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Multilingual Information Retrieval & Use: Perceptions and Practices Amongst Bi/Multilingual Academic Users

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ABSTRACT

In recent years, technological advancements in Natural Language Processing (NLP) such as machine translation have made it possible for users to access information in multiple languages, even those in which they may not be proficient. The current study investigated the information searching behavior of bi/multilingual academic users, and examined their practices and perceptions regarding searching for information on the Internet and on electronic databases. Bi/multilingual students were recruited from a Canadian university and a community college both located in London, Ontario. A total of 250 ($N = 250$) students completed a web survey through a link that was embedded in an invitation e-mail. Results showed that though advancements in NLP technology have alleviated some of the linguistic related challenges that some bi/multilingual academic users face while searching for information online, language barriers do still exist for some especially at the *query formulation stage*. The study found that an increase in Multilingual Information Access (MLIA) tools on electronic databases coupled with appropriate information literacy instruction could be helpful in further alleviating language barriers.

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Introduction

User Experience (UX) and user perception are increasingly becoming important concepts in the Library and Information Science (LIS) profession. The definitions of these aspects tend to be elusive, and often overlap. A brief review of the LIS literature seems to suggest that definitions of user experience tend to emphasize products and systems (Gallant & Wright, 2014; Majors, 2012; Norman & Nielsen, n.d.; Yue & Beisler, 2014;) while user perception definitions mainly address services (Lupien, 2007; Ouellete, 2011; Rehman, Shafique, & Mahmood, 2011; Rojeski, 2012). With a specific focus on language and how it impacts information searching online, the current study employed a web survey to gather information on bi/multilingual users' experience and perceptions on searching for information on the Internet and on electronic databases.

With the exponential increase of information on the Internet, multilingual information retrieval and use is on the rise: many users now have access to information in various languages not just on the Internet but on electronic databases as well. Additionally, many digital libraries

now offer access to content in multiple languages. Multilingual information access in the electronic environment is facilitated through various language tools including: multilingual interfaces for electronic databases, OPACS and library websites, multilingual library guides, correct display of multiple fonts or characters, machine translation of retrieved documents, multilingual thesauri, and cross language information retrieval (CLIR) search options. The current study explored the information searching behavior of bi/multilingual academic users and examined their language choices and their use or non-use of the multilingual information access tools mentioned above. Peters, Braschler, and Clough (2012) suggest that making these kinds of functionalities available on Multilingual Information Retrieval (MLIR) systems could benefit users who lack proficiency in the language they are searching in. It could also greatly enhance their experience, by providing support in query formulation and reformulation, in browsing support and in evaluating the results they retrieve.

In keeping with the current emphasis on the human aspects of information retrieval such as interaction, emotions of the users, user satisfaction and perception, this study aims to enhance and contribute to user-centered studies that have been done in this area by examining and exploring the information searching behavior of bi/multilingual academic users at two Canadian higher education institutions: the University of Western Ontario (and its affiliate colleges- Brescia, Huron and Kings University Colleges) and Fanshawe College, a community college.

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Literature review

User-centered studies in MLIR are documented in literature: Some studies that have explored users' language choices while using CLIR systems found that users often chose the most appropriate language for their task, not necessarily their native language (Petrelli, Levin, Beaulieu, & Sanderson, 2006; Petrelli et al., 2004; Rieh & Rieh, 2005). Other user centered studies also revealed that bi/multilingual users of IR systems desired more multilingual capabilities such as being able to search in multiple languages simultaneously and being able to filter results by language (Petrelli et al., 2004; Vassilakaki, Garoufallou, Johnson, & Hartley, 2015; Wu, He, & Luo, 2012).

Several studies have explored the information seeking behavior of international students and ESL students and their use of libraries with many of these reporting language issues as a recurring theme (Click, Wiley, & Houlihan, 2016). For instance, some studies have reported that international students often experience anxiety due to barriers associated with interaction with library staff, including language and other affective barriers (Curry & Copeman, 2005; Jiao & Onwuegbuzie, 2001; Martin, Reaume, Reeves, & Wright, 2012; Naveed, 2016). Other studies have shown that this student population could benefit from multilingual services or at the least an acknowledgement of their language needs (Ferrer-Vinent, 2010; Liu & Redfern, 1997; Taha & Cox, 2016) while others have documented how English language proficiency affects their use of electronic information: For example, a study by Irving (1994) indicated that a lack of fluency in English may result in failed online catalog searching, while a study by Zhuo, Emanuel, and Jiao (2007) found that many international students were unaware of the specialized language features on some of the electronic databases. Another study by DiMartino, Ferns, and Swacker (1995) looked at the database searching techniques used by ESL students and compared it to that of native speakers and found that the main difficulties for ESL students that differed significantly from those of native English speakers were concentrated in vocabulary issues e.g. utilization of plural forms, the use of synonyms and how to expand key concepts. Recommendations on how to address these challenges have ranged from providing specialized library instruction and orientation, providing multilingual library tutorials and a strong collaboration between ESL instructors and librarians (Bosch & Molteni, 2011; Conteh-Morgan, 2001; Liestman & Wu, 1990; Spanfeller, 1991).

It is widely believed that due to technological advancements in machine translation, language barriers are becoming less severe. The current study provides a timely investigation on whether bilingual and multilingual students are taking full advantage of these technological advancements and/ or what further steps need to be taken to reduce language barriers in online information seeking, not just for academic users, but for all online information users worldwide.

Research questions

The current study is based on the following research questions:

- 1) What role do linguistic determinants (such as language proficiency, vocabulary, and spelling) play in information searching on the web and in electronic databases?
 - a. Do bi-/multilingual speakers use other languages (apart from English) while searching for information on the web and in electronic databases?
 - b. To what extent are bilingual/multilingual system users aware of, and in the habit of using multilingual information access tools available in electronic databases and search engines?
- 2) Are there relationships between various measures of students' English language proficiency and their language choices while

searching for information on the Internet and in electronic databases? More specifically:

- a. Is there a relationship between English language proficiency (as measured by attendance in ESL classes, length of English as language of instruction and self-reported English proficiency scores) AND language used for searching for information on the Internet?
 - b. Is there a relationship between English language proficiency (as defined above) AND the choice of language used in formulating search terms on electronic databases?
- 3) What linguistic related challenges do LEP (Limited English Proficient) users face while searching for information online and what kind of coping mechanisms do they employ?
 - 4) What kind of library services do these students desire?

Methods

A web-based anonymous survey (see Appendix A) was administered through SurveyMonkey and was posted between March 1, 2014 and August 30, 2014. For purposes of the study, students who were likely to speak or have knowledge of one other language in addition to English were targeted for participation in the study; more specifically the researchers targeted international students as well as students who were enrolled in ESL classes. An invitational e-mail to participate in the study was sent through a mass e-mail system to both undergraduate and graduate international students who were matriculated at the University of Western Ontario and the Affiliate colleges for the winter 2014 term. Out of the 1120 e-mail invitational messages that were sent out, a total of 203 ($N = 203$) responses were collected resulting in a response rate of 18.1%. Additionally, in a bid to recruit bilingual/ multilingual students whose native language is not English but who are not by immigration status considered international students, invitation e-mails were sent out to regional student groups such as the Chinese Student Association, the African Students' Association, Arab Students' Association etc. and to language and culture related clubs such as the French Club, SALSA (Spanish and Latin Students' Association) and the Portuguese Connexion. The first author also worked with instructors to recruit some students from the English Language Institute at the University of Western Ontario and the ESL Program at Fanshawe College. Interested participants clicked the URL embedded in the email and were directed to the survey website to join the study. These additional efforts yielded another 47 responses bringing the total number of respondents for the survey to 250 ($n = 250$).

The survey questionnaire consisted of 3 sections. The first section of the questionnaire was designed to collect demographic information about the participants. This section included questions about gender, age, major, native language and level in college (i.e. Undergraduate or Graduate). The second and third sections were designed to elicit information from the participants about their use of language tools while searching for information on the Internet and in electronic databases respectively. Two general questions were included at the end: one was to give participants a chance to comment on what type of linguistic help they often needed while searching for information online, while the other sought the participants' input on what type of library services they thought would be beneficial to them while searching for information online.

Findings

The data was analyzed using IBM SPSS Statistics version 22:

Web survey section 1: demographics

From the 250 ($n = 250$) participants who completed the survey, 158 (63.2%) self-identified as undergraduate students compared to 91 (36.4%) who identified themselves as graduate students. With regard to gender, 100 (40%) self-identified as male while 146 (58.4%) self-

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