

Exploratory Research into the Use of Web Resources of Students Enrolled
in an Introductory University-level Medical Translation Course

by

Ofelia Fernández

A Thesis Presented in Partial Fulfillment
of the Requirements for the Degree
Masters of Arts

Approved November 2015 by the
Graduate Supervisory Committee:

Barbara A. Lafford, Chair
Sara Mariel Beaudrie
Álvaro Ulises Cerrón-Palomino

ARIZONA STATE UNIVERSITY

December 2015

ABSTRACT

This study explored the Web resources used by four students enrolled in an introductory university-level Medical Translation course over a period of one semester. The research examined the students' use of time, information needs and searches, and whether user attributes (translation experience and training, specialization and familiarity with the text, previous Web search training, and effort) or task-related factors (perceived task difficulty) had a relationship with the Web searching behavior of the participants. The study also investigates how this behavior might have been reflected in the quality of the product. The study focused on two translation tasks extracted from medical texts selected by the instructor that had to be translated from English into Spanish. Data was gathered by means of various instruments: translated texts, Think-Aloud Protocols, computer screen recordings, and questionnaires. The results of the data gathered from these instruments were triangulated in an effort to find relationships between the translation process and the translation product. Results were analyzed both qualitatively and quantitatively.

The findings of the study revealed that the students spent a considerable amount of time looking for information on the Web during their translation assignments, and that the students exhibited an inclination toward bilingual Web sources. An analysis of user attributes suggested that translation experience might have had a relationship with the resources used, and the frequency of their use. Data showed that the more experienced students in the translation program received higher scores in their translations. It was also found that the higher the level of familiarity with the topic, the fewer the number of total searches. In addition, previous Web search training appeared to have a relationship with

where and how information was sought. It was observed that in one of the two translation tasks, the more effort the students declared, the more Web searches they carried out. A look at perceived task difficulty indicated that in one of two tasks, this factor had an impact on the number of Web searches, which in turn, seemed to influence the time spent on the translation process, and the translation scores.

DEDICATION

To my husband, for all his support:

Working full-time, while pursuing graduate studies
and assisting with teaching has not been easy.

To my mother, for her infinite love.

ACKNOWLEDGMENTS

I wish to express my appreciation to Dr. Barbara A. Lafford for supervising my work and to my two other committee members, Dr. Álvaro Cerrón-Palomino and Dr. Sara Beaudrie for their guidance. My sincere and deepest gratitude to my supervisor at work Irma Bustamante; her understanding and support throughout my graduate studies have played an important part in my efforts towards earning a master's degree. Special thanks to María Teresa Martínez for her friendship, for sharing her knowledge and enthusiasm, and for the opportunity to assist her in the Medical Translation course. Many thanks to professor Lisa Burns and Dr. Stollar for their comments, and to Marcela Testai for sharing her knowledge of translation. I am also grateful to the translation students who generously agreed to take part in this study. Without their participation, this thesis would have not been possible.

TABLE OF CONTENTS

	Page
LIST OF TABLES	viii
LIST OF FIGURES	x
INTRODUCTION	1
TRANSLATION COMPETENCE.....	2
RESEARCH INTO THE USE OF RESOURCES IN TRANSLATION	5
Justification of the Current Study	11
Research Questions.....	12
METHODOLOGY	12
Medical Translation Course.....	12
Subjects.....	13
Data Collection Instruments	15
Text and Translations.....	15
Think-Aloud Protocol.....	16
Screen Capture	17
Questionnaires.....	17
Operationalization of Constructs	18
Procedures.....	20
Data Analysis	23
Translations.....	23
Think-Aloud Protocol.....	24
Screen Capture	24

	Page
Initial Questionnaire.....	25
Questionnaire about the Translated Text	26
Questionnaire about Resources.....	26
Questionnaire on Notions about Translation	26
RESULTS AND DISCUSSION.....	26
Students’ Opinions on the Use of Resources over Time	27
Students’ Distribution of Time between Translation and Resource Consulting....	32
Use of Web Resources	46
Relationship between Web Consultations and Translation Quality	60
User Attributes: Translation Experience and Formal Training, Specialization and Familiarity with the Topic of the Text, Previous Web Search Training, and Effort.....	63
Task-Related Factors: Perceived Task Difficulty.....	69
CONCLUSIONS	72
Pedagogical and Research Implications.....	73
Limitations of the Study and Future Research.....	76
REFERENCES	78
APPENDIX	
A TRANSLATION TASK 1	85
B TRANSLATION TASK 2	87
C INITIAL QUESTIONNAIRE.....	89
D QUESTIONNAIRE ON NOTIONS ABOUT TRANSLATION	91

	Page
E QUESTIONNAIRE ABOUT THE THINK-ALLOUD PROTOCOL	95
F QUESTIONNAIRE ABOUT THE TRANSLATED TEXT	97
G QUESTIONNAIRE ABOUT RESOURCES	102

LIST OF TABLES

Table	Page
1. Subjects.....	15
2. Most Translation Problems Can be Solved with the Help of a Good Dictionary.....	27
3. Since You Can't Know the Meaning of All the Words in a Text, a Bilingual Dictionary is the Best Solution.....	28
4. When Translating a Specialized Text, Terminology Is Not the Biggest Problem.....	29
5. As Soon as you Find a Word or Expression You Don't Know the Meaning of, You Should Look it up Straightaway in a Bilingual Dictionary	29
6. If You Find a Word in a Text that You Don't Understand, You Should Try to Work out the Meaning from the Context	30
7. Disagree vs. Agree from the Pre- and Post-class Questionnaires.....	31
8. Distribution of Time - Task 1	33
9. Information Search by Number of Information Needs - Task 1	34
10. Distribution of Time - Task 2	35
11. Information Search by Number of Information Needs - Task 2.....	37
12. Individual vs. Common Information Needs - Task 1	46
13. Common Information Needs - Task 1	48
14. Distribution of Searches by Resource (Tokens) - Task 1	50
15. Individual vs. Common Information Needs - Task 2	54
16. Common Information Needs - Task 2	55
17. Distribution of Searches by Resource (Tokens) - Task 2	56
18. Resources Consulted and Translation Quality – Tasks 1 and 2.....	60

Table	Page
19. Total Searches, Total Times, and Quality – Tasks 1 and 2.....	62
20. User Attributes: Translation Experience and Training, Specialization and Familiarity with the Topic of the Text, Previous Web Search Training, and Effort.....	65
21. Task Difficulty, Total Searches, and Scores – Task 1	70
22. Task Difficulty, Total Searches, and Scores – Task 2	71

LIST OF FIGURES

Figure	Page
1. Study Timeline.....	23
2. Amy – Translation Task 1 Progression Timeline (Home).....	38
3. Monica – Translation Task 1 Progression Timeline (Home).....	39
4. Julia – Translation Task 1 Progression Timeline (Home)	40
5. Emily – Translation Task 1 Progression Timeline (Home)	40
6. Amy – Translation Task 2 Progression Timeline of Part 1 at Home (Left) and Part 2 at the Lab (Right)	43
7. Monica – Translation Task 2 Progression Timeline of Part 1 at Home (Left) and Part 2 at the Lab (Right)	44
8. Julia – Translation Task 2 Progression Timeline of Part 2 (Lab).....	45
9. Emily –Task 2 Progression of Part 1 at Home (Right).....	45

Introduction

The main focus of early research in translation studies was, for the most part, the study of translation as a product. However, in the mid 1980s, an interest to comprehend what goes on in the translator's mind—that is, a process-oriented perspective—flourished.

More recently, there has been an interest in approaching translation research from a process- and product-perspective. As a result, large-scale empirical research projects have emerged. These include the CPT project (Capturing Translation Process) conducted at Zurich University of Applied Sciences, Switzerland, the PACTE Group (Process in the Acquisition of Translation Competence and Evaluation) project at the University of Barcelona, Spain, and the TransComp project at the University of Graz, Austria. The last two groups study translation competence and its multiple components. Despite the differences in the translation models, it is agreed that documentation skills play a critical role in translation competence (PACTE, 2008, 2011; Göpferich, 2009). “Translators are not only information users, but also information processors and producers” (Pinto & Sales, 2007, p. 532).

The sources of information that can be employed by the translator are varied. Traditionally, the translator has used non-electronic resources such as encyclopedias, manuals, printed dictionaries, etc. However, the Internet has now become perhaps the most frequently used source of documentation, providing immediate access to a vast amount and variety of information from nearly anywhere (Alcina Caudet, Soler Puertes & Estellés Palanca, 2005).

A survey conducted by Palomares Perraut and Pinto Molina (2000), which sought to explore the information needs and information-seeking behavior of professional translators, revealed that in 1999 already more than 50% of the participants always used the Internet as a source of consultation when translating. Likewise, results from research on the information behavior of translation students showed that both undergraduate and graduates resort to Internet resources as their principal source of information (Sales, 2008). In view of that fact, this investigation will focus on how four translation students use the Web resources at their disposal when translating medical texts to gain insight into their information needs, and discover whether the use of these resources influenced the quality of the translation product with a view to improve translation teaching.

First, the term *translation competence* will be defined and PACTE's Group model of translation competence and its sub-competencies will be described; this model serves as the theoretical framework for the current study. This will be followed by a literature review. Finally, a study carried out to explore the use of Web sources of students enrolled in an introductory university-level Medical Translation course will be presented.

Translation Competence

To date, there is no generally accepted definition of translation competence and the components that integrate it. The PACTE Group defines *translation competence* as “the underlying system of knowledge required to translate. The group believes that translation competence: (a) is expert knowledge; (b) is predominantly procedural knowledge (knowing how), rather than declarative knowledge (knowing what); (c) comprises different hierarchical interrelated sub-competencies that are subject to

variation; and (d) includes a strategic component that is of particular importance” (PACTE, 2011, p. 33).

In the model proposed by PACTE translation competence consists of the following sub-competencies (PACTE, 2003, 2008, 2011):

(a) *Bilingual sub-competence*: Predominantly procedural knowledge required to communicate in two languages. It comprises pragmatic, socio-linguistic, textual, grammatical and lexical knowledge;

(b) *Extra linguistic sub-competence*: Predominantly declarative knowledge, both implicit and explicit. It comprises general world knowledge, domain-specific knowledge, and bicultural and encyclopedic knowledge;

(c) *Knowledge about translation and aspects of the profession*. It includes knowledge about how translation functions and knowledge about professional practice;

(d) *Instrumental sub-competence*: Predominantly procedural knowledge related to the use of documentation resources and information and communication technologies applied to translation (dictionaries, encyclopedias, grammars, stylebooks, parallel texts, corpora, search engines, etc.). (PACTE, 2008, p. 106; 2011, p. 33).

According to Enríquez Raído (2011a), translation studies literature refers to *instrumental competence* as *documentary competence*, *research competence* or *information competence*. Palomares Perraut and Pinto Molina (2000, p. 100) define *documentary competence* as translators’ specific abilities to manage any resources of information available in any format, quickly and with precision. Other terms found are

information literacy competency or *information behavior* (Pinto & Sales, 2007; Sales, 2008).

The American Library Association (ALA) defines *information literacy* as “a set of abilities requiring individuals to recognize when information is needed and have the capacity to locate, evaluate, and use effectively the needed information” (ALA, 2000, p. 2). The term *information behavior* has mainly been used within the disciplines of library and information science, information studies, user studies, and documentation (Enríquez Raído, 2011a), and it involves “those activities a person may engage in when identifying his or her own needs for information, searching for such information in any way, and using or transferring that information” (Wilson, 1999, p. 249).

In this study, these terms will be used interchangeably. It should be noted that, within the field of information behavior, this investigation would be considered a user-oriented study since it is concerned with the information seeking behavior of people in a particular occupation.

(e) *Strategic sub-competence*: Procedural knowledge to guarantee the efficiency of the translation process and solve problems encountered. This sub-competence is the most important since it controls the translation process. Its function is to plan the process and carry out the translation project selecting the most appropriate method, to evaluate the process and the partial results obtained in relation to the final purpose, to activate the different sub-competencies and compensate for any shortcomings and to identify translation problems and apply procedures to solve them (PACTE, 2008, p. 106; 2011, p. 33), and;

(f) *Psycho-physiological components*: Different types of cognitive and attitudinal components and psychomotor mechanisms, including cognitive components such as memory, perception, attention and emotion. Attitudinal aspects include intellectual curiosity, perseverance, rigor, the ability to think critically, creativity, logical reasoning and synthesis, etc. (PACTE, 2008).

Three of the six sub-competencies are believed to be specific to translation: *translation knowledge*, *instrumental sub-competence*, and *strategic sub-competence*. The PACTE Group postulates that the acquisition of sub-competencies is a process of restructuring and development, evolving from novice to expert (PACTE, 2014).

Sub-competencies are inter-related, and compensate for each other, do not develop in parallel, and variations occur based on translation direction, language combinations, specialization (legal, literary, medical translation, etc.), the learning context (formal training, self-learning, etc.), and the methodology used by teachers in the acquisition process (PACTE, 2014). Results of PACTE's research can be found in a series of articles (2005, 2008, 2011, 2014). To my knowledge, no results have been published on the use of resources.

Research into the Use of Resources in Translation

The present study conceptualizes translation as problem solving. According to Prassl (2010), research and knowledge are central components of problem solving and decision-making in the translation process¹. PACTE (2005) maintains that these processes require two kinds of support: internal and external. "Internal support refers to

¹ The translation process is defined "as everything that happens from the moment the translator starts working on the source text until he finishes the target text" (Hansen, 2010, p. 190).

the retrieval of [automatic and non-automatic] knowledge from the translator's long term memory, and external support to the consultation of external resources, such as dictionaries and parallel texts" (Prassl, 2010, p.57), that is, the use of any type of documentation resource.

Most of the previous research in consultation resources has concentrated on the use of dictionary (e.g., Dancette, 1997; Livbjerg & Mees, 1999, 2003; Mackintosh, 1998; Ronowics, Hehir, Kaimi, Kojima, & Lee, 2005; Varantola 1998) as well as other reference materials (Gerloff, 1988; House, 2000; Jääskeläinen, 1989; Luukkainen, 1996; Pavlovic, 2007). Only a few studies have specifically examined the *information behavior* of translators (Massey & Ehrensberger-Dow, 2011; Nord, 2009; Palomares Perraut & Pinto Molina, 2000; Sales & Pinto, 2011; White, Matteson, & Abels, 2008); or translation students (Massey & Ehrensberger-Dow, 2011; Pinto & Sales, 2007; Sales, 2008), in particular their use of Web resources (Enríquez Raído, 2011a, 2011b, 2014).

Massey and Ehrensberger-Dow (2011) investigated the information behavior in the translation process of students and professionals. In this study the authors presented the results based on: (a) the anonymous online pilot survey completed by 14 instructors and 96 students of translation; (b) the survey completed by 110 professional translators, and: (c) the preliminary findings and results from a study of translators and students behavior. The researchers triangulated survey data with other data compiled from observation, concurrent and cue-based retrospective verbal protocols, screen recordings, keystroke logging, and eye tracking.

In both surveys used by Massey and Ehrensberger-Dow (2011), subjects were asked to recall a recent translation assignment and answer questions about the tools and resources used in the process of translation. The answers revealed that the main difference in the research behavior between students and instructors had to do with students' over-reliance on online dictionaries, while instructors preferred parallel texts and search engines for extra-linguistic problems. Instructors also favored reviewed or authoritative resources (printed and electronic dictionaries or terminology databases) for linguistic research.

Students seemed less aware of the value of these resources. Freelancers often use search engines, online multilingual dictionaries and terminology databanks to solve linguistic problems, and consult parallel texts and online encyclopedias for extra-linguistic problems. Age was found to be related to the use of Internet resources, (i.e., younger translators used more online resources). The main limitation of Massey and Ehrensberger-Dow (2011) was, as recognized by the authors, the possibility that the self-reported data may not reflect what happens in reality (what is being used, how, and why).

The preliminary findings of computer-monitoring data revealed that the more advanced students were quicker and more successful at doing research. In fact, advanced students and recent graduates were even faster and more successful than the professional translators. A possible explanation for this phenomenon might be that the students and recent graduates had participated in a course in research techniques (Massey & Ehrensberger-Dow, 2011).

In Spain, information skills courses have been part of the undergraduate curriculum for degrees in translation and interpreting since 1991. Examples of such courses are: “Documentary Research to Applied Translation” (which is part of the core curriculum and typically taught in the second year of studies), and “Computer Science Applied to Translation” or “Electronic Tools and Resources for Translation” both of which are offered as optional courses (Enríquez Raído, 2011a).

Evidence from a broad research project known as INFOLITRANS (Information Literacy for Translators), designed to identify information literacy instruction needs, revealed that students and faculty in the field of translation and interpretation in Spain perceive there is a need to further students’ documentation skills (Pinto & Sales, 2007, 2008).

Data gathered in 2005 using an emailed semi-structured questionnaire from 193 second-, third- and fourth- year students of translation and interpretation at Universitat Jaume I de Castellón, Spain, point out that participants feel they need reinforcement in information management skills, organization and planning skills, and computer literacy (Pinto & Sales, 2007).

The findings of an online semi-structured questionnaire answered in 2006 by teachers of translation and interpreting at undergraduate level from several universities in Spain, stress the value placed by trainers on information competence for the practice of translation (Pinto & Sales, 2008). However, it appears that there is a gap between the importance given to this competence and the degree of success to which the teachers consider the students had acquired documentation skills.

“Trainers see the first need of a specialized translator as being the skill of information search (68%). This is followed by subject knowledge (34%), which is after all, the product of a sound global information competence that is continually being enriched and updated for whatever field of expertise. In third place is evaluation of information (17%)” (Pinto & Sales, 2008, p. 61). When asked what elements needed to be added to the curriculum, teachers proposed reinforcing knowledge of documentation techniques (43%), information search (30%), subject knowledge (17%), and evaluation of sources (8%).

Enríquez Raído (2011a) explored the Web search behaviors of four female students enrolled in an introductory course on Scientific and Technical Translation during the first or second semester of their postgraduate programs in Spanish or in Translation. Each student participated in a total of four translation and Web searching tasks that were carried out in class, as part of their coursework. The students were required to translate texts from Spanish into English. Data was collected using a screen recorder called “BB FlashBack,” along with semi-structured interviews and two questionnaires via Survey Monkey.

The screen recorder also created a log of all the keystrokes, revisions, and editions, keyboard shortcuts, cursor movements and mouse-clicks made during the process of typing. The researcher analyzed both process and product (two evaluators examined the translations produced by the students based on their problem-solving performance and classified the solutions as unsuccessful, partially successful, successful or highly successful). The analysis was both qualitative and quantitative.

Enríquez Raído (2011a) found the following results: Overall (a) students initiated their searches from known resources (using direct addresses); (b) students frequently visited the same source to address search needs of a different nature (for example, students used online bilingual dictionaries to find non-dictionary type of information); (c) task complexity increased the use of information sources; (d) task complexity increased the use of information resources and together with translation experience had an impact on students' choice of sources; (e) students displayed a shallow online search in a desire for fast and easy access to equivalents; (f) students carried out search engine queries only when their dictionary searches failed to provide them with satisfactory answers; (g) the higher the level of perceived domain knowledge, the lower the number of information needs, and less specialized the nature of the needs; and (h) the type of research (linguistic and extra-linguistic), and the amount of time spent online, seemed to have had an impact on translation quality. These findings emphasize the need for formal training in the use of appropriate resources (Enríquez Raído, 2011a).

It must be noted that Enríquez Raído (2011a) studied the Web search behavior of four female students enrolled in an introductory course on Scientific and Technical Translation; a different specialization than the present investigation. She also conducted her investigation in 2009, requiring students to translate texts from Spanish into English. The present study uses data collected in 2013, and involves translation from English into Spanish.

Justification of the Current Study

Empirical studies on *translation competence* and *information resource use* are fairly new. The latter mainly focused on electronic resources, which have become such an important tool for translators, sometimes replacing customary reference materials (Enríquez Raído, 2011a; Massey & Ehrensberger-Dow, 2011).

According to Enríquez Raído (2011a), “there is very little research on how translation students actually search for Web-based information (p. 58).” In addition, Massey & Ehrensberger-Dow (2011) observed “the relative weight accorded to *information literacy* by translation practitioners, teachers, and scholars has yet to be underpinned by a significant body of research” (p. 194).

This study takes a step in that direction. It contributes to the literature of empirical research of translation processes and, in particular, provides insight into the use of Web-based resources (*instrumental competence*) in translation from English into Spanish in students enrolled in a university-level Medical Translation course over a period of one semester.

It is hoped that the findings of this exploratory research will provide a basis from which to continue the study of students’ Web information search needs and habits to help them develop better skills in documentation, as the Medical Translation course taught at the university where this research took place does not incorporate extensive training in information research skills.

Research Questions

The main research questions guiding this study will be the following:

- Did the students' opinions on the use of various translation resources change over time?
- How did students distribute their time between translating and consulting resources while completing two translation assignments?
- What were the students' information needs while undertaking two different translation tasks and how did they utilize Web resources to fulfill those needs?
- Does the participants' Web search behavior have a relationship with the quality of the translation?
- Do user attributes (translation experience and training, specialization and familiarity with the topic of the text, previous Web search training, and effort) or task-related factors (perceived task difficulty) influence the Web search patterns of the participants?

Methodology

Medical Translation Course

According to the syllabus (Martínez, 2013), the Medical Translation course taught at the university where this research took place provides guided practice in the successful completion of professional translation tasks involving texts in the medical and scientific domain (e.g., discharge instructions, medical history questionnaires, consents, medical information for patients). The course follows a workshop design, accompanied by Principles of Translation directly related to the texts presented during the class with the

aim of linking theory and practice. Students are also introduced to the principles of low literacy writing and the influence of these ideas on the translation of medical texts.

The primary focus of the Medical Translation course is not terminology, but language in use: How discourse is developed in different cultural settings, how information becomes meaningful to target populations, and how genres and text types guide written discourse (M.T. Martínez, personal communication, October 22, 2015).

The course does not incorporate extensive training in information research skills. However, at the beginning of the semester students are provided an annotated list of general and specialized Web resources they can use for consultation. The students are also encouraged to consult monolingual dictionaries and parallel texts². In addition, they are advised not to automatically accept the first solution they find in bilingual dictionaries, and verify that the information obtained from this resource has the same meaning they are trying to convey.

Subjects

The current study sample included four female translation students at Arizona State University enrolled in the course SLC 494: Medical Translation as part of a 14 credit Certificate Program in Translation (English-Spanish). This one-semester course lasted 15 weeks. All students were in their early- or mid-twenties. Three students declared Spanish as their first language (L1); two of them were born in Mexico, but moved to the United States prior to the age of nine years. One student declared that English was her L1. As stated in the entrance requirements for this certificate program

² Parallel texts are texts in the target language that are “independently produced (not translated)” (Colina, 2003, p.18) and have a similar function as the source text.

(<https://international.clas.asu.edu/node/929>), all participants had passed a written proficiency examination in both source and target languages at the level of completion of an advanced composition course in Spanish (SPA 412) and English (ENG 301).

Three of these students were pursuing undergraduate degrees (two in Spanish Linguistics and one in Interdisciplinary Studies, with concentrations in business and communications), and one was enrolled as a non-degree student and had a degree in Spanish Literature. One of the students had never taken a translation course, one had completed a translation theory class, and two had completed three translation classes, including translation theory. All previous translation training had been completed at ASU. One student was in her first semester of study of the Translation Certificate, one in her second semester, and two were in their fourth semester (one returned to finish the Translation Certificate after two years of absence from school). The details of the sample are summarized in Table 1 below. The subjects were given fictional names for purposes of anonymity.

The class had four more participants: three females (two of whom dropped the class for personal reasons towards the beginning of the course), and one male student. However, in an effort to control age and gender variables, their data was excluded from the analysis.

Table 1

Subjects

Subject	Age	L1	College major	Semester of study
Amy	20	English	Spa Ling.	1 st
Julia	21	Spanish	BIS Bus./Com.	2 nd
Monica	24	Spanish	Spa Lit.	4 th
Emily	21	Spanish	Spa Ling.	4 th

Data Collection Instruments

Data was gathered by means of various instruments: texts and translations, Think-Aloud Protocols (video and audio), screen captures, and questionnaires.

Texts and translations. The translation tasks involved two different texts (Appendices A and B). They illustrated salient problems or dilemmas faced by translators, and related directly to the theoretical components studied in class. These translation tasks were among the assignments students were required to complete as part of their regular coursework; whether they participated in the research study or not.

Translation Task 1 (Appendix A) is an excerpt from an article about pain. It was published online in 2008 on the website of a residential behavioral health treatment facility. Translation Task 2 (Appendix B) is an extract of a text used in 2007 by a former Arizona Governor as part of an underage drinking prevention campaign called Draw the Line. It was required that texts be translated from English into Spanish. The translation brief for both texts was discussed in class, and also made available to students.

Both texts are for the general public, are considered informational, promotional, and persuasive. However, Translation Task 1 deals with the treatment of pain with the intent of motivating people to seek for alternative approaches to alleviating pain, and

incorporates more specialized terminology. Translation Task 2 is concerned with a public health issue; it is a call to attention to the hazardous effects of underage drinking, and aims at prevention.

To my knowledge, Text 1 was originally written in English and addressed to an English-speaking population. Text 2 was initially written in English and addressed to an English-speaking population, but later modified in English (after a conversation with a translator) with the purpose of being more effective when translating it for the Spanish-speaking population in Arizona.

Think-aloud protocols (video and audio). Subjects were asked to translate two documents and to verbalize whatever crossed their mind in the course of their work on a translation. Translation protocols were recorded using the application Camtasia Relay and later transcribed for analysis.

Despite many critics (Bernardini, 2001; Göpferich & Jääskeläinen, 2009; Jääskeläinen, 2011; Jakobsen, 2003), Think-Aloud Protocols (TAPs) are considered by many scholars to be very useful (e.g., Göpferich & Jääskeläinen, 2009; Wakabayashi, 2003). They are used in conjunction with other data elicitation methods that have emerged in the past few years. These include dialogue protocols (thinking aloud in pairs), retrospection, questionnaires and interviews, keystroke logging, video and screen recordings, eye-tracking, electroencephalograms, positron emission tomography, etc. It has been argued that the combination (triangulation) of different data-gathering techniques allows the researcher to have a more complete picture of the translation processes (Göpferich & Jääskeläinen, 2009).

Screen capture. As part of the study, screen activity during the translation process was also recorded using Camtasia Relay, allowing for a determination of which electronic resources or Web sites the subjects used during translation.

Questionnaires. The research also involved the completion of four questionnaires: (a) an initial questionnaire, requiring demographic information (such as sex, age, country of birth), students' native/second language, educational background and translation expertise on the basis of previous translation experience, length of work experience, specializations in particular fields (such as business, legal, medical, or technical translation) or subject matter (Appendix C); (b) a pre- and post-class questionnaire, consisting of 27 items, to obtain information on students' notions about translation, that is, their translation knowledge (adapted from PACTE, 2008; Appendix D) based on seven factors: concept of translation and translation competence, translation units, translation problems, the different phases involved in the translation process, methods required, procedures used (strategies and techniques), and the role of the translation brief and the target reader (PACTE, 2008, 2014); (c) a questionnaire requesting students' impressions about the Think-Aloud Protocol (Appendix E); (d) a questionnaire about the translated text (adapted from Orozco & Hurtado Albir, 2002; PACTE, 2011) that elicited information on the function, genre, and the degree of difficulty of the translated text as well as the familiarity with the topic of the text, priorities when translating the text, and translation problems encountered during the process of translation (Appendix F); (e) a questionnaire about resources (Appendix G) asking the participants' which instruments help them during translation, which resources they used when translating (monolingual and bilingual dictionaries, print and electronic

dictionaries or other reference materials), their frequency of Internet usage, and their previous training in Web searching. In this last questionnaire a few questions included in Orozco and Hurtado Albir 2002 were used. Not all data from these instruments was analyzed for this thesis.

On the pre- and post-class questionnaire on knowledge about translation, the present study focused on the questions related to the use of resources. From the questionnaire about the translated text, this investigation analyzed questions 5-7 only; those related to task difficulty, and familiarity with the topic of the text. From the questionnaire about resources, only the data pertaining to previous training in Web searching was examined.

Operationalization of Constructs

Constructs relevant to this research study will be operationalized in this section. *Translation* “is the process or the product of transforming written text(s) from one human language to another that generally requires a necessary degree of resemblance to or correspondence with the source text (ST)” (Colina, 2015, p. 34). The present study conceptualizes *translation* as a form of problem solving. Following Enríquez Raído (2014), in this study, *translation problems* are understood as items in the source text that the students considered troublesome for translating purposes. “Not all translators find the same items difficult” (Séguinot, 2000, p. 144), and problems “do not necessarily refer to something serious or very difficult” (Sirén & Hakkarainen, 2002, p. 77).

When a translation problem is encountered, an *information need* arises. For this study, *information need* is defined as “the motivation people feel to seek information” in order to achieve a specific purpose (Information Today, Inc., n.d.). This investigation

focuses on how students in the Medical Translation course seek to satisfy their information needs via the use of *Web resources* (defined as sources or supply of information available on the Web).

According to White and Iivonen (2001), Web search strategies are divided into three categories: *direct address*, *subject directory*, and *search engine*. Direct address searches involve “only one step to reach a specific site,” (White & Iivonen, 2001, p. 722), since all a researcher needs to do is type the universal resource locator (URL) of the site or infer the specific address “based on their knowledge of a company or organization’s name, the address structure, categories and abbreviations” (White & Iivonen, 2001, p. 722).

Subject directory searches require a multi-step process. Subject directories are a compendium of websites organized by broad subject categories, are produced by human beings, and are more selective than search engines.

Searches performed through search engines (e.g., Bing, Google, Yahoo!), provide access to information available on the Web that is indexed “based on programs that spider and surf the Web, continually seeking documents” (White & Iivonen, 2001, p. 722).

Subjects in this study employed only two of these strategies: Search engine and direct address searches. An additional search strategy identified in the present study is *navigational queries*. “The intent of navigational searching is to locate a particular Website” that the user “may have in mind or may think it exists” (Jansen, Booth, & Spink, 2008, p. 1256). According to Battelle (2006), navigational queries are a two-step

process, carried out by typing the name of the known site they wish to visit in a search engine box, then clicking the site link.

The use of Web resources will be measured, among other indicators, by the number of search sessions conducted by the subjects. A *search session* has been described as “a series of interactions by the user toward addressing a single information need” (Jansen, Spink, Blakely, & Koshman, 2007, p. 862). Sessions are composed of queries, and “a query consists of one or more search terms, and possibly includes logical operators and modifiers” (Jansen, Spink, & Saracevic, 2000, p. 211). In this study, this term encompasses general research sessions aimed at addressing more than one information need.

Search sessions are delimited by changes from the translation window to the Web search window and vice versa. The term *translation window* refers to all the actions related to translation, such as reading source text silently/aloud, translating, oral translating, deleting, rewriting, and editing. The term Web search window, also referred to as “information search time,” “research window/time” or simply “research” or “researching”, refers to time spent in Web browser windows to seek information.

Procedures

At the beginning of the semester, all participants completed an initial questionnaire requiring demographic information and a questionnaire of 27 items on knowledge about translation, originally created and pilot-tested by the PACTE Group (2008). The post-class questionnaire, completed in the last class, consisted of the same 27 items, 12 of which indicated a dynamic concept of translation and 15 indicated a static concept, but the order of the questions was changed. PACTE defines a dynamic concept

of translation as textual, interpretative, communicative and functional, as opposed to a static concept that can be defined as linguistic and literal (PACTE, 2008, 2014). The questionnaire on knowledge about translation served to measure students' progress regarding knowledge about translation during the semester. This study will focus on the questions related to the use of resources.

Participants were asked to translate two texts: one at the beginning of the semester, another one at the end of the semester (Appendices A and B). Students produced a rough draft, plus a final version of each translation task. During each task, students were asked to verbalize whatever crossed their mind in the course of their work on a translation (Think-Aloud Protocol). Using the application Camtasia Relay and flip cameras, students' verbalizations were recorded on audio and/or video while they translated the documents (Task 1 and Part 1 of Task 2) on their own computers, in the privacy of their homes, and with complete access to all their regular resources, including dictionaries and the Internet.

The other part of the translation (Part 2 of Task 2) was carried out in the computer laboratory at school (during class time), where they could bring any needed resources, and still have access to the Internet. There were no time constraints in either venue, nor were there restrictions on whether to use paper-based or Web resources.

The first translation was done entirely at home, while the second was divided into two parts: Part 1 was done at home; Part 2 was done in the computer laboratory, as a classroom activity. This is a regular procedure of the class, and it was unaltered for this study.

Participants had an information session at the beginning of the semester in which they watched a Camtasia Relay brief tutorial. The video is available at <http://www.techsmith.com/tutorial-camtasia-relay.html>. The students were also provided with a printed copy of concise instructions on how to record a Think-Aloud Protocol, using the application.

After each time participants finished a rough draft or final version of a translation using the Think-Aloud Protocol, they were asked to complete two more questionnaires: the first requested their impressions about the Think-Aloud Protocol, and the second asked about the translated text, it elicited information on translation problems encountered during the process of translation. The former provided information on the students' ability to verbalize their thoughts, the factors that might contribute to making it easy or difficult to verbalize, the level of the subjects' engagement with the translation task, as well as the possible effect that verbalizing thoughts may have had on the participants' translation process. The latter reflected the participants' opinion on the difficulty of translating the text, how familiar they were with the topic of the text, and their priorities and main problems encountered when translating.

At the end of the semester, students answered a questionnaire about resources that provided information regarding their previous training in Web searching.

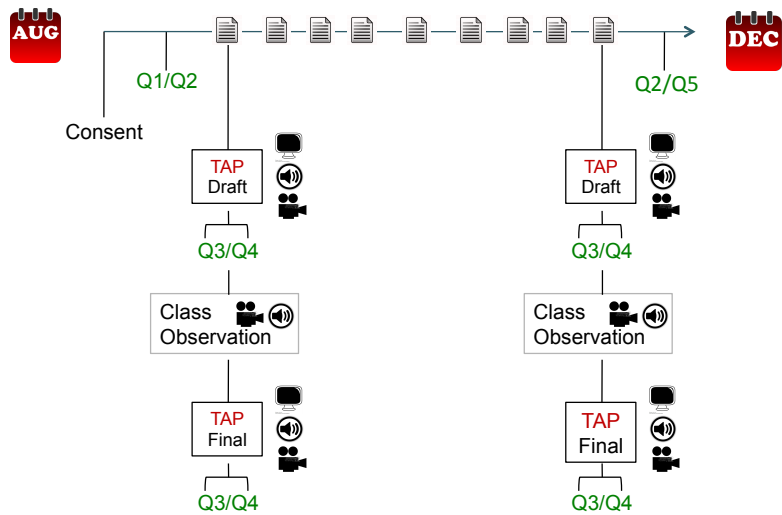





Figure 1. Study Timeline. Initial questionnaire (Q1); questionnaire on notions about translation (Q2); questionnaire about the Think-Aloud Protocol (Q3); questionnaire about the translated text (Q4); Think-Aloud Protocol (TAP),  screen capture,  audio recording, and  video recording; and questionnaire about resources (Q5).

Data Analysis

Translations. Students produced a rough draft and a final version of each translation, but only turned in the final version. After the first version was complete, the student brought it to class. Some students would write one sentence of the translated text on the white board, another one would edit it, and then a group discussion would take place. This was a customary procedure of the course (sometimes complemented by error analysis) and it remained unchanged for this study. Afterwards, the students went home, made the necessary changes, and turned in the final version in the following class.

The quality of the translations was assessed using a functional approach on the criteria of target language, functional and textual adequacy, meaning, and terminology (adapted from Colina, 2009). Each category had an equal number of descriptors (four for each component), and 100 points was the maximum number possible (Colina, 2009). With the objective of obtaining an unbiased assessment, the lead instructor of the class (not the author of this thesis), graded the assignments throughout the course.

Think-aloud protocol. Think-Aloud Protocols were transcribed and analyzed. Verbalizations are quoted to exemplify comments made by the research participants.

Screen capture. The analysis of the screen recordings provided information about the translation procedure followed by the subjects, as well as the reference material used during translation. The subject's actions were documented on individual spreadsheets (adapted from Enríquez Raído, 2011b); one per participant and translation task.

In the spreadsheets, the researcher logged the exact time at which actions were performed, as well as the window in which subjects were working (translation window or Web searches window). She also noted the actions performed (such as Reads ST silently/aloud, Translates, Oral Translation, Deletes, Rewrites, Editing), the address of the Web pages accessed, the queries typed in a Search engine (such as Google) or an internal site search engine (such as Word Reference), the translation rendered, and comments made by the students while translating, as well as observations made by the researcher while analyzing the screen captures.

Additionally, the spreadsheet included a column labeled “Teaching,” which included concepts that, in the researcher’s opinion, could be taught, discussed or clarified in class (e.g., the use of definite and indefinite articles, passive voice, capital letters, and punctuation marks in Spanish, false cognates, syntax, cultural matters).

The researcher created tables that showed the time spent on the translation window and in searching for information, as well as translation tasks progression timelines (graphs) that facilitated the visualization of how many switches there were between tasks and the point in time in which they happened. In these graphs, the number zero (0) was assigned to information search (referred to as “Research) and the number 1 to translation-related actions (referred to as “Translation”). In addition, the number of information needs, search sessions, and the average time spent on each search session was calculated. The researcher classified the variety of resources used. These data are presented in tables throughout the results section.

Initial questionnaire. The students’ translation expertise on the basis of previous translation experience, length of work experience as a translator, formal training in translation, specializations in particular fields (such as business, legal, medical, or technical translation) or subject matter was examined to determine if it had any relationship to the perceived difficulty of the translation task, the resources consulted, and the time spent doing research and on the translation. Table 1 displays the demographic data obtained from this questionnaire.

Questionnaire about the translated text. The subject's familiarity with the subject of the text and the perceived difficulty of the translation task were examined to ascertain whether they influenced the number of resource consultations and time spent on the translation.

Questionnaire about resources. Previous training in Web searching is considered to establish if it had any impact on the participants' information behavior.

Questionnaire on notions about translation. The subjects' opinions about translation were measured using the Likert scale: *I strongly disagree, I disagree, I agree, I strongly agree*. As mentioned before, this study concentrated only on the questions related to the use of reference material. The responses were analyzed by question, and per student. The results of the questionnaire completed at the beginning of the semester were compared to those of the questionnaire completed in the final class, and also to the data gathered from the screen recordings.

The results of the data gathered from these instruments were triangulated in an effort to find relationships between the translation process and the translation product. Results were analyzed both qualitatively and quantitatively.

Results and Discussion

In this section, data answering the four research questions posed earlier will be presented. First, the researcher will analyze the students' opinions on the use of translation resources over time. Second, the distribution of time between translation and resource consulting in the translation process of the two texts will be reviewed; then the information needs of the students and their use of Web resources to address those needs will be explored. Next, the use of Web-based resources in relationship to the quality of

the translated text will be examined. Finally, data from the questionnaires will be evaluated to discern any possible relationships between user and task attributes and the Web search patterns of the participants.

Students' Opinions on the Use of Translation Resources over Time

This segment presents pre- and post-class answers related to the use of resources obtained from the knowledge about translation questionnaire. Tables 2-6 display these findings. The data reflects the students' opinions of the indicated resources on the following scale: SD = *strongly disagree*, D = *disagree*, A = *agree*, SA = *strongly agree*.

Table 2 shows the students' disagreement with the statement in question five: Most translation problems can be solved with the help of a good dictionary.

Table 2

Most Translation Problems Can be Solved with the Help of a Good Dictionary

Question 5	SD	D	A	SA	Total
Pre	2 (50%) Amy Emily	2 (50%) Julia Monica			4 (100%)
Post	1 (25%) Emily	2 (50%) Amy Julia	1 (25%) Monica		4 (100%)

Note. SD = *Strongly disagree*; D = *Disagree*; A = *Agree*; SA = *Strongly agree*.

In the pre-class questionnaire, all of the subjects either *disagreed* (50%) or *strongly disagreed* (50%) that most translation problems can be solved with the help of a good dictionary. The post-class questionnaire reveals that by the end of the semester, one student (Amy) changed her opinion from *strongly disagree* to *disagree* and the returning student (Monica) changed her view about this statement to *agree* (see Table 2). Thus, two

of the students had a slightly more favorable view of the merits of a good dictionary over the course of the semester.

Table 3 exhibits the student’s replies regarding students’ reactions with question 9: Since you can’t know the meaning of all the words in a text, a bilingual dictionary is the best solution.

Table 3

Since You Can’t Know the Meaning of All the Words in a Text, a Bilingual Dictionary is the Best Solution

Question 9	SD	D	A	SA	Total
Pre	1 (25%) Emily	3 (75%) Amy Julia Monica			4 (100%)
Post	1 (25%) Emily		3 (75%) Amy Julia Monica		4 (100%)

Note. SD = *Strongly disagree*; D = *Disagree*; A = *Agree*; SA = *Strongly agree*.

When asked: “Since you can’t know the meaning of all the words in a text, a bilingual dictionary is the best solution” (question 9), 75% of the students (Amy, Julia, and Monica) answered *disagree* on the pre-class questionnaire, whereas only one student (Emily) chose *strongly disagree* (Table 3). Conversely, on the post-class questionnaire, the majority (Amy, Julia, and Monica) elected to *agree*. Emily’s opinion remained unchanged. Overall, students’ opinions on the use of bilingual dictionary changed over time.

Table 4 contains data regarding students' reactions to question 14: When translating a specialized text, terminology is not the biggest problem.

Table 4

When Translating a Specialized Text, Terminology Is Not the Biggest Problem

Question 14	SD	D	A	SA	Total
Pre	1 (25%) Amy	2 (50%) Julia Monica	1 (25%) Emily		4 (100%)
Post	1 (25%) Amy	2 (50%) Julia Monica	1 (25%) Emily		4 (100%)

Note. SD = *Strongly disagree*; D = *Disagree*; A = *Agree*; SA = *Strongly agree*.

As seen in Table 4, the results found that on the pre-class questionnaire one student (Amy) *strongly disagreed* that when translating a specialized text, terminology is not the biggest problem, two students *disagreed* (Julia and Monica), while one *agreed* (Emily). On the post-class questionnaire, all the students' response remained unchanged.

Table 5 presents data on the students' reactions to 16: As soon as you find a word or expression you don't know the meaning of, you should look it up straightaway in a bilingual dictionary.

Table 5

As Soon as you Find a Word or Expression You Don't Know the Meaning of,

You Should Look it up Straightaway in a Bilingual Dictionary

Question 16	SD	D	A	SA	Total
Pre	1 (25%) Emily	2 (50%) Julia Monica	1 (25%) Amy		4 (100%)
Post	1 (25%) Emily	2 (50%) Julia Monica	1 (25%) Amy		4 (100%)

Note. SD = *Strongly disagree*; D = *Disagree*; A = *Agree*; SA = *Strongly agree*.

Question 16 addressed whether the translator should look up an unknown word or expression straightaway in a bilingual dictionary (Table 5). The answers on both the pre- and the post-class questionnaires were consistent and unchanged: Emily *strongly disagreed*, Julia and Monica *disagreed*, and Amy *agreed*.

Table 6 presents data from students’ reactions to question 27: If you find a word in a text that you don’t understand, you should try to work out the meaning from the context.

Table 6

*If You Find a Word in a Text that You Don’t Understand,
You Should Try to Work out the Meaning from the Context*

Question 27	SD	D	Depends	A	SA	Total
Pre				2 (50%) Amy Monica	2 (50%) Julia Emily	4 (100%)
Post		1 (25%) Julia	1 (25%) Amy		2 (50%) Monica Emily	4 (100%)

Note. SD = *Strongly disagree*; D = *Disagree*; A = *Agree*; SA = *Strongly agree*.

As observed in Table 6, for question 27, “If you find a word in a text that you don’t understand, you should try to work out the meaning from the context,” the replies on the pre-class questionnaire revealed that Amy and Monica *agreed*, and Julia and Emily *strongly agreed* with that statement. Emily’s opinion did not change from the pre- to the post-class questionnaire; however, the other three students shifted their response. The most notable shift was Julia’s, her position changed from *strongly agree* to *disagree* by the end of the semester. Amy decided to remain neutral and added a comment to her response: “Depends - if it’s a phrase, use the context.” As opposed to the other three

students, who either stayed with their original opinion (Emily), went from agreement to disagreement (Julia), or switched from *agree* to *strongly agree* (Monica) by the end of the semester.

A decision was made to convert the Likert scale used into a binary option in which the answers *strongly disagree* or *disagree* would be considered *disagreement*, and *agree* and *strongly agree* would be considered *agreement*. The rationale behind this decision was to gain an overall sense of the behavior that could be expected to be seen in the screen recordings.

Table 7

Disagree vs. Agree from the Pre- and Post-class Questionnaires

Question	Pre-class questionnaire		Post-class questionnaire		
	Disagree	Agree	Disagree	Depends	Agree
Question 5	4 (100%)		3 (75%)		1 (25%)
Question 9	4 (100%)		1 (25%)		3 (75%)
Question 14	3 (75%)	1 (25%)	3 (75%)		1 (25%)
Question 16	3 (75%)	1 (25%)	3 (75%)		1 (25%)
Question 27		4 (100%)	1 (25%)	1 (25%)	2 (50%)

Based on the findings from these five questions, it seems that: (a) 75% of the students consider terminology to be the biggest problem when translating a specialized text (question 14) both at the beginning and end of the semester; (b) at the beginning of the semester all of the students said that one should try to work out the meaning of a word from the context (question 27), while only half agreed with this statement at the end of the semester; (c) all of the students did not believe that most translation problems can be solved with the help of a good dictionary (question 5), and most (75%) still held that

opinion at the end of the class; (d) 75% of the students said they should not look up the meaning of a word or expression straightaway in a bilingual dictionary (question 16) both before and after the semester; (e) at the beginning of the semester 100% of the students indicated that the bilingual dictionary was not the best solution to translation problems (question 9); however, at the end of the semester 75% agreed that this resource was a good resource for solving translation problems. Later on, when the screen captures of students' use of resources are analyzed, these findings (what the students report) will be compared to the results of the screen recordings (what resources the students actually use when translating).

Students' Distribution of Time between Translation and Resource Consulting

The results reported in this section were drawn from a total of 15 screen recordings, which totaled 8 hours, 19 minutes, and 8 seconds. Data from two tasks were analyzed and then compared for each student to determine if there were any differences in how first-, second- and fourth-semester students spent their time between the translation window and the Web search window. Task 1 was completed at home and Task 2 was done both at home (Task 2, Part 1) and the computer laboratory as a regular classroom activity (Task 2, Part 2).

In Translation Task 1, Amy (the first semester student) did not consult any Web resources, and instead resorted to a paper-based dictionary on 7 occasions (which represent 4.80% of the total searches). This was the sole case of paper-based consultation in the study. A decision was made to include these consultations in the results to be able to offer a complete analysis of the data obtained, and to show the deviation from Web-based consultations.

Translation task 1. Table 8 presents data on the distribution of time spent by students (translation vs. search time) in Task 1.

Table 8

Distribution of Time - Task 1

Subject	Sem.	Translation window time (hh:mm:ss)	%	Information search time (hh:mm:ss)	%	Total times (hh:mm:ss)
Amy	1 st	0:41:48	92.31	0:03:29 ^a	7.69	0:45:17
Julia	2 nd	0:40:39	59.75	0:27:23	40.25	1:08:02
Monica	4 th	1:13:07	75.35	0:23:55	24.65	1:37:02
Emily	4 th	1:05:55	59.67	0:44:33	40.33	1:50:28
Average		0:55:22	71.77	0:24:50	28.33	1:20:12

Note. Sem. = semester; ^aPaper-based dictionary search, not Web resources.

As seen in Table 8, it took an average of 1 hour and 20 minutes for students to complete translation Task 1. The fourth-semester students (Monica and Emily) took the longest (30 and 17 minutes more than the average time). The first- and second semester students (Amy and Julia) spent 34 and 12 minutes less respectively than the average time. Based on these results, the more advanced the student the more time was taken for the task. The analysis of the distribution of time between the translation and information search windows reveals that students spent an average of 71.77% of their time on translation-related actions, and an average of 28.33% of their time consulting resources. Two of the students (Julia and Emily) invested up to 40% of their time looking for information on the Web. This highlights the importance of teaching students in the Medical Translation course how to critically search, use, and manage Web information sources.

Amy’s low information search time could be explained by her fewer number of information needs (6), as observed in Table 9, where subjects are listed according to the number of information needs they had.

Table 9

Information Search by Number of Information Needs - Task 1

Subject	Sem.	Information search time (hh:mm:ss)	Search sessions	Average search session time (hh:mm:ss)	Information needs	Total searches (tokens)	Average searches per info need
Amy	1 st	0:03:29 ^a	5 ^a	0:00:34 ^a	6	7 ^a	1.17
Julia	2 nd	0:27:23	28	0:00:59	15	50	3.33
Monica	4 th	0:23:55	21	0:01:08	14	37	2.64
Emily	4 th	0:44:33	36	0:01:12	24	52	2.17
Total		1:39:20	90		59	146	
Average		0:24:50	22.5	0:00:59	14.75	36.5	2.33

Note. Sem. = semester; ^aPaper-based dictionary search, not Web resources.

The rest of the subjects had two to almost four times the information needs Amy had (Table 9). It appears that the greater the number of information needs, the greater the amount of time spent on research. The number of total searches varied among participants and they performed several searches addressing the same information needs. For instance, Emily conducted a search session consisting of a total of five searches, that is, a Google Search that lead her to WebMD in which she typed the query “opioid medications,” and four more searches using direct addresses in Google Translate (GT), Real Academia Española (RAE) and WebMD in which she used the queries “opioid,” “opioides,” “opioid medications,” and “narcotic pain medication” in this order. All of these searches were carried out to address a single information need: “opioid medications.”

As shown in Table 9, there is no relationship between the number of information needs and the number of total searches; they do not increase in the same proportion. Amy conducted an average of 1.17 searches per information need. Julia had only one information need more than Monica, but had an average of 3.33 searches per information need compared to Monica's 2.64.

On the other hand, Emily's information needs were greater than Monica's (24 and 14 respectively), but the average number of searches per need was comparable (2.17). It is noticeable that Julia and Emily had a similar number of searches despite the differences in information needs. A possible explanation for the variance in the average of searches per information need is that: (a) subjects did not have a clear idea of the information needed; (b) did not locate what they were looking for; or (c) did not know what sources to consult. Conducting an interview with the subjects could have clarified if this was truly the case. This is one of the limitations of the present study.

Translation task 2. Table 10 presents data on the students' distribution of time on Task 2.

Table 10

Distribution of Time - Task 2

Subject	Sem.	Translation window time	%	Information search time	%	Total times (hh:mm:ss)
Amy	1 st	0:55:20	94.24	0:03:23	5.76	0:58:43
Julia	2 nd	0:29:15 ^a	82.55	0:06:11 ^a	17.45	0:57:53 ^b
Monica	4 th	0:43:48	95.39	0:02:07	4.61	0:45:55
Emily	4 th	0:31:23 ^a	82.05	0:06:52 ^a	17.95	0:53:06 ^b
Average		0:39:56	89.60	0:04:38	10.40	0:53:54

Note. Sem. = semester; ^aDoes not reflect missing data; ^bTotal times are estimated.

Overall, Task 2 took an average of 53 minutes to complete. The first-semester student (Amy) spent almost 59 minutes working on Task 2, while all three of the other students, needed less time to complete the task. It is important to note, however, that Julia's and Emily's total times are estimates since Julia did not record the first part of her translation (62.38% of the word count), and in Emily's case, the second part of her recording was corrupted (37.62% of the word count). Utilizing the aforementioned percentages of word count, their estimated completion time would have been 57 and 53 minutes respectively. As displayed in Table 10, for Task 2, students spent an average of 89.60% of their total time in the translation window and an average of 10.40% of their time consulting resources online.

When comparing students' use of time between both translation tasks, it can be seen that the total average time in Task 2 is 27 minutes less than in Task 1 (see Tables 8 and 10). The average percentage of time spent on the translation window is higher on Task 2 (89.60%) than in Task 1 (71.77%), while the average time on consultations is lower in Task 2 (10.40%) than in Task 1 (28.33%).

Table 11 contains data regarding the number of information needs that students had during the completion of Task 2.

Table 11

Information Search by Number of Information Needs - Task 2

Subject	Sem.	Information search time (hh:mm:ss)	Search sessions	Average search session time (hh:mm:ss)	Information needs	Total searches (tokens)	Average searches per info need
Amy	1 st	0:03:23	5	0:00:41	4	9	2.25
Julia	2 nd	0:06:11 ^a	13 ^a	0:00:32	7 ^a	23 ^a	3.29
Monica	4 th	0:02:07	6	0:00:21	5	6	1.20
Emily	4 th	0:06:52 ^a	19 ^a	0:00:22	15 ^a	26 ^a	1.73
Total		0:19:22	44		31	64	
Average		0:04:38	10.75	0:00:29	7.75	16	2.12

Note. Sem. = semester; ^aDoes not reflect missing data.

Table 11 displays the number of information needs and total searches for Task 2. By comparing Tables 9 and 11, it is evident that these indicators reduce in the same way that the total and research times do from Task 1 to Task 2. The number of information needs went down from 59 to 39, and the number of total searches was reduced from 146 to 64. A plausible explanation of the decrease in the figures from Task 1 to Task 2 is that subjects found the second task to be easier, perhaps because they were more familiar with the topic of the text (this possibility is addressed later in the discussion). Julia and Emily continue to be the students with the highest number of total searches. Regarding the searches per information need, each student conducted an average of 2.12 searches with 1.2 (Monica) being the lowest and 3.29 (Julia) the highest; this is on a par with the averages in Task 1, where Julia (3.33) conducted more average searches than Monica (2.64).

The analysis of the students' use of time also helped to identify how many times students shifted from the translation window to the research window (to initiate a Web search session). In the following analysis, graphs illustrating these switches will be presented (Figures 2-5 for Task 1, and Figures 6-9 for Task 2). The bottom part of the graph marks the point in time when the research sessions occurred, while the top part indicates the translation intervals.

Translation task 1. The overall analysis of the translation process of the subjects indicates that none of them read the source text nor the translation brief before beginning the writing stage; they began translating immediately.

Figure 2 displays Amy's distribution of time between researching and translating.

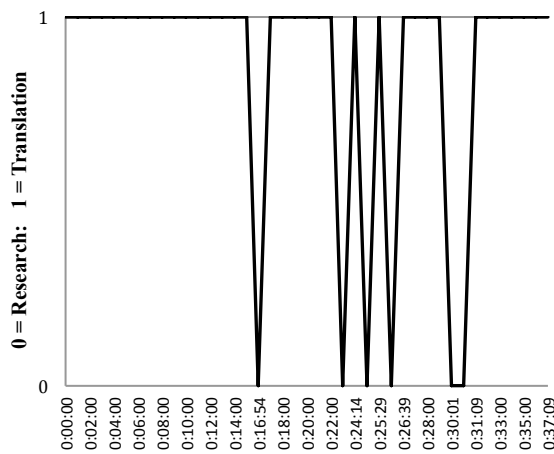


Figure 2. Amy – Translation Task 1 Progression Timeline (Home)

Amy worked with two windows opened in parallel, one with an electronic version of the source text (ST) and the other intended for the target text (TT). As observed in Figure 2, for Task 1, she only had 5 research sessions throughout the completion of her translation, the first one happening at the 16-minute mark. Noticeably, she had four

intervals of prolonged translation time. Previous studies indicate (Enrriquez Raído, 2014) that long periods of uninterrupted translation are characteristic of professional translators since it usually shows they process larger units of information (at the sentence or paragraph level). Interestingly, in Task 1, it is the first semester student (Amy) who spent 92.31% of her time in translation related activities and occasionally processed longer units than the rest of the students (yet not at the sentence level). However, Amy produced the translation with the lowest score, which could suggest a lack of awareness of potential problems and/or task difficulty; it could also be a reflection of unfamiliarity with the topic. Later in the discussion, the researcher will address user- and task-related factors in relationship to the use of Web resources and to the quality of the translation.

As seen in Figure 3, Monica, like Amy, dedicated the initial part of her time to translation. Her first Web consultation took place at the 14-minute mark. Subsequently, several clusters of research sessions occurred, combined with short as well as long periods of translation time.

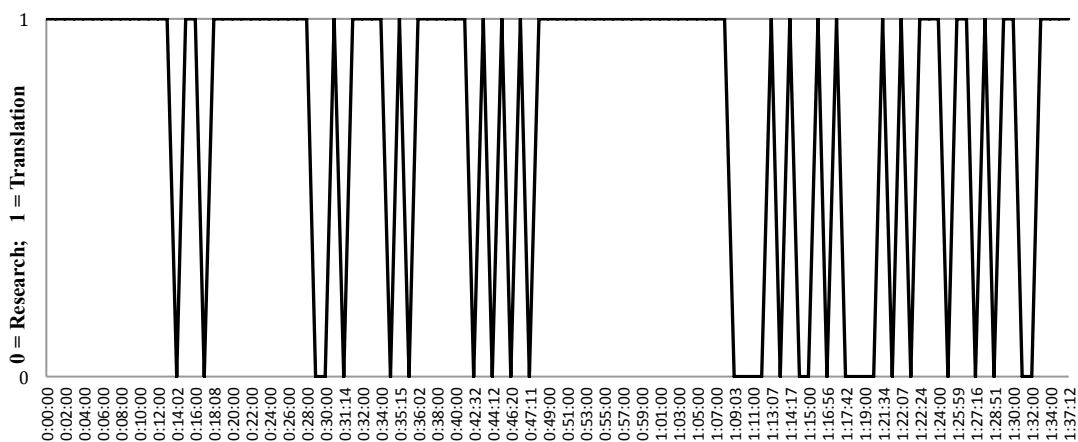


Figure 3. Monica – Translation Task 1 Progression Timeline (Home)

Figures 4 and 5 illustrated that Julia and Emily showed quite similar task progression patterns: a) they both spent the first few minutes on translation and turned to research within the 4-6-minute mark; and b) they had longer periods of research that appear to be almost as long as some of the translation periods, which coincides with the fact that they spent more than 40% of their time doing research.

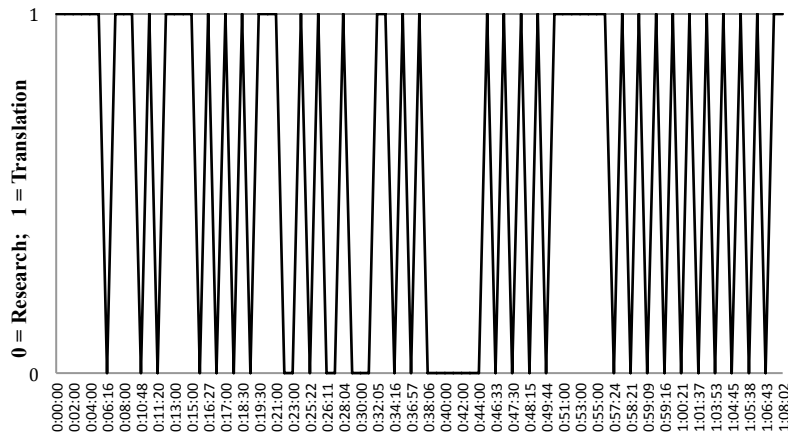


Figure 4. Julia – Translation Task 1 Progression Timeline (Home)

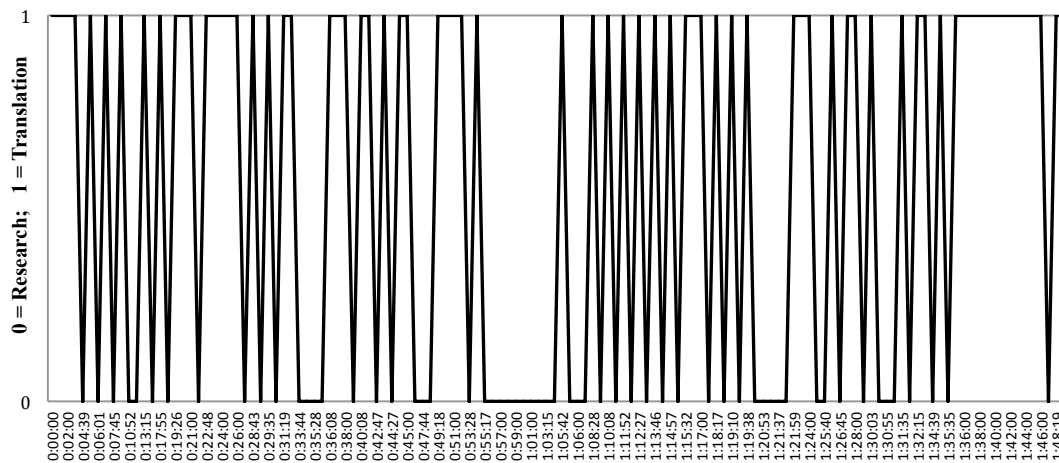


Figure 5. Emily – Translation Task 1 Progression Timeline (Home)

To summarize, Amy only had five research sessions throughout the completion of her translation in contrast to 21, 28, and 36 from Monica, Julia, and Emily, respectively. It is noticeable that Julia, Monica, and Emily switched frequently between the translation and research tasks, which means they did not spend long periods of uninterrupted translation time. As soon as a translation problem arose, the students turned to the Web in an attempt to solve it. However, students' responses to the questionnaire on knowledge about translation reported that 75% of the students said they should try to work out the meaning of a word from the context (question 27).

In her Think-Aloud experiment in subtitling, Kovačič (1997) found that less experienced translators “typically sought help from dictionaries (either traditional or electronic) much sooner than more experienced ones, who first searched in their memory or used deduction” (p. 234). “Immediately resorting to a dictionary tends to narrow the range of possible equivalents down to those listed on the page, bypassing renditions that might be more creative or more appropriate in a particular context” (Wakabayashi, 2003, p. 65). In the present study, the three students who turned right away to Internet resources received much higher translation scores than Amy, who invested relatively little time on research.

Translation task 2. As in the case of Task 1, the analysis of the translation task progression timeline for Task 2 reveals that there is inter-subject variability. However, two distinctive patterns emerged. The first one was evidenced by Amy and Monica (first- and fourth-semester students) who translated for quite some time before engaging in research. As in Task 1, Amy had at all times two windows side by side, one with the source text and the other with the target text she was working on. As evident in Figure 6,

for the first part of Task 2 (done at home), she began researching at the 29-minute mark, and at that point, she only made two searches within a two-minute period, and switched only once to the translation window. By the 33 minute-mark, she had completed the first part of her translation.

On the second part of Task 2 (done at the computer laboratory as a classroom activity), Amy spent the first few minutes reviewing her previous work from part one. She first read aloud the initial paragraph of the ST and then proceeded to read aloud the first paragraph of the TT and made two small revisions. Then she read aloud the second paragraph of the ST, then the second paragraph of the TT, and made minor revisions. Immediately after that, Amy began translating the second part of the assignment. At the 4-minute mark, she conducted her first search and then resumed the translation for 15 minutes until another information need arose. Amy changed tasks a total of five times (as seen on Figure 6). Overall, no differences in Amy's task progression were observed between her performances at home (both in Task 1 and Task 2) and in the computer laboratory (in Task 2).

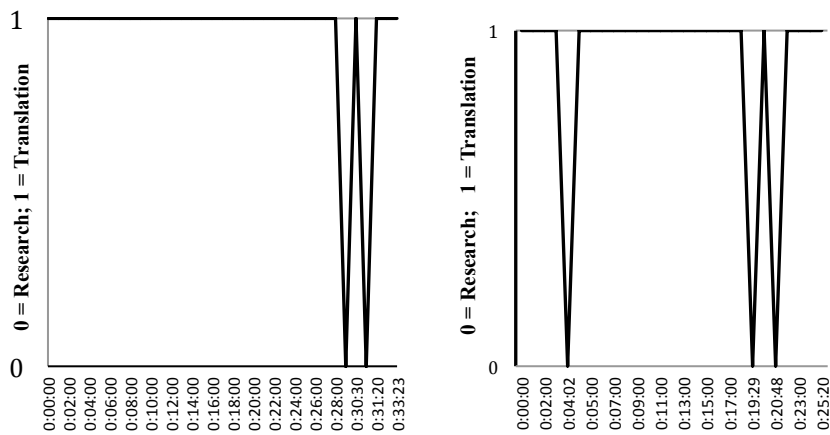


Figure 6. Amy – Translation Task 2 Progression Timeline of Part 1 at Home (Left) and Part 2 at the Lab (Right)

Monica completed the first part of Task 2 at home in 19 minutes without consulting any resources. As observed in Figure 7, for the second part of Task 2, she began translating right away without reading or revising the first part of the assignment. Her initial search session occurred at the 3-minute mark, after which she proceeded with the translation for another seven minutes. Then, she spent the following six minutes going back and forth between translation and research. At the 18-minute mark, Monica resumed translation uninterrupted until she finished. Finally, she reviewed and edited her translation.

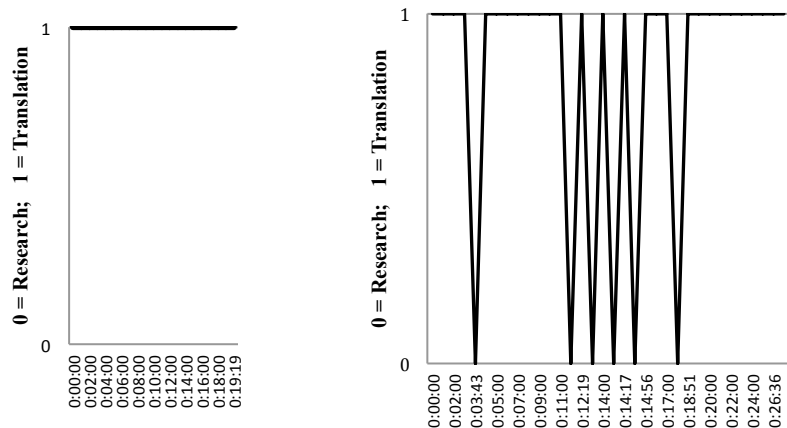


Figure 7. Monica – Translation Task 2 Progression Timeline of Part 1 at Home (Left) and Part 2 at the Lab (Right)

Figure 8 only exhibits data for Task 2, Part 2 because Julia did not record Part 1 of Task 2, therefore that information could not be analyzed. The graph illustrates she only spent a few seconds in the translation window before carrying out her first research session. After her first research session, she conducted 12 more research sessions in a period of 30 minutes with two distinctive translation intervals of 4 and 7 minutes. There does not appear to be any changes in the way Julia approached Task 1 at home and Task 2 in the computer laboratory.

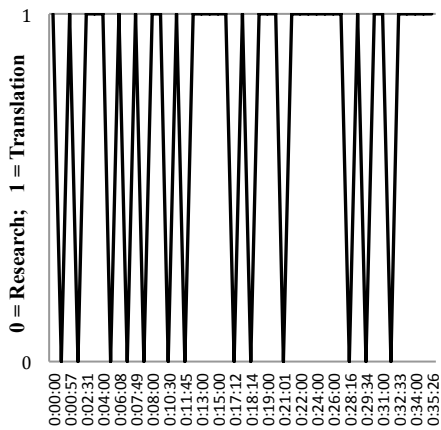


Figure 8. Julia – Translation Task 2 Progression Timeline of Part 2 (Lab)

As Figure 9 illustrates, Emily’s working style during the first part of Task 2 consisted of frequent changes from the translation window to the research window, with a total of 19 search sessions. This suggests that she resorted to the Web whenever she encountered a need for information. She only showed two periods of continuous translation of not more than 5 minutes. Emily’s recording of the second part of Task 2 could not be analyzed due to the fact that it was corrupted.

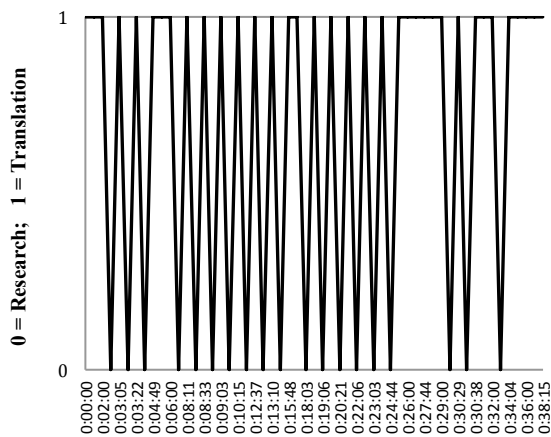


Figure 9. Emily –Task 2 Progression of Part 1 at Home (Right)

In sum, Monica and Amy (fourth- and first semester students respectively) were the students who had longer uninterrupted translation periods; they both conducted the least amount of research. Conversely, Julia and Emily (second- and fourth- semester students) are characterized by frequent changes between the translation and research windows. Overall, students turned to the Web as soon as a translation problem arose. However, students' responses to the questionnaire on knowledge about translation reported that 75% of the students said they would try to work out the meaning of a word from the context (question 27). In the data collected, subjects did research exclusively during the course of the translation process, never beforehand. To understand students' information seeking practices an analysis of each subject's Web search behavior is required; this is the topic of the next section.

Use of Web Resources

This section presents the findings obtained from the screen recordings on the subject's information needs and Web consultations on Tasks 1 and 2.

Translation task 1.

Information needs. Table 12 presents data on the individual (idiosyncratic) vs. common (those displayed by at least two students) information needs.

Table 12

Individual vs. Common Information Needs - Task 1

Type of information need	Information needs		Total searches (tokens)	
	Number	%	Number	%
Individual needs	14	46.67	27	18.50
Common needs	16	53.33	119	81.50
Total types of information needs	30	100.00	146	100.00

Table 12 shows that the four subjects had a total of 30 different information needs that generated 146 total searches, 7 (4.80%) of which were conducted via paper-based dictionary by Amy (the first semester student). Even though this study is about Web resources, Amy's paper-based dictionary searches are included in the data analysis as they provide a picture of her information seeking and retrieval preferences, and to show her deviation from Web-based research. It is possible that Amy (the first-semester translation student) used the known resource of a paper dictionary rather than immediately using Web-based translation resources. Of the 30 information needs of all students, 14 (46.67%) were individual and 16 (53.33%) common (see Table 12). It is very noticeable that the common needs were more challenging for the subjects than the individual needs. As reported in Table 12, 119 searches were carried out to meet the 16 common needs; in contrast, only 27 searches were performed to meet the 14 individual information needs.

Table 13 presents the common information needs listed from the highest to the lowest number of students who had the same information needs, and subsequently from the highest to the lowest total number of searches performed.

Table 13

Common Information Needs - Task 1

Rank	Common information needs	Number of students	Total number of searches
1	non-aspirin pain reliever	4	20
2	opioid medications	4	17
3	splints	4	11
4	antidepressants	4	4
5	Top 12 management tools	3	13
6	use specialized equipment at home	3	13
7	strength and flexibility	3	7
8	psychological conditions	3	6
9	anti inflammatory drugs	3	5
10	social interaction	2	4
11	emotional reaction	2	4
12	hassle	2	4
13	elevated toilet seats	2	4
14	current job	2	2
15	allowing individuals to be more mobile in their own home	2	3
16	crutches	2	2
	Total		119

The information needs in Task 1 shared by all four students were: “non-aspirin pain reliever,” “opioid medications,” “splints,” and “antidepressants.” A particular unexpected finding is that some students looked up long queries with many or all the

terms such as “Top twelve management tools,” “use of specialized equipment at home,” “elevated toilet seats,” and “allowing the individuals to be more mobile at home.”

Information search. Choosing one of the following four approaches satisfied the students’ needs for information: direct address searches, navigational queries, or search engine queries. Table 14 provides data on the distribution of searches by resources for Task 1.

Table 14

Distribution of Searches by Resource (Tokens) - Task 1

Resource	Amy	Julia	Monica	Emily	Total	%
Paper-based bilingual dictionary Merriam-Webster (M-W)	7					4.79
<hr/>						
Direct address searches						
<hr/>						
Bilingual Web sources						
Google Translate (GT)			15	23	38	26.03
Word Reference (WR)			12		12	8.22
Bing Translator (BT)		9			9	6.16
Subtotal						40.41
<hr/>						
Direct Address Searches						
<hr/>						
Monolingual Web sources						
Dictionary.com ^a		7			7	4.79
SpanishDict ^a		1			1	0.68
Real Academia Española (RAE)				14	14	9.59
Subtotal						15.06
<hr/>						
Direct address searches						
<hr/>						
Other Web sources						
General						
El País (newspaper)				4	4	2.74
La Reforma (newspaper)				3	3	2.05
Medical						
MedlinePlus			10		10	6.85
WebMD				1	1	0.68
Subtotal						12.32
Total						72.58
<hr/>						
Navigational queries		1		3	4	2.74
<hr/>						
Search engine queries						
Google		32		4	36	24.66
Grand Total	7	50	37	52	146	100.00

Note. ^aClassified as monolingual since this is the function for which it was used.

Paper-based bilingual dictionary. As evidenced in the table above, in Task 1, one student (Amy) opted to consult a paper-based bilingual dictionary (Merriam-Webster) on seven occasions. This is the single case of a paper-based resource consultation throughout this study, accounting for 4.79% of the total searches (146).

Direct address searches. As mentioned in the section on Operationalization of Concepts, direct address searches involve “only one step to reach a specific site” (White & Iivonen, 2001, p. 722). The results in Table 14 reveal that in Task 1, out of a total of 146 searches, 99 of the Web searches (67.79%) were direct address searches. Bilingual Web sources were the primary choice of resources used (40.41% of total searches), suggesting that the subjects were looking mostly for word equivalents. The subjects utilized a total of 10 different direct address sources, the most frequently used were: Google Translate (GT) 26.03%, Real Academia Española (RAE) 9.59%, Word Reference (WR) 8.22%, MedlinePlus 6.85%, and Bing Translator (BT) 6.16%. Table 14 displays these figures. The other resources consulted were: Dictionary.com 4.79%, El País 2.74%, La Reforma 2.05%, SpanishDict 0.68%, and WebMD 0.68% (see Table 8).

It is worth mentioning that the only direct address consulted by more than one subject was Google Translate; all of the remaining direct addresses were used exclusively by one student. This can be interpreted as an indication that subjects resort to their familiar or preferred sources when facing a translation problem.

Only two of the students referred to monolingual Web resources: Julia (second-semester student) and Emily (fourth-semester student). Julia’s choice of a monolingual resource was the dictionary function of Dictionary.com to look-up the English definition of several words, for example, “management,” “manage,” “strength,” “flexibility,”

“equipment,” “hassle,” and the pronunciation of “opioid,” and SpanishDict to find the Spanish conjugation of the verbs “ayudar” and “poder.”

Emily preferred to use (RAE) where she confirmed the Spanish definition of some of the words she obtained in Google Translate. For instance, she typed the words “psychological conditions,” “opioid,” “equipment,” “splint,” in Google Translate, and then entered “psicológica,” “opioides,” “equipo,” “equipamiento,” and “férulas” in RAE. According to Newark (1981) “every time one consults a bilingual dictionary the word should be checked in half-a-dozen sources and target language monolingual dictionaries and reference books” (p.16). Throughout the Translation Certificate Program, students are encouraged to consult monolingual dictionaries in general, but particularly, to verify that the information obtained from a bilingual dictionary is correct (has the same meaning they are trying to convey).

The findings also indicate that only the same fourth-semester student (Emily) sought parallel texts through general sites (newspapers). The usefulness of parallel text is discussed in class, and even though it seems she had grasped that concept, she may not have been able to put it into practice. Emily’s search behavior showed that first she tried to find health related texts in Spanish using two different online newspapers (El País and La Reforma) that were general in nature and not publications related directly to the medical field. It seemed that she wanted to examine how article titles were written in Spanish and find words that she could use in her translation, as well; as in (1):

- (1) “Tengo que buscar palabras en un texto paralelo que me pueden asistir a pensar en una fácil palabra que sea como *equivalent a use specialized equipment at home* (Emily)

Emily found the word “equipamiento” in a diabetes article, which she decided to incorporate into her translation. However, she never performed search engine queries for texts in Spanish with the same topic as the source text (pain management tools). This might be due to students not knowing how to use advanced search features. Her comment (stated aloud), “I don’t know where to go look for that” was revealing in this regard.

Navigational and search engine queries. There were a total of 4 navigational queries, performed by only two of the subjects, Julia and Emily, who were interested in locating the websites of Bing Translator, El País, La Reforma, and RAE.

As seen in Table 14, search engine queries accounted for 26.66% of the total searches, and only Julia and Emily (second- and fourth-semester students) conducted them. The only search engine used was Google. Julia’s queries were a few words long, and included question words such as “What is,” and noticeably the use of the phrase “in Spanish” which led her with easy access to Google Translate’s “quick results,” without even having to click on the link. Emily’s queries in Google were: “interacción social definición,” “emotional reactions in Spanish,” “opioid medications,” and “splints.”

Another relevant point is that none of the subjects used Boolean operators (*and*, *or*, *and not*), terms enclosed in quotation marks, the advanced search features, nor saved links for future use. Many of the subjects only checked the first results page. According to Aula, Jhaveri, and Kāki (2005), “typical Web users seldom use advanced operators or use them improperly, typically only check the first result page per query, and rarely reformulate their queries. Thus, the general public uses search engines in a very simple way, a way which may to be very efficient” (p. 583).

Translation task 2.

Information needs. Task 2 produced a total of 23 different needs among the subjects. The majority of those needs (16, corresponding to 69.57%) were individual, while seven of them (corresponding to 30.43%) were shared by two or more subjects. Individual needs prompted 36 searches (56.25%) out of a total of 64, and common needs produced 28 (43.75%). The individual needs are mostly those of Julia and Emily. Table 15 displays these figures.

Table 15

Individual vs. Common Information Needs - Task 2

Type of information need	Information needs		Total searches (tokens)	
	Number	%	Number	%
Individual needs	16	69.57	36	56.25
Common needs	7	30.43	28	43.75
Total types of information needs	23	100.00	64	100.00

Although the individual needs in Tasks 1 and 2 are similar, Task 2 has less than half the common needs of Task 1. As for total searches, Task 2 led to one fourth of the total searches in Task 1.

Table 16 shows the six terms considered to be common needs in Task 2.

Table 16

Common Information Needs - Task 2

Rank	Common information needs	Number of students	Total number of searches
1	irreversibly damage	3	4
2	enabling kids to drink hurts their health can program them for addiction and it's against the law	2	13
3	hard liquor	2	5
4	susceptible	2	4
5	public awareness campaign to help you understand	2	4
6	legal problems	2	4
7	research shows	2	2
	Total		36

The problematic term common to most of the students was “irreversibly damage,” yet the segment that prompted the most searches was “enabling kids to drink hurts their health, can program them for addiction and it’s against the law.” Julia exhibited an idiosyncratic strategy that she used on a few occasions: modifying her original query by adding words to each subsequent query, as in (2).

- (2) enable, enabling, permitiendo, enabling, enabling kids to drink, enabling kids to drink hurts their health, enabling kids to drink hurts their health can program them for addiction, enabling kids to drink hurts their health can program them for addiction and it’s against the law (Julia)

In comparison with Task 1, the terms in the group of common needs in Task 2 are less specialized, but nevertheless, challenging for the students. For Task 2, the individual needs included: “alcoholic drinks,” “making it harder,” “youth,” “to serve,” “anyone,”

“anyway,” “drink,” “so,” “families have more influence,” “underage drinking,” and “culturally accepted.”

Information search. Choosing one of the three following approaches satisfied the students’ needs for information: direct address searches, navigational queries, or search engine queries. Table 17 provides the data on these three types of information searches.

Table 17

Distribution of Searches by Resource (Tokens) - Task 2

Resource	Amy	Julia	Monica	Emily	Total	%
Direct address searches						
Bilingual Web sources						
Google Translate (GT)				18	18	28.13
Bing Translator (BT)		13			13	20.31
Word Reference (WR)			6		6	9.38
Reverso (R)	4				4	6.25
Subtotal						64.07
Direct address searches						
Monolingual Web resources						
Real Academia Española (RAE)	5	6		8	19	29.69
Dictionary.com ^a		2			2	3.13
Subtotal						32.82
Total						96.89
Navigational queries		1			1	1.56
Search engine queries						
Google		1			1	1.56
Grand total	9	23 ^b	6	26 ^b	64	100.00

Note. ^aClassified as monolingual since this is the function for which it was used;

^bDoes not reflect missing data.

Direct address searches. Altogether, subjects carried out a total of 64 direct address searches, with Julia and Emily carrying out the majority of them. The data in Table 17 highlight the fact that direct address searches were the preferred strategy (96.89%), and that bilingual Web sources are the most frequently consulted sources (64.07%), followed by monolingual dictionaries (32.82%). The subjects in the present study used a total of six direct address searches, favoring Google Translate (28.13%), Bing Translator (20.31%) and RAE (29.69%) as resources. Nearly all of the students had multiple windows open while searching to facilitate their ability to get back to previously found information or re-access desired websites. No other information re-access strategies were observed (e.g., bookmark usage).

Navigational and search engine queries. There was only one navigational query and one search engine query in Task 2, both performed by Julia. In her navigational query, she was trying to locate Bing Translator; her query in Google included the phrase “in Spanish,” as in “culturally accepted in Spanish.”

Comparison of the use of web resources between task 1 and task 2. As seen in Tables 14 and 17, the subjects showed a clear preference for direct address searches on both Task 1 and Task 2, reflected by 67.79% and 96.89% of the sources accessed respectively. In Task 1, the use of bilingual Web sources reached the highest percentage of direct address searches at 40.41%, followed by monolingual dictionaries at 15.06%, and “Other” direct address searches at 12.32%. Task 2 data showed that bilingual Web sources were also utilized more (64.07%) than monolingual dictionaries (32.82%). In the case of Task 2, no “Other” direct address searches were performed (neither newspapers nor medical websites).

Previous research indicates that bilingual dictionaries are the preference of less experienced students, while experienced students prefer the use of monolingual dictionaries and other resources such as encyclopedias and newspapers, and tend to look up the same item in several dictionaries (Jääskeläinen, 1989). Jääskeläinen associated this type of practice with that of professional translators who tend “not to trust just one source, but to check given information on other resources too” (Jääskeläinen, 1989, p. 188). The results of the current study concur with Jääskeläinen’s findings.

When comparing students’ actual usage of bilingual resources (40.41% in Task 1, and 64.07% in Task 2) to their reported opinions in the pre- and post-questionnaires about knowledge of translation, a mismatch is perceived. In the questionnaires, 75% of the students said (before and after the class) that “as soon as you find a word or expression you don’t know the meaning of, you should not look it up straightaway in a bilingual dictionary.”

Additionally, in the pre-class questionnaire 100% of the student said that “since you can’t know the meaning of all words in a text, a bilingual dictionary is not the best solution,” yet they consulted bilingual resources 40.41% of the time in Task 1 (which was completed at the beginning of the semester). By the end of the semester, when the post-class questionnaire was answered, 75% of the students said that a bilingual dictionary is the best solution, and that is more in line with what is observed in their behavior in both translation tasks (especially in Task 2 near the end of the semester).

In Task 1, the subjects utilized a total of 10 different direct address sources; the most frequently used being GT (26.03%), RAE (9.59%), WR (8.22%), while in Task 2 subjects used a total of six direct address searches favoring RAE (29.69), GT (28.13%),

BT (20.31%), and WR (9.38%). Although 10 direct address sites were accessed in Task 1 and 6 direct address searches in Task 2, the findings emphasize that students preferred certain sites, known resources. This is also a trend observed by Enríquez Raído (2014).

In Task 1, only GT was used by two students (Monica and Emily), and in Task 2, RAE was consulted by three students (Amy, Julia, and Emily). The ranking for the use of RAE in Task 2 was noticeably different across students (Amy, 55.55% of her total consultations, Julia 26.08%, and Emily 12.50%). Although the increase in the use of RAE in Amy's case is evident (from 0% to 55.55%), her translation score for Task 2 is not as high as the other students' score. The increase of use of RAE from 9.59% in Task 1 to 29.69% in Task 2 reflects the instructor's emphasis on the importance of using monolingual dictionaries.

The use of navigational queries, only accounted for 2.74% of the total of resources accessed in Task 1, and 1.56% in Task 2. In comparison, search engine queries reached 24.60% of resources accessed in Task 1, although they only represented 1.56% of resources consulted in Task 2.

To summarize, students in this study utilized Web-based resources as their principal source of information when translating, equivalent to an overwhelming 96.66% of the total combined consultations in Task 1 and Task 2, as opposed to a mere 3.33% of paper-based consultations. These figures support the findings of Massey and Ehrensberger-Dow (2011) who reported that younger translators use more online resources and that students of translation rely heavily on online dictionaries.

Relationship between Web Consultations and Translation Quality

The resources consulted and the translation scores for both translated texts are presented in Table 18.

Table 18

Resources Consulted and Translation Quality - Tasks 1 and 2

Subject	Sem.	Task 1			Task 2		
		Score	Web resources consulted	N	Score	Web resources consulted	N
Amy	1 st	55/100	M-W (paper-based)	7	75/100	Reverso RAE	4 5
Total				7			9
Julia	2 nd	85/100	BT Dictionary.com SpanishDict Google search engine NQ	9 7 1 32 1	85/100	BT Dictionary.com RAE Google search engine	13 2 6 1
Total				50			23 ^a
Emily	4 th	85/100	GT RAE El País La Reforma WebMD Google search engine NQ	23 14 4 3 1 4 3	90/100	GT RAE	18 8
Total				52			26 ^a
Monica	4 th	90/100	GT WR MedlinePlus	15 12 10	90/100	WR	6
Total				37			6

Note. Sem. = semester; M-W = Merriam-Webster; RAE = Real Academia Española; BT = Bing Translator; NQ = Navigational query; GT = Google Translate; WR = Word Reference. ^aDoes not reflect missing data.

Table 18 shows that the highest scores were obtained by the fourth-semester students (Emily and Monica), followed by the second-semester student, Julia. Amy, the first-semester student, obtained the lowest scores on both translation tasks.

In Task 1, Amy used a paper-based bilingual dictionary (Merriam-Webster), and in Task 2, she resorted to an online bilingual resource (Reverso), and added a monolingual online dictionary (RAE). Perhaps the use of the online bilingual and monolingual resources contributed to the 20-point increase in her translation score (55→75); however, this higher score could also be attributed to the fact that Task 2 was done at the end of the semester, hence, she could have gained more skills by then.

A closer look at Amy's difficulties in her translations revealed that her major errors in Task 1 involved dialect inadequacies, parts of the translated text that followed closely English syntax, passive voice transfer mistakes, and also errors concerning prepositions, articles, as well as incorrect terminology. The terminology mistakes could have possibly been resolved by doing more research. Some of the other challenges that she had may have different explanations (e.g., that she was translating into her second language). In Task 2, she still had some unnecessary transfers from the source text, and a few semantic errors; however she had a better use of terminology than in Task 1. This could also have a relationship with the resources she consulted.

Julia continued to be the sole student who utilized BT, Dictionary.com, and SpanishDict for both translation tasks, and her scores did not vary. She was also one of two students who performed searches in Google (although considerably less in Task 2 [1] than in Task 1 [32]). The only considerable commonality in resources between the fourth-semester students (Emily and Monica) was the use of Google Translate. Monica, the

student with the highest scores, used Google Translate, Word Reference, MedlinePlus, and did not use monolingual dictionaries at all, as opposed to the other students.

The following table shows the number of consultations (total searches), time spent on the translation, and the quality of the translation.

Table 19

Total Amount of Searches, Total Times, and Quality – Tasks 1 and 2

Semester	Amy 1 st	Julia 2 nd	Monica 4 th	Emily 4 th	Average
Total searches					
Task 1	7	50	37	52	36.5
Task 2	9	23 ^a	6	26 ^a	16
Total times					
Task 1	0:45:17	1:08:02	1:37:02	1:50:28	1:20:12
Task 2	0:58:43	0:57:53 ^b	0:45:55	0:53:06 ^b	0:53:54
Score					
Task 1	55/100	85/100	90/100	85/100	79/100
Task 2	75/100	85/100	90/100	90/100	85/100

Note. ^aDoes not reflect missing data; ^bTotal times are estimated.

Comparing Amy’s numbers in Task 1 to the other three students’, it could be said that the fewer the number of total searches and the less time spent completing the translation, the lower the score (Table 19). However, among the three more advanced students, the relationship between total searches, total time, and score is not as linear. For instance, Julia and Emily obtained the same score, performed almost the same amount of searches, but Julia spent 42 minutes less working on the assignment. Monica attained the best score, even though her completion time was in-between Julia’s and Emily’s, and she carried out at least 13 fewer searches. These subtle differences between Julia, Monica,

and Emily could possibly be accredited to user or task attributes, which will be addressed later on.

For Task 2, there is no apparent relationship between the number of consultations (total searches), time spent on the translation, and the quality of the translation, as exemplified by Monica's (fourth semester student) 6 total searches, 45 minutes working on the translation, and a score of 90/100, compared to Emily's (fourth semester student) 26 total searches, 53 minutes, with the same score (90/100).

Some prior studies showed that there was no relationship between the number of resource consultations, time spent on the translation, and the quality of translation (Dancette, 1997), while other research found that there was indeed such a relationship (Gerloff, 1988; Jääskeläinen, 1990; Livbjerg & Mees, 1999).

User Attributes: Translation Experience and Formal Training, Specialization and Familiarity with the Topic of the Text, Previous Web Search Training, and Effort

The current investigation focuses on time and number of Web consultations in connection with a number of user attributes. The user attributes examined in this study are previous translation experience and training, specialization and familiarity with the topic of the text, previous Web searching training and effort (how diligent the subjects were when working on a translation task).

The information pertaining to translation experience and formal training was obtained from questions 10-14 of the initial questionnaire; the data regarding specialization and familiarity with the topic of the text were drawn from the initial questionnaire and question number 7 from the questionnaire about the translated text: "How familiar were you with the topic of the text?"; the information on previous Web

search training came from the questionnaire about resources; and the answers to question 4 of the questionnaire about the Think-Aloud Protocol provided the information on effort.

Table 20 provides data on the user attributes of translation experience and training, specialization and familiarity with the topic of the text, previous Web search training, and effort.

Table 20

*User Attributes: Translation Experience and Training, Specialization and Familiarity**with the Topic of the Text, Previous Web Search Training, and Effort*

	Amy	Julia	Monica	Emily	Average
Earn living by translating	No	No	No	No	No
Translation experience	5 months (Generalist)	None	None	None	Low
Formal training in translation	None	1 course ASU ^a	3 courses ASU ^a	3 courses ASU ^a	
Semester of study	First	Second	Fourth	Fourth	
Specialization					
Medical field	No	No	Full-time Interpreter	No	
Familiarity with ST topic					
Task 1	4	6	5	5	5
Task 2	9	7	7	5	7
Previous Web search training	Yes (Elementary School)	None	None	Yes (High School & College)	Low
How diligent were you with the task? (Effort)					
Task 1	7	10	6	9	8
Task 2	8	9	6	5	7
Information search time					
Task 1	0:03:29 ^b	0:27:23	0:23:55	0:44:33	0:24:50
Task 2	0:03:23	0:06:11 ^c	0:02:07	0:06:52 ^c	0:04:38
Total searches					
Task 1	7	50	37	52	36.5
Task 2	9	23 ^c	6	26 ^c	16
Score					
Task 1	55/100	85/100	90/100	85/100	79/100
Task 2	75/100	85/100	90/100	90/100	85/100

Note. ASU = Arizona State University; ^aOne Translation Certificate class offered per semester; ST = Source text; ^bPaper-based dictionary search, not Web resources; ^cDoes not reflect missing data.

Translation training and experience. To my knowledge, none of the participants earned their living by translating; however, Amy declared having five months of experience as a generalist translator. Three of the participants were pursuing undergraduate degrees (Amy, Julia, and Emily); Monica was enrolled as a non-degree student and had completed her bachelor's two years before.

The relationship between translation experience and Web search behavior was apparent in the resources they used and the frequency of their use. The students exhibited a clear preference for bilingual (online) resources, which they used quite frequently. Earlier research associated these practices with less experience in translation (Jääskeläinen, 1989; Massey & Ehrensberger-Dow, 2011). The results of the current study differ from those of prior studies that have reported that the use of dictionaries decreases with greater experience in translating (Jensen, 1999).

Another aspect that is related to translation experience is the ability to avoid fixating on the word and trying to retrieve its equivalent, and instead processing larger units of information (at the sentence or paragraph level) that allow the translator to work at the discourse level. The interest in retrieving equivalents, and conducting shallow online searches due to fast and easy access to information has also been observed in other studies and has also been connected to less experience in the field of translation (Enríquez Raído, 2011a).

In regards to formal training in translation, Amy (the first-semester student) had none and this Medical Translation course was her introduction to translation studies. Julia was in her second semester of the Translation Certificate, and Monica and Emily were in their fourth. All previous translation training for these students had been completed at

Arizona State University (ASU). It should be mentioned that Monica had come back to finish the Translation Certificate after two years of being away from school.

The data showed that the more experienced students in the translation program received higher scores. Certainly, the introductory courses of the Certificate in Translation, of which the Medical Translation class is a part, contribute to sensitizing students to some of the common problems a translator may encounter in the course of his work in this region of the United States where English has such a strong influence over the Spanish language. However, there could be other factors associated with these results. For instance, the three students with the highest scores all grew up speaking Spanish.

Specialization and familiarity with the topic of the text. Concerning specialization, Monica (one of the two fourth-semester students) had worked as a full-time interpreter-by-phone for five months, where she interpreted for professionals in various fields, including medical. Thus, Monica is the only student who might be familiar with the medical field. In addition, when asked how familiar they were with the topic of the first task (Pain) on a scale from one to ten, all subjects' average response was 5 with an average number of 36.5 searches (see Table 20). On the second task, the level of familiarity with the subject averaged 7 with an average number of 16 searches, which indicates that the students were more acquainted with the subject of underage drinking. Overall, it appears that the higher the level of familiarity with the topic, the fewer the number of total searches; these results are consistent with the findings of Enríquez Raído (2011a).

As mentioned before, the average familiarity with the topic of Task 1 reported by the students was 5/10, with 4 being the lowest and 6 the highest. It seems understandable that Amy obtained the lowest score since she had the least familiarity with the topic (4). Monica, on the other hand, declared to have less familiarity than Julia, yet she scored higher on her translation. As for Task 2, the average familiarity with the topic of the text was 7, higher than in Task 1 and, by the same token, translation scores were higher.

Previous web search training. Only two students had received Web search training. Amy mentioned she had taken a class on Web searching in elementary school and Emily had been trained on how to perform Web searches in high school and college. In the current study, the general lack of Web search training was mostly seen in their lack of advanced search queries, their unawareness of monolingual dictionaries, their search for information (e.g., parallel texts) in non-relevant sources, and not knowing where to seek the information needed. Enríquez Raído (2011a) reported that in her study, the link between the students' Web search expertise and Web search behavior was "most notably felt in connection with their query construction and modification skills to locate relevant information on the Web" (p. 69).

Effort. When questioned how diligent they were with Task 1 on a scale from one to ten (ten being very diligent), the subjects' answers varied from 6 to 10 (as observed in Table 20), averaging 8. The only pattern observed in relation to effort was among the second- and fourth-semester students for Task 1: the more effort they declared, the more Web searches they carried out. In the case of Task 2, responses fluctuated from 5 to 9, with an average of 7. In Task 2, there does not seem to be a relationship between effort and the number of searches performed.

Task-Related Factors: Perceived Task Difficulty

The only task factor considered for this study was perceived task difficulty. Data was drawn from questions 5 and 6 of the questionnaire about the translated text: “How difficult do you think this text was to translate?” and “What are the general characteristics of the text that made you think the text was easy or difficult to translate? The results show that perceived difficulty varied greatly among individuals.

Translation task 1. On average, Task 1’s difficulty was ranked at 6.25. When asked to rate the difficulty of the text on a scale from zero to 10, the first-semester student’s (Amy) response was different from the other students’. Amy found that the translation Task 1 was not very difficult (3/10), which coincided with her being the student who spent the least amount of time completing the task and carrying out the least amount of searches. Amy said: “This text did not include many specific terms, so using my own knowledge of Spanish I was able to easily point out the main ideas and translate.” However, despite Amy’s perception that Task 1 was not very difficult, her translation of this text received the lowest score (55/100).

On the other hand, the second-semester student (Julia) considered translation Task 1 to be more difficult (7/10). Likewise, Monica and Emily (the fourth-semester students) rated Task 1 at a similar level of difficulty (7 and 8 respectively). Like Amy, the second- and fourth- semester students believed that Text 1 did not contain many medical terms, yet all four students performed a total of 20 searches in connection with “non-aspirin pain reliever,” 17 searches related to “opioid medications,” 11 searches associated with the term “splints,” and 4 searches for “antidepressants.” Perhaps what

they were trying to say is that they were not many technical terms. Monica mentioned that noun clusters had been challenging for her.

In general, the second- and fourth-semester students needed more time to complete the task and conducted more Web searches (see Table 21). These three students obtained higher scores in translation Task 1 (Julia 85/100, Monica 90/100, and Emily 85/100). Thus, it appears that as the level of perceived task difficulty increased, more searches were performed, more time was spent to complete the task, and translation scores improved. Although in Monica’s case, she performed a fewer number of total searches (37) than Julia and Emily (50, 52).

Table 21

Task Difficulty, Total Searches, and Scores – Task 1

Subject	Semester	Difficulty	Total searches (tokens)	Total times (hh:mm:ss)	Score
Amy	1 st	3	7	0:45:17	55/100
Julia	2 nd	7	50	1:08:02	85/100
Monica	4 th	7	37	1:37:02	90/100
Emily	4 th	8	52	1:50:28	85/100
Average		6.25	36.5	1:20:12	79/100

Translation task 2. As Table 22 shows, on average, Task 2’s difficulty was ranked at 4.75, lower than in Task 1 (6.25). Individually, Amy and Monica declared that Task 2 was not very difficult (4/10), which makes sense when considering they did not undertake much research (9, 6 total searches). On the other hand, Emily, who found the difficulty to be higher (8/10), conducted many more searches (26) than Amy (9) and

Monica (6). Interestingly, Julia not only found the assignment easier than the other students (3/10), but had a high number of total searches (23).

Amy and Julia commented that Text 2 was easier than Text 1 because the text was already tailored to the Hispanic population (it was written in English to be translated into Spanish). Monica mentioned that the vocabulary was not difficult, but that “long sentences with many ideas” had been challenging for her. Emily expressed that the vocabulary and discourse in Text 2 were not difficult, but still ranked the difficulty of the text at 8; she did not specify what characteristics made the text difficult.

The scores in Task 2 do not show the same relationship for all the students between perceived difficulty, searches performed, and scores as they do in Task 1, where the low difficulty rankings were related to lower scores. Amy continued to assess the difficulty of the translation as low, doing little research, and getting the lowest score; on the other hand, Emily perceived a high rank of difficulty, did the most research, and obtained the highest score. However, there seems to be no similar trend in Julia’s and Monica’s cases.

Table 22

Task Difficulty, Total Searches, and Scores – Task 2

Subject	Semester	Difficulty	Total searches (tokens)	Total times (hh:mm:ss)	Score
Amy	1 st	4	9	0:58:43	75/100
Julia	2 nd	3	23 ^a	0:57:53 ^b	85/100
Monica	4 th	4	6	0:45:55	90/100
Emily	4 th	8	26 ^a	0:53:06 ^b	90/100
Average		4.75	16	0:53:54	85/100

Note. ^aDoes not reflect missing data; ^bTotal times are estimated.

In sum, it was found that in Task 1 as the level of perceived task difficulty increased, more searches were performed, more time was spent to complete the task, and translation scores improved. These results are in line with those of Enríquez Raído (2011a, 2014) who found that task complexity increased the use of information sources and, together with translation experience, had an impact on student's choice of sources. In Task 2, the same trend was not observed for all students.

Conclusions

The results of this research show that the subjects had a distinct preference for direct address searches on both Tasks 1 and 2, reflected by 72.58% and 96.89% of the sources accessed respectively. All subjects relied heavily on the usage of bilingual Web sources to address their information needs (40.41% in Task 1 and 64.07% in Task 2); nevertheless they also used monolingual resources (15.06% in Task 1 and 32.82% in Task 2). The use of the monolingual dictionary RAE increased from one student to three by the end of the semester, and only one student used parallel texts, albeit not with a completely successful outcome.

When comparing the students' actual usage of bilingual resources to what they believed were best practices in the pre- and post-questionnaires about knowledge of translation, there is a mismatch. In the questionnaires, the majority of the students said that one should not look up unknown words or expressions straightaway in a bilingual dictionary, and that the bilingual dictionary was not the best solution to translation problems, yet the findings show they resort to bilingual dictionaries rather quickly and quite often. Overall, the first-semester student utilized reference materials less often than the more advanced students, and was the only one who employed a paper-based source.

Translation experience seemed to have a relationship with the resources used, and the frequency of their use. The data showed that the more experienced students in the translation program received higher scores in their translations. It was also found that the higher the level of familiarity with the topic, the fewer the number of total searches. In addition, previous Web search training appeared to have a relationship with where and how information was sought. The students' behavior was characterized by the lack of use of advanced search queries, a search for information (e.g., parallel texts) in non-relevant sources, and not knowing where to seek the information needed; therefore, students at all levels may benefit from training in Web searching skills that go past superficial searching. The fact that some students invested up to 40% of their assignment time looking for information on the Web highlights the importance of teaching students in the Medical Translation course how to critically search, use, and manage Web information sources.

In relation to effort, it was observed that in translation Task 1 the more effort the students declared, the more Web searches they carried out; however, this was not the case in translation Task 2. Additionally, it was found that in Task 1, perceived difficulty had an impact on the number of Web searches, which in turn seemed to influence the time spent on the translation process, and the translation scores. In Task 2, the same trend was not observed.

Pedagogical and Research Implications

Having immediate access to an extensive amount of information and being able to use it well would help the students in the Translation Certificate Program to a great extent. This study demonstrated that much time is dedicated to searching for information,

and perhaps this could be done in a more efficient manner. The acquisition of these research skills is vital to a student in his/her professional life beyond the translation class and is worth developing to the greatest extent possible.

Enríquez Raído (2011a) suggested forging a closer relationship between teachers of information literacy and those in charge of teaching specialized translation courses. She suggested that, in addition to offering core and optional courses on information skills, institutions could integrate these skills in specialized translation courses. She emphasized that an approach like this one could compensate for course availability and time restrictions in programs of shorter duration. There could be different ways of bringing this idea into the classroom: inviting information literacy teachers/professionals, scheduling hands on sessions (at the library) during class-time facilitated by library staff, incorporating more information literacy skills to regular in-class translation activities, or creating an online module (with the assistance of the library staff) that students could take and later apply in class or report on it.

Besides proving to be a very good and unobtrusive research instrument, screen recordings, together with TAPs proved to be of pedagogical value to the researcher by pointing out that some concepts that were taught throughout the Translation Certificate Program had not yet been fully comprehended by the students. For instance, students continued to struggle with an understanding of the passive voice and its usage in English and Spanish, as in (3).

- (3) El ejercicio ayuda a mantener el cuerpo fuerte y flexible [Reads translation aloud] “Is it passive voice? Let's see the difference. Conjugation, let's see if this one helps... Ayudan, ayudamos, ayudar, ayudar, hube ayudado, habré ayudado, habíamos ayudado, habían... No that's not it. Habría ayudado, ayuden Imperative, ayuda, ayuden, ayude, ayudaré, ayudares, ayudaré, ayudaremos, ayuden, ayudará, ayudará. Oh my god, I think I'm getting lost here, let's see....” (Monica)

In this episode, Monica was trying to determine whether the sentence “*El ejercicio ayuda a mantener el cuerpo fuerte y flexible*” was passive by finding the passive voice conjugation of the verb “ayudar.” Monica faced the same challenge again with the verb “poder” in the sentence “Algunos medicamentos recomendados por su médico pueden aliviar el dolor.” Perhaps if the instructor had been aware of her struggle, the passive voice could have been reviewed in class or individually.

When asked if and how the TAP had been beneficial, all the students responded that it had helped to make them: a) think of the translation process as just as important as the final product (the translated text); b) think of translators as thinkers and problem solvers; c) be aware of their problem-solving strategies; and d) be aware that good translations are the fruit of careful analysis and deliberation. Taking a step further, students would do a screen recording (with video and audio) of the translation process and then watch said process on screen, and report on their findings in class (verbally) or write a brief reflection about it.

What is proposed here is not that students capture a screen recording for each translation assignment, which may overwhelm the student as well as the instructor. Instead, a screen recording could be assigned as an in-class activity or homework; the students could carry out the assignment individually, in pairs or small groups. These screen recordings could be a way of employing computer technology to assist translation instructors in their teaching goals.

In closing, it is hoped that the findings of this study will provide a basis from which to continue the analysis of students' Web information search needs and habits, and, in turn, enhance their documentation skills. Possibly, the insights of this investigation could be of benefit to the training of translators.

Limitations and Future Research

It is important to recognize that there are a number of limitations associated with this study. The first limitation concerns the small number of participants. For this reason, the results should be interpreted in relation to the specific context and sample. Future research could include more students, both female and male, similar in as many aspects as possible (first language, professional background, etc.) to limit the possible effects of individual variance.

A second limitation was that no interviews with the subjects were conducted. Conducting a post-assignment interview with the subjects could have clarified some characteristics in their behavior and some of their choices.

A third limitation is the direction of translation. In this sense, future studies could include translation tasks in both directions (English to Spanish and Spanish to English) in order to analyze whether directionality influences participants' behavior. Previous research (Pavlovic, 2007) has found that subjects depend to a greater extent on external resources when translating into L2 than when translating into L1.

The fourth limitation is that the second text was modified to prepare it for translation into Spanish, while the first one was not; this makes it difficult to compare them.

The fifth limitation relates to the duration of the study. Future research could examine the development of translation competence of the same individuals at other stages of their training (over the course of more than one semester).

In conclusion, additional studies should be conducted to investigate whether training in documentation skills does indeed, produce more effective translations. Much is left to be understood about how translation competence is acquired and how it can be measured and fostered. It is imperative then that theoretically-grounded empirical studies be carried out to answer these questions.

References

- Adab, B. (2000). Evaluating Translation Competence. In C. Schäffner & B. Adab (Eds.), *Developing translation competence* (pp. 215-228). Amsterdam: John Benjamins.
- Alcina Caudet, M.A., Soler Puertes, V., & Estellés Palanca, A. (2005). Internet como instrumento para la documentación en terminología y traducción. Hacia las plataformas de recursos electrónicos para el traductor especializado. In D. Sales Salvador (Ed.), *La biblioteca de Babel: Documentarse para traducir* (pp. 221-241). Granada: COMARES.
- American Library Association (ALA) (2000). *Information literacy competency standards for higher education*. Retrieved from:
<http://www.ala.org/acrl/sites/ala.org.acrl/files/content/standards/standards.pdf>
- Atkins, B. T. S., & Varantola, K. (1998). Monitoring dictionary use. In B. T. S. Atkins (Ed.), *Using dictionaries: Studies of dictionary use by language learners and translators* (pp. 83-122). Tübingen: Max Niemeyer.
- Aula, A., Jhaveri, N., & Käki, M. (2005). Information search and re-access strategies of experienced web users. In *WWW 2005 proceedings of the 14th international conference on world wide web* (pp. 583-592). New York: ACM Press.
- Batelle, J. (2006). *The search*. London and Boston: Nicholas Brealey.
- Bernardini, S. (2001). Think-aloud protocols in translation research: Achievements, limits, future prospects. *Target*, 13(2), 241-263.
- Colina, S. (2003). Towards an empirically-based translation pedagogy. In B. J. Baer & G. S. Koby (Eds.), *Beyond the ivory tower: Rethinking translation pedagogy* (pp. 29-59). Amsterdam: John Benjamins.
- Colina, S. (2009). Further evidence for a functionalist approach to translation quality evaluation. *Target*, 21(2), 235-264.
- Colina, S. (2015). *Fundamentals of translation*. Cambridge, United Kingdom: Cambridge University Press.
- Dancette, J. (1997). Mapping meaning and comprehension in translation: Theoretical and experimental issues. In J. H., Danks, G. M. Shreve, S. B. Fountain & M. K. McBeath (Eds.), *Cognitive processes in translation and interpreting* (pp. 77-103). Thousand Oaks, CA: SAGE.
- Ehrensberger-Dow, M., & Perrin, D. (2009). Capturing translation processes to access metalinguistic awareness. *Across Languages and Cultures*, 10(2), 275-288.

- Enríquez Raído, V. (2011a). Developing web searching skills in translator training. *Redit*, 6, 57-77.
- Enríquez Raído, V. (2011b). *Investigating the web search behaviors of translation students: An exploratory and multiple-case study* (Unpublished doctoral dissertation). Universitat Ramon Llull, Barcelona, Spain. Retrieved from http://www.tesisenred.net/bitstream/handle/10803/21793/Enriquez_PhD_Thesis_Final.pdf?sequence=1
- Enríquez Raído, V. (2014). *Translation and web searching*. New York: Routledge.
- Freed, B. F., Dewey, D. P., Segalowitz, N., & Halter, R. (2004). The language contact profile. *Studies in Second Language Acquisition*, 26(2), 349-356.
- Gerloff, P. (1986). Second language learners' reports on the interpretative process. In J. House & S. Blum-Kulka (Eds.), *Interlingual and intercultural communication: Discourse and cognition in translation and second language acquisition studies* (pp. 243-262). Tübingen: Gunter Narr.
- Gerloff, P. A. (1988). From French to English: A look inside the translation process in students, bilingual, and professional translators (Unpublished doctoral dissertation). Harvard University, Cambridge, MA.
- Göpferich, S. (2009). Towards a model of translation competence and its acquisition: The longitudinal study TransComp. In S. Göpferich, A. L. Jakobsen & I. M. Mees (Eds.), *Behind the mind: Methods, models and results in translation process research* (pp. 11-37). Copenhagen Studies in Language 37. Copenhagen: Samfundslitteratur.
- Göpferich, S. (2010). The translation of instructive texts from a cognitive perspective: novices and professionals compared. In S. Göpferich, F., Alves & I. M. Mees (Eds.), *New approaches in translation process research* (pp. 5-56). Copenhagen Studies in Language 39. Copenhagen: Samfundslitteratur.
- Göpferich, S., Bayer-Hohenwarter, G., Prassl, F., & Stadlober, J. (2011). Exploring translation competence acquisition: Criteria of analysis put to the test. In S. O'Brien (Ed.), *Cognitive explorations of translation* (pp. 30-56). London, NY: Continuum.
- Göpferich, S., & Jääskeläinen, R. (2009). Process research into the development of translation competence: where are we, and where do we need to go? *Across Languages and Cultures*, 10(2), 169-191.
- Hargittai, E. (2004). Classifying and coding online actions. *Social Science Computer Review*, 22(2), 210-226.

- Hansen, G. (2010). Integrative description of translation process. In G. M. Shreve & E. Angelone (Eds.), *Translation and cognition* (pp. 213-227). Amsterdam, Philadelphia: John Benjamins.
- House, J. (2000). Consciousness and the strategic use of aids in translation. In S. Tirkkonen-Condit & R. Jääskeläinen (Eds.), *Tapping and mapping the process of translation and interpreting: Outlooks on empirical research* (pp. 149-162). Amsterdam: John Benjamins.
- Information Today, Inc. (n.d.). Definition of information need. Retrieved from <http://books.infotoday.com/asist/Information-Need/SampleChapter.pdf>
- Jääskeläinen, R. (1989). The role of reference material in professional vs. non-professional translation: A think-aloud protocol study. In S. Tirkkonen-Condit & S. Condit (Eds.), *Empirical studies in translation and linguistics* (pp. 175-200). Joensuu: University of Joensuu.
- Jääskeläinen, R. (1990). Features of successful translation processes: A think-aloud protocol study (Unpublished licentiate thesis). School of Translation Studies, University of Joensuu, Finland.
- Jääskeläinen, R. (2010). Are all professionals experts? Definitions of expertise and reinterpretation of research evidence in process studies. In G. M. Shreve & E. Angelone (Eds.), *Translation and cognition* (pp. 213-227). Amsterdam, Philadelphia: John Benjamins.
- Jääskeläinen, R. (2011). Back to basics: Designing a study to determine the validity and reliability of verbal report data on translation processes. In S. O'Brien (Ed.), *Cognitive explorations of translation* (pp. 15-29). London, NY: Continuum.
- Jakobsen, A. (2003). Effects of think aloud on translation speed, revision, and segmentation. In F. Alves (Ed.), *Triangulating translation: Perspectives in process-oriented research* (pp. 11-37). Amsterdam, Philadelphia: John Benjamins.
- Jansen, B. J., Booth, D. L., & Spink, A. (2008). Determining the informational, navigational, and transactional intent of web queries. *Information Processing and Management*, 44(3), 1251-1266.
- Jansen, B. J., Spink, A., Blakely, C., & Koshman, S. (2007). Defining a session on web search engines. *Journal of the American Society for Information Science and Technology*, 58(6), 862-871.

- Jansen, B. J., Spink, A., & Saracevic, T. (2000). Real life, real users, and real needs: A study and analysis of user queries on the Web. *Information Processing and Management*, 36(2), 207-227.
- Jensen, A. (1999). Time pressure in translation. In G. Hansen (Ed.), *Probing the process in translation: Methods and results* (pp. 103-120). Copenhagen Studies in Language 24. Copenhagen: Samfundslitteratur.
- Kelly, D. A. (2002). Un modelo de competencia traductora: Bases para el desarrollo curricular. *Puentes: Hacia nuevas investigaciones en la medicación intercultural*, 1, 9-20.
- Kiraly, D. C. (2003). From instruction to collaborative construction: A passing fad or the promise of a paradigm shift in translator education? In B. J. Baer & G. S. Koby (Eds.), *Beyond the ivory tower: Rethinking translation pedagogy* (pp. 3-27). Amsterdam, Philadelphia: John Benjamins Publishing Company.
- Kovačič, I. (1997). A thinking-aloud experiment in subtitling. In M. Snell-Hornby, Z., Jettmarová & K. Kaindl (Eds.), *Translation as intercultural communication* (pp. 229-238). Amsterdam, Philadelphia: John Benjamins.
- Lauffer, S. (2002). The translation process: An analysis of observational methodology. *Cadernos de Tradução*, 2(10), 59-74.
- Livbjerg, I., & Mees, I. M. (1999). A study of the use of dictionaries in Danish-English translation. In G. Hansen (Ed.), *Probing the process in translation: Methods and results* (pp. 135-149). Copenhagen Studies in Language 24. Copenhagen: Samfundslitteratur.
- Livbjerg, I., & Mees, I. M. (2003). Patterns of dictionary use in non-domain-specific translation. In F. Alves (Ed.), *Triangulating translation: Perspectives in process-oriented research* (pp. 123-136). Amsterdam, Philadelphia: John Benjamins.
- Luukkainen, T. (1996). *Comparisons of translations made with and without reference material: A think-aloud protocol study* (Unpublished MA thesis). University of Joensuu, Finland.
- Mckintosh, K. (1998). An empirical study of dictionary use in L2-L1 translation. In B. T. S. Atkins (Ed.), *Using dictionaries: Studies of dictionary use by language learners and translators* (pp. 123-149). Tübingen: Max Niemeyer.
- Martínez, M. T. (2013). *Medical translation* [Syllabus]. Phoenix, AZ: School of International Letters and Cultures, Arizona State University.

- Massey, G. (2005). Process-oriented translator training and the challenge for e-learning. *Meta*, 50(2), 626-633.
- Massey, G., & Ehrensberger-Dow, M. (2010). Investigating demands on language professionals: Methodological challenges in exploring translation competence. *Bulletin suisse de linguistique appliquée*, 1: 127-141.
- Massey, G., & Ehrensberger-Dow, M. (2011). Investigating information literacy: A growing priority in translation studies. *Across Languages and Cultures*, 10(2), 193-211.
- Massey, G., Riediger, H., & Lenz, S. (2008). Teaching instrumental competence in an e-learning environment: A Swiss perspective. In R. Dimitriu & K.-H. Freigang (Eds.), *Translation technology in translation classes* (pp.175-183). Iasi: Institutul European.
- Mackey, A., & Gass, S. (2005). *Second language research: Methodology and design*. Mahwah, NJ: Lawrence Erlbaum.
- Newark, P. P. (1981). *Approaches to translation*. Oxford: Pergamon Press.
- Nord, B. (2009). In the year 1 BG (before Google); Revisiting a 1997 study concerning the use of translation aids. In G. Wotjak (Ed.), *Translatione via facienda. Festschrift für Christiana Nord zum 65* (pp. 203-217). Frankfurt am Main: Peter Lang.
- Orozco, M., & Hurtado Albir, A. (2002). Measuