive potential of the technologies. Success of technology-mediated instruction such as teleconferencing and computer conferencing is dependent on teachers' ability to manage discussions and help learners create knowledge through interaction and critical thinking (Anderson & Garrison, 1995).

Methods

The qualitative research method used in this study is outlined under the following subsections; Design, Participants, and Procedures. The method is described in sufficient detail to demonstrate

how the qualitative method was conducive to the search questions and to the study, and to provide steps for conducting the research of value to the reader to follow and for other researchers to use for replication. Details of the method are included to convey how the research was conducted, how the process adhered to professional guidelines, and how the research design met the goals of the study. Cognizant of the need for dependability or ability for others to replicate or adapt the study under similar conditions, documentation of the design, sampling, interview, interview guide, transcribing, and analysis processes are included.

Design

This study utilised a qualitative research design. The qualitative research design was selected as it was considered well suited to the problem or phenomenon under study, and the intended audience. The purpose of this study, to probe for deeper understanding of the communication needs of faculty members using technologies, made use of the strengths of qualitative methods to seek illumination, understanding and extrapolation to similar situations. Johnson supported the qualitative research method for educators to "probe for deeper understanding rather than examining surface features" of factors that support learning and teaching (Johnson, 1995, p. 2). Similarly, Armstrong (1998) selected a qualitative method including interviews to investigate and explore influences that motivate faculty to incorporate technology with their instruction. Armstrong indicated that a qualitative method sought to gain a richer understanding of the experiences of faculty members, thus, contributing to a body of literature that is weak in linkages between faculty members as adult learners and their professional development with regard to technology. A qualitative method was also recommended for technology related studies: to investigate the adoption or integration of technologies in education (Norum, 1997; Pedretti & Woodrow, 1999; Strickland et al, 2020; Martin & Christopher, 2020). A qualitative approach was selected by the researcher because the method fit the purpose of the research questions, and because the method was supported by research in the field of education, in technology, and by researchers involved in similar studies.

The use of interviews in the qualitative approach was considered as the study involved technologies that are diverse and continuously evolving. During the data collection process, the interviewer could use examples and probing questions to communicate the need for participants to respond about the use of technologies in their own work, not necessarily the use of computers. The technical vocabulary could be explained, examples could be given for clarification, and questions could be answered by the interviewer. The interviewer could observe and perceive if the participants understood the technology questions or were in need of clarification, and the interviewer could ask for a clarification of responses. The interviewer could strive to make the participants feel comfortable in responding to open questions to provide additional information and issues of value or of concern to them — responses the data collection designers and interviewers could not have elicited as they would not have known what questions to ask. Interviews were also deemed appropriate as it was estimated that it would be more time effective for participants to verbally respond than to compose written answers. Interviews as a means to collect data from participants were proposed.

Interview Method

The interview method was selected to capture an in-depth view from participants at a specific point in time in this study. The interview method was supported by Hoepfl (1997) and Denham and Onwuegbuzie (2013), as a communication tool whereby interviewers could perceive non-verbal cues,

focus on research questions, ask for clarification, and yet allow participants opportunity to expand on their responses. For the interview, an interview guide was developed. In addition to using the literature review to investigate and explore existing work and issues in the topic area, the literature review was also used as a source of data to help determine interview questions. The interview guide was also based on input from three faculty members who were familiar with people and technology within the faculty. An interview beta test or pre-test was established to give the interviewers opportunity for practice interviewing, to test the interview guide, and to test the interview process. The beta-test participants were selected if they had similar responsibilities and background to the sampling group but who would not be involved in the study. Part of the beta-test process was the opportunity for interviewers to revise the interview guide. The beta test lent itself to the question of credibility or the ability of the interview process to gain the perspectives of the participants. The beta test provided opportunity for edits, and revisions to the interview guide and interview process. The researcher and interviewers met periodically during the interview process to ascertain if the interview process and interview guide needed refining or were remaining a process to measure what it was purported to measure. No major revisions were necessary as the interview guide and interview process gathered the information it was intended to gather.

