

ASSESSING THE PURPOSE AND IMPORTANCE UNIVERSITY STUDENTS ATTRIBUTE TO CURRENT ICT APPLICATIONS

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ABSTRACT

In this study we surveyed students in a mid-sized university in Ontario, Canada to explore various aspects associated with their use of computer-based applications. For the purpose of analysis, the computer applications under study were categorized according to the Human-Computer-Human Interaction (HCHI) model of Desjardins (2005) in which interactions between users and digital technology are categorized into four classes of interaction, namely, Technical Interactions (interactions with the digital devices themselves), Social Interactions (interactions with other users through digital devices), Informational Interactions (interactions with information through digital devices), and Computational Interactions (interactions with data processing software through digital devices). The survey attempted to assess the following four aspects of computer application use (in the context of the HCHI model): importance, purpose, frequency, and confidence. In this paper we report on preliminary findings regarding the purpose and importance students attributed to the applications under study. Frequency and confidence studies were reported elsewhere— Partosoedarso, DiGiuseppe, vanOostveen, & Desjardins (2013). Preliminary findings indicate that, in general, students in this study tended to engage in technical, social, and informational interactions primarily for personal purposes and computational interactions for school purposes. In terms of importance, students ascribed the greatest importance to social interactions, followed by technical, informational, and computational interactions, in that order.

KEYWORDS

Information Communication Technology, higher education, digital technology

1. INTRODUCTION

Information and communication technology (ICT) is rapidly becoming a pervasive and highly valued resource in all endeavours, including post-secondary education. Laptops and mobile devices, including smartphones, tablets, which enable ubiquitous Web surfing, video conferencing, and social networking have for some time now been deemed necessary tools in higher education (Melton & Kendall, 2012). Furthermore, highly interactive—and highly motivating—applications such as serious games, augmented reality, and massively open online courses (MOOCs) are making greater inroads into post-secondary schooling (Dede, 2013; Johnson, Smith, Willis, Levine, & Haywood, 2011). Almost three-quarters of these institutions offer online courses and almost one quarter of all post-secondary students having taken at least one online course in 2011 (Parker, Lenhart, & Moore, 2011). Currently, most North American post-secondary institutions offer online courses in which geographically distributed students and instructors learn together in virtual classrooms. These developments have placed great pressure on students and instructors to keep up with the trends, assess the value of these new technologies, determine their most appropriate uses, and develop essential skills.

It can be assumed that university students are likely exposed to a variety of computer-based devices and applications in their personal lives, work lives (if gainfully employed), and studies, especially given the pervasiveness of ICT in today's (Canadian) educational milieu. It may also be assumed that as students gain experience with various devices and applications, they will gain confidence in their use and will likely begin to find some devices and applications more useful than others for various purposes. In other words, they may attribute varying levels of importance (i.e., value) (Wyse, 2011) to the devices and applications they use.

Thus, in the broader study on which this paper is based, we assessed—via an online survey—the following four aspects of computer-based device/application use: frequency, confidence, purpose, and importance. In earlier papers (DiGiuseppe, Partosoedarso, vanOostveen, & Desjardins, 2013; Partosoedarso, DiGiuseppe, vanOostveen, & Desjardins, 2013), we reported on findings regarding the frequency with which a group of university students employed a particular inventory of common devices and applications, and the level of confidence they developed in using those technologies. In this paper, we extend the findings of that study by reporting our findings on the purpose and importance students attributed to the same inventory of computer-based applications discussed in the papers noted above.

1.1 Frameworks

In this study, we employed a survey instrument adapted from Desjardins & Bullock (2012) in which Human-Computer-Human interactions (HCH interactions) are categorized into the following four types: *Technical Interactions (TI)* (users interact with digital devices for basic operations), *Social Interactions (SI)* (users interact with digital devices for social purposes), *Informational Interactions (II)* (users interact with digital devices for information), and *Computational Interactions (CI)* (users interact with digital devices for creative and computational purposes). Table 1 provides some examples of these four types of interaction.

Table 1. HCH Interactions (adapted from Desjardins & Bullock (2012))

INTERACTION	DESCRIPTION
Technical (TI)	Employ basic devices and applications; Create/edit documents/multimedia
Social (SI)	Communicate via email, video, text, audio; Use social networking systems
Informational (II)	Search for and exchange articles, video, music, books, etc.
Computational (CI)	Create concept maps, plans, diagrams, pictorials, graphics; Process data

Survey responses provided by the participants in this study regarding their interactions with ICT were analyzed in relation to the four types of interactions of the HCHI Model summarized in Table 1.