Selection of Participants

Convenience sampling was used to select participants deemed by the researcher to be available and accessible and the most likely to provide the best information critical to the research topic, and representative of other faculties of education. The invitation to participate was sent to all 120 members and administrators involved with the faculty of education from one university at the time of the study. This non-random procedure was best described as a convenience sample. Although convenience sampling can be limited to the perceptions of the participants, inviting all faculty members and administrators provided maximum variation and breadth across departments, subject areas, skills, fields of expertise, and positions.

Procedure

Interviews

Interviews were scheduled over a three-month time span to avoid changes in data and circumstances over time, to schedule the greatest number of participants with the least number of interviewers, and to allow for participants' previous commitments.

The interviews were conducted over fourteen days during visits to the campus in November 2019, December 2019, and January 2020. Each participant signed a consent form prior to beginning the interview. The interviews were semi-structured, using an interview guide and open-ended questions to explore the participants' experience in using technology in research. In each interview, I adapted the questions based on how the participants responded to the open-ended questions. I also asked follow-up questions that were prompted by the information the participants shared. The interview was conducted individually, one participant at a time. All of the interviews took place in the participants' offices or a departmental meeting room on campus. Most of the interviews were between 40 and 60 minutes, with only three lasting less than 35 minutes. With permission, all interviews were recorded.

The interview guide was developed based on the literature and input of the interviewers, and edits from the beta test. The interview guide was used to assist with the gathering of comprehensive information into the same topics for each participant, to keep the interview focused, and to make good use of both the interviewer and participant's time. The interview guide included topics of technology in research, and demographics. Open-ended questions for comments were combined with each topic, and a final open-ended question at the end of the interview was included to ask participants if there was anything that was not included in the interview that they would like add. Opportunity was made for participants to add comments or concerns of their choice. The interview guide was not intended to restrict the participants' input but as Booth and Williams (1995), De (2020), and Ramdial (2020), recognise, it was intended for the interviewer to be prepared and consistent.

An application for ethical review was submitted to the university and approval was granted before the study was launched. A request was made to the office of the Dean of Education to gain access to the population. The dean of the faculty chose to describe the study to faculty members and administrators through an announcement letter. A typed invitation from the researcher was then sent through the mail to each invitee requesting volunteer participation in the study. The invitation outlined details of the study and included a release form. The interviewers contacted invitees by mail, telephone and through personal encounters to arrange personal interviews. Interviews were conducted in the participant's office or area suggested by the participant as conducive to the interview. The invitation indicated the purpose of the study, information about the interviewers, anticipated time required, need for a signed release to participate in the study, ethical considerations, security and use of recording devices and transcription. The invitation doubled as a release form. Before the interview began, participants were asked to sign the invitation/release form confirming that they understood the ethics, security, confidentiality, hazards, ownership, use of recorders and transcription services, use of data, and voluntary right of refusal and withdrawal. With a signed release form and verbal permission to use a tape recorder, the interview began. Ethics were observed, permission from participants was obtained, and confidentiality in the data was considered by assigning numbers rather than names. Interviewers wrote their own notes on the interview guide, used the guide to track questions answered, and to track topics or questions the interviewer might have wanted to return to or focus on. Hoepfl (1997) and Avidov (2020) support the use of a recorder as an indispensable tool to capture data, and the least intrusive tool to allow the interviewer to focus on the interview rather than on note taking. The recorded data were then compiled for transcription and analysis.

Database

Cognizant of the need for dependability or ability for others to replicate this study under similar conditions, the analysis process was documented. In preparation for analysis, the tapes of the interviews were transcribed and information from interview notes was added. A coding system was developed to organise the data by fields or categories, and, important to confidentiality, the names of the participants were replaced with numbers. To promote credibility of the analysis, the researcher developed an electronic database to record interview data. The interviewers met to review preliminary fields or categories, and revisions were made as necessary to the database structure. To prepare for analysis, each set of interview data was entered as a record into the database.

Analysis

Analysis began and continued during data collection, using a qualitative content analysis approach, with the goal of allowing patterns to emerge as the research progressed (Williams et al, 2014). Qualitative content analysis involves a systemic coding of the data to identify themes or patterns. I began the analysis during transcription of the interviews. Transcribing each interview myself allowed me to review and reflect on the interviews before beginning the formal coding. I created the transcripts within NVivo software, which allowed me to synchronise them with the audio files. This meant that I could easily review the audio as I was reviewing the transcripts if I wanted to verify tone or content. My initial coding focused on what was said. I coded the transcripts and documents for the topics that were mentioned, adding codes as new topics appeared. This initial coding was intended to help me identify topics that appeared repeatedly. Then, I examined how each source addressed those common topics to identify similarities and differences. Findings were reported using direct quotations, tables and figures for reference. Sufficient information was provided for the reader to determine if the findings were applicable to other situations or as a guide to the future.

Findings

The study investigated the participants' perceived communication needs with regard to technology. The participants were from the population of the entire faculty and administrators of the faculty of education from one university. From the 120 invited faculty members and administrators representing all departments within the faculty of education, 42 female and 58 male invitees participated. Of the 20 who did not participate, two suggested a conflict of interest, six were out of the city or on sabbatical, and 12 either said no or did not respond.

After signing a release form that outlined the ethical and confidentiality procedures and right to refrain from participation, the 100 participants were interviewed. The 100 participants reported on their use of technology in their work, and their needs and concerns with integrating technology into their communication. Interviews were audiotaped and transcribed and combined with interviewer field notes for each participant. Transcripts of data were analysed and emerging categories were established. Entries cut from transcripts and pasted into the database included a variety of short answers, keywords and enough data from transcripts to understand the entry in context. Queries to the database were established, and reports were run and analysed. Within each category or field in the database, each faculty member participant (participant) in the study was assigned a database number to maintain confidentiality of names. When the findings reference a participant or participant's comments, the database number is recorded in parentheses. Each table within the topics is preceded by a description of the comments. When quotes from participants are used, they are used as clarification.

When participants were asked about communication, their major focus was on the computer and e-mail as a communication tool. All participants (100%) talked about e-mail. Participants also mentioned the telephone or cell phone (16%), voice mail (15%), fax (8%), websites (7%), text telephone system for deaf or hard of hearing people (TTY) (1%), electronic meeting makers (1%), video/audio conferencing (2%), and the need for face-to- face meetings (8%).

Participants were asked to think about the use they presently make of technology in communication with students regarding non-course related activities, with administrative staff, with students

regarding course related activities, with graduate students, and with colleagues or professional contacts. Participants were asked if they have, at least once, used an electronic file transfer process. Participants were also invited to contribute additional comments.

General Communication

Participants are using e-mail. As indicated in Table 1, participants are using e-mail for general communication. Of the 100 participants interviewed, almost all of the participants (92%) indicated they use e-mail to communicate with students for non-course related activities, and all participants (100%) indicated they used e-mail to communicate regarding administration. Most participants (94%) indicated they have used an attachment or file transfer process at least once.

As indicated in Table 1, participants are using e-mail for communication regarding course related activities. Of the 100 participants interviewed, a high number (91%) indicated they used e-mail to communicate with students for course related activities, and most participants (94%) used e-mail to communicate with graduate students. As indicated in Table 1, all participants are using e-mail to communicate with colleagues or professional contacts. Participants are using e-mail in their general communication, in their communication with undergraduate and graduate students, and with regard to their research and areas of interest.

Table 1: General Use of Technology as a Communication Tool

N = 100	Participants using Technology to Communicate
92	Students regarding non-course related activities
100	Administrative staff
94	Attachment or file transfer process
91	Course related activities
94	Graduate students
100	Colleagues and professional contacts

Technology to Communicate — Non-Course Related Activities

Most participants (92%) used e-mail to communicate with students regarding non-course related activities. As noted in Table 2, technology has changed the way faculty communicates. The number of e-mail requests for information has increased, the time it takes to answer e-mail is continuously increasing, and people are demanding immediate responses. Participants notes that their e-mail addresses are being obtained from a variety of sources such as university websites, from their publications, from the literature, and from other colleagues worldwide.

As noted in Table 2, participants are responding to inquiries from students all over the world, including former students, prospective students and students from other colleges and universities. Participants are responding to requests for information about their area of expertise and research, requests to preview students' resumes, proposals and research, and to requests for letters of reference, interview tips and information about career or educational opportunities. Many requests are received for information about the university, programs and courses. Participants noted that they provided marketing through e-mail responses. "We get e-mails like crazy, requesting information" (database participant #50) and "students are shopping for universities, searching for program descriptions, and

making decisions on what they see on our website, and from our responses" (61). Although technology has increased the volume of communications that, in tum, places a stronger demand on participants' time and commitment to immediate replies, most participants (92%) recognise the importance of communicating and are striving to respond, however, to meet the challenge of electronic requests, and participants suggest administration could assume more responsibility for making information available. Participants suggest they need a repository of drafts, templates, forms and marketing data to draw information from for their responses, and a website to communicate from the faculty or department to the many inquiries from prospective or interested students who have Internet access (50, 30, 61, 65).

Table 2: Communication for Non Course Related Activities — (92%)

Advantages	Concerns
Communicate with former and Prospective students, local and international (3) (17). Give interview tips (71). Provide social, program inquiries (18). Review resumes, reference letters (16) (8).	Get e-mails like crazy requesting information. Everyone gets bombarded (50). People expect a very rapid response (23). Need website one to many (61). Information in a central place- server (30). Register and advise students online (65). Opens up communication that might have died (former students}-changed nature of interaction (17).

Technology to Communicate with Administration

In addition to seeing administration as a resource for information to communicate with former and prospective students, participants also note that e-mail is their direct connection with administration. "E-mail and list serves are our internal network" (65).

All participants (100%) use e-mail in their communication regarding administration. As noted in Table 3, participants see the advantages of e-mail and list serves to communicate with administration and they also see disadvantages. Some participants critique e-mail as a push of information from administration rather than a pull of information from the participant on a need basis. Participants suggest that written and signed communications get better attention, face-to-face meetings are better for understanding, the sheer amount of e-mail is taxing and time consuming to weed through, and it is often faster and more efficient to speak on the telephone or in person rather than type e-mail messages.

However, participants recognise the strength of e-mail and list serves, commenting that it is good to receive announcements on time that they might otherwise miss out on, that it is a written and recorded message and a replacement of memos, that it provides access to shared data and that it is a help to prepare proposals and grants. All of the participants are using e-mail as a communication tool to networks within and among departments, their faculty, other faculties, central administration, graduate studies or support services.

Table 3: Communication with Administration (100%)

Advantages	Concerns
Need to read because of the 5% nuggets from lists that is valued information (2). Prefer e-mail for record of what was sent (25, 63). E-mail replaces memos (15). Department, faculty, graduate studies get information when it is fresh and current, don't have to wait (4).	Formally written and signed correspondence gets better attention (2). For decision making, one-on-one, face-to-face is best (20) Telephone effective (10)

Technology to Communicate with Undergraduates — Course Related Activities

In addition to communicating electronically for non-course related information and with administration, participants are also using e-mail to communicate with students enrolled in their courses. Almost all of the participants (91%) are using e-mail to communicate with students regarding course related activities. As noted in Table 4, comments suggest students have limited access to computers and e-mail. Although one participant indicates limiting availability of time online and limiting turnaround time for responses, another participant indicates being wired and available 24 hours every day, 7 days a week. One comment indicates a concern about confidentiality of e-mail addresses, and another believes it is public information. Regardless of concerns, most participants (91 %) are distributing their own e-mail addresses and using e-mail to communicate with students regarding course related activities.

Table 4: Communication for Course Related Activities (91%)

Advantages	Concerns
E-mail addresses for students that is public information as far as I am concerned (3). I am wired for them wherever they are, 24 hours a day (23) Almost 100% have access to e-mail (12).	Legalities need to be worked out (61). Time: Yes, get back to them within a day (70) Undergrads typically do not use e-mail or telephone to communicate with me, many do not have access to internet (2).

Technology to Communicate with Graduates – Course/Supervisory Related Activities

In addition to communicating with undergraduate students regarding course related activities, most participants (94%) are also communicating with graduate students. As noted in Table 5, participants who are teaching classes or supervising find the use of technology valuable to maintain contact with and distribute information to graduate students. Participants are communicating with graduate students through e-mail, although many prefer face-to-face conversations when possible. "Yes, grad students I supervise, I use e-mail quite a lot, for the lower level communication, but usually require face-to-face with graduate students for meatier aspects" (3). However, with so few students in residence, participants are finding e-mail an essential tool to stay connected to graduate students, to guide them in their courses, in their program and in their research.

Table 5: Communication with Graduates (94%)

Advantages	Concerns
Constant contact with those doing thesis, projects, papers, easy for them to e-mail (4). Always, for supervision, their work, anxiety attacks, finding work (8). So few are in residence, and those who are in residence will be home (28).	Yes. E-mail to make appointments but old fashioned come in and meet with me (18). Face-to-face with graduates for meatier aspects (3).

Technology to Communicate with Colleagues and Professional Contacts

All participants (100%) indicate they are using e-mail to communicate with colleagues and professional contacts. As noted in Table 6, participants are communicating with colleagues and professional contacts within and among departments or faculties on campus, with a network of scholars throughout the world, and with organizations, colleges and other universities worldwide.

Participants suggest that e-mail is a great tool to establish rapport and build relationships with the people they meet personally, at face-to-face at meetings or conferences. Although working globally opens up the need for language translation systems and although it is time consuming to filter through the mail and correspond with so many colleagues, all participants are using e-mail locally, nationally or internationally. Participants identify e-mail as an easy-to-use tool that is key to effective and timely communication with professional contacts and colleagues in their field or area of expertise worldwide. "It is the most meaningful, professional contacts in my area of interest internationally, made possible through e-mail" (8). When communicating with colleagues, participants also note that they need to use a file transfer process to share data.

Table 6: Communication with Colleagues and Professional Contacts (100%)

Advantages	Concerns
Big improvement to communicate with other faculties (2). Get information when it is fresh and current, Continue networking started face-to-face at conferences (4). Discover contacts at conferences or through literature, then build relationships through e-mail (8). Most meaningful professional contacts in my area of interest internationally made possible through e-mail (8). Communicate with researchers across the country (40, 13).	However, a second language is a problem, need translation systems to be rapid and efficient (10). Saves time but creates need for incredible amount of time (17).

Technology to Communicate — Attachments or File Transfer Process

When asked about the process of file transfer, the majority of participants (94%) indicate they have used electronic file transfer at least once. As indicated in Table 7, some participants have experienced difficulty with attachments or file transfer, are seeking further training, or are fluent with the process. Concerns include hardware or software compatibility problems, lack of information about type of attachment or download, threat of viruses arriving with attachments, and lack of skill or knowledge of the function. However, participants indicate a need for further training in the area as they recognise the growing need for transferring files to and from students or administration, for collaborative writing and research, for board reviews, submission of articles, and submission of keynote speeches.

Table 7: File Transfer Process (94%)

Advantages	Concerns
Write collaboratively (4). Board reviews, articles, chapters or sections (63).	Virus alert (19). Almost illiterate in this field (29). Once in a blue moon (69).

Table 8: Communication — Other Comments

E-mail Advantages	E-mail Concerns
I could not get by without a computer – need to send in electronic - even keynote speech. Good for written record, but what about storage (15). Yes e-mail I live by in all respects, very important. E-mail is like a conversation (38). I can get to my mail from anywhere in the world (77).	Takes 60 seconds to view and decide to delete or not (2). 20-30 messages waiting... spend a lot of the day dealing with e-mail (3). Can't ignore the messages...can be horrendous (12). Here is a recent proposal could you read it please ... and taking me a half a day to answer properly, and I haven't the time to do it, it's really a big pain (13). People expect a very rapid response (23).

Summary

Although participants recognise the drawbacks of e-mail, participants are using e-mail to communicate. Participants are communicating regarding non-course related activities such as maintaining relationships with former students, providing research information to students and marketing information for new students — students from the campus or from anywhere else. Participants are communicating with administration to both send and receive information regarding the administration of the department, faculty or university for students, or for their own professional development. Participants who are teaching are using e-mail to communicate with the undergraduate and graduate students enrolled in their classes. Participants are also using e-mail to continuously communicate with graduate students they supervise and colleagues worldwide.

Time spent communicating through e-mail has "significantly changed part of academic life" (12). As noted in Table 8, e-mail is time consuming, often taking several hours a day to filter through incoming mail. It is also time consuming to compose responses especially if responses deserve research or thoughtful replies, or if there is a lack of keyboarding skills. The large number of e-mail messages sent and received also poses a problem of storage or archiving and retrieval.

The participants note that e-mail has escalated a demand for responses — e-mail senders expect an immediate action or response within hours of a message no matter what time of day or what day of year the message is sent. However, as noted in Table 8, participants also identified strengths of e-mail as "liberating for the deaf or hard-of-hearing people," (2) more like a conversation than a formal memo (38), a natural paper trail, and an excellent tool for information exchanges. Participants have discovered a new world, using e-mail to communicate without leaving their desks. E-mail can be accessible from participants' local offices or from anywhere in the world a Web browser connection is available (77). As technology opens up communication to and from students, participants are recognizing the potential to use technologies in their teaching and learning strategies.

Conclusion

Based on the findings of this study investigating the communication needs of faculty members with regard to technology, the following conclusions emerged.

1. Faculty are using technology, specifically e-mail, to communicate with administrators (100%), colleagues (100%), students (91%), and graduates (94%), and with other people outside of the university regarding non-course related activities (92%).
2. As faculty are using e-mail, and as faculty need information to learn about best practices, new technologies, and professional development opportunities, e-mail becomes a viable communication tool to meet their needs.

Recommendations

Recommendations for Practice

The following practical recommendations are offered for consideration:

- Faculty members indicate they communicate electronically with administration, students, and colleagues with common interests worldwide, without leaving their computers. Faculty members also indicate that they are less dependent on hallway help with computer applications, and they can now print from within their offices and work from home. However, academic members need to devise ways to purposefully gather to share ideas and best technology practices to lead the way in education and technology.
- Faculty members indicate that the success of professional development regarding technologies is based on hearing about or seeing technologies from the media or early adapters, on support from academic leaders and administrators, on a network of contacts or registries of specialists, and, ultimately, on the infrastructure group that technically supports it all. Based on the need for faculty to communicate within this interdependent system, the implementation of multi-communication strategies in the department, faculty and the university is recommended to keep people connected. Multi-communication strategies could include electronic connections such as e-mail links to department / faculty / university newsletters, minutes of meetings or user groups, and the use of project, course, and department websites. Colleagues could be invited as online guests in courses. Summaries, pictures, and examples of faculty using technology could be featured, technology articles and magazines could be circulated, services available could be communicated continuously, and a buddy system or mentor opportunity to work with colleagues using technology could be established. New faculty could also be introduced to other faculty using technology, conversely, new faculty with experience with technology could share their ideas.

Recommendations for Further Research

After analysing the data and themes emerging, and after further reading and research, the following recommendations are offered for further research.

1. Replication of this study is recommended in other contexts, such as with other faculties of education, as other universities might serve a more geographically scattered population, or might be combined with a college with less focus on research, or a university that focuses on distance delivery. Replication of this study is also recommended for other disciplines to learn how others apply technology in their communication and develop professional development initiatives.
2. Ongoing studies are suggested to reveal how technologies are being used by administrators, faculty members, students at the university, student teachers, teachers, and students. Ongoing studies to reveal how others are using technologies will help individuals realise how much they know and how much "they don't know what they don't know" (74).

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