2. METHODS

In this study, we surveyed a sample of university students in a mid-sized university in the province of Ontario, Canada to assess their use of a variety of current computer-based technologies. The survey questionnaire employed three Likert scales for assessing “Importance of Use,” “Frequency of Use,” and “Confidence of Use,” and a nominal scale to assess “Purpose of Use” (Table 2).

Table 2. Scales used to assess importance of, purpose of, frequency of, and confidence in using computer-based technology

Importance of use	Purpose of Use	Frequency of use	Confidence of use
1 = not important 2 = somewhat important 3 = very important 4 = indispensable	personal studies work	1 = never 2 = few times a year 3 = few times a month 4 = few times a week 5 = daily	1 = do not know how to use 2 = not confident 3 = confident 4 = quite confident 5 = very confident

A total of 423 students (n = 423) were invited by email to complete the online survey in February-March, 2013 and 157 students (n = 157) voluntarily completed the survey, for a 37% completion rate. The segment of data pertinent to this paper were analyzed in Microsoft Excel using descriptive statistics for students’ self-assessments of the purpose for which the students used various devices and applications and the importance they attributed to those technologies. Survey responses were then coded, categorized, and analyzed in relation to the four types of HCH interactions of the HCHI Model summarized in Table 1.

3. FINDINGS AND DISCUSSION

3.1 Purpose for using ICT Applications

Figure 1 indicates that, in general, students in this study most often employed ICT applications involving technical, social, and informational interactions (Desjardin, 2005) for personal purposes. This is demonstrated by the relatively high proportion of responses indicating personal use of social interactions such as texting, audio recordings, social media, and sharing ideas with others.

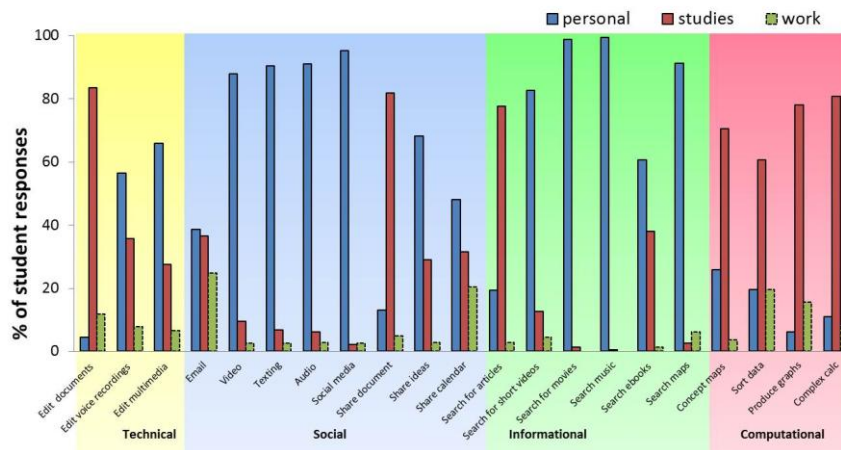


Figure 1. Purpose for using various computer applications.

With the exception of emailing (a social interaction) and sharing calendar information, sorting data, producing graphs, and performing complex calculations (computational interactions), very small proportions of participating students employed most of the other applications assessed in this study for work-related purposes. This may be an indication that small numbers of the students had jobs, or if employed, their jobs did not require significant use of these other applications. However, the chart also indicates that more equal proportions of students employed email—a principal means of communication globally (Robinson, 2012)—for personal, work, and study purposes. This suggests that while emailing was not as popular a way of interacting socially for personal purposes as texting, audio, video, and social media were, significant proportions of students indicated that they used email for all three purposes assessed in this study (personal, work, and studies), further suggesting that these students considered email to be a more versatile and more broadly applicable form of social interaction.

Figure 1 also shows that a majority of students engaged in a minority of technical, social, and informational interactions for study purposes. For example, only editing documents (a technical interaction), sharing documents (a social interaction), and searching for articles (an informational interaction) were employed by a majority of students for study purposes. However, a majority of students engaged in most of the computational interactions for study purposes, not personal or work-related reasons. Computational interactions include activities such as concept mapping, sorting and processing data, graphing, and calculating. These findings seem to align with the sorts of applications students commonly employ in completing school assignments, especially in contemporary universities in which the use of ICT is becoming increasingly pervasive (Lai, 2011). Interestingly, however, is the generally low proportions of students who indicated use of social interactions such as video, texting, audio, and social media, and the very limited use of some of the informational interactions, such as searching for music and movies, for educational (study) purposes—findings consistent with those of Selwin (2007) who maintains that “many university students and faculty make only limited formal academic use of computer technology . . . use of computer technologies in many areas of higher education could best be described as sporadic, uneven, and often ‘low level’” (p. 84).

These findings seem to suggest that highly social interactions (video, texting, audio, social media) and informational interactions with social affinities (searching for movies and music) may still not be highly integrated in post-secondary teaching and learning as they could be, suggesting further research in this area.

3.2 Importance attributed to Various ICT Applications

Figure 2 is a bar graph illustrating the levels of importance participating students attributed to the various computer interactions studied in this project.

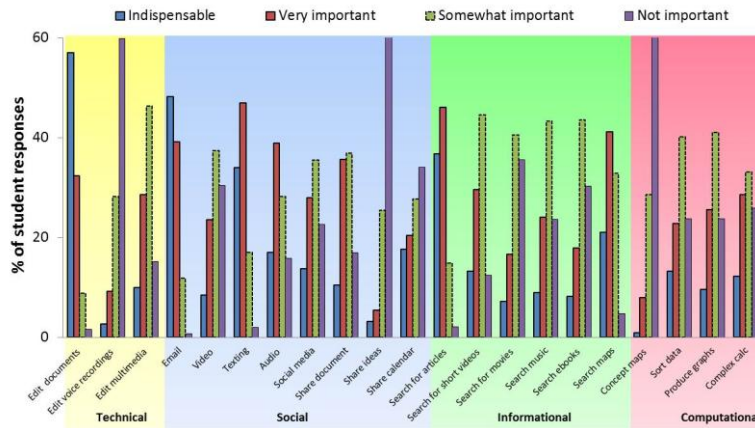


Figure 2. Level of importance students attribute to various computer applications.

Some interesting patterns may be discerned in Figure 2. For example, within the category of computational interactions, a majority of students attributed relatively low importance to all of the applications in this category, including concept mapping, sorting data, graphing, and performing complex calculations—with the least importance ascribed to concept mapping. When comparing these results to the purposes described in Figure 1, it is obvious that the majority of students claimed to have used these applications for study purposes, not for work or personal reasons. Within the social and informational interaction categories, the importance ascribed to the various applications is highly variable; however, some interesting results are noticeable. For example, a very large proportion of students valued email very highly—an application which the results in Table 1 showed was employed by approximately equal numbers of students for personal, academic, and work related purposes. This tends to indicate the importance and pervasiveness of email in virtually all aspects of these students’ lives.

Another notable result is that within the category of technical interactions, a very large proportion of students considered editing documents (an application most students performed for educational purposes) to be a very important activity while editing voice recordings and multimedia (applications most students performed for personal reasons) not to be so important. A similar pattern is evident within the informational interaction category where searching for articles is highly valued by a majority of participating students and used by a majority for educational purposes while searching for video clips, movies, music, and e-books are not highly valued by a majority of the students and used by a majority for personal purposes. This seems to indicate that in a number of cases, participating students valued applications used in their studies more highly than applications employed primarily for personal purposes. This may simply be an indication that the participants were students at the time the survey was conducted, and, as such, more of them tended to value applications required for achieving success in their studies more than those used in their personal and/or work worlds. Nevertheless, this was not a consistent finding. For example, texting (a highly valued social interaction) was employed by a large majority of students for personal purposes while sharing documents (a moderately valued social interaction) was employed by most students for educational (study) purposes.

4. IMPLICATIONS AND CONCLUSIONS

The small number of analyses reported in this brief paper tend to indicate that in many of the technical, social, and informational HCH interactions assessed in this study, participating university students tended to value more highly those ICT applications employed in their studies more so than those employed for work or personal purposes. However, this was not a consistent finding, for there were cases in which the reverse was true. In general, however, it was found that none of the interactions (i.e., applications) assessed were used for the purpose of employment (i.e., work). This, however, was likely a reflection that only a small proportion of the participating students held a job at all, or one that required them to use the assessed applications. In terms of the computational category, most students employed these applications for educational purposes, but did not value them highly in large numbers. Interestingly, in a paper on another aspect of this study, Partosoedarso, DiGiuseppe, vanOostveen, and Desjardins (2013) reported on the “frequency” and “confidence” with which students used these computational applications, and indicated that the students tended to use these applications infrequently, and possessed relatively little confidence in their use. Taken together, these and the current findings suggest the need for more research in this area, including qualitative case studies to help determine why students tend to value such potentially academically useful ICT applications so low; why they tend to use them so infrequently; and why they tend to have such little confidence in their use.

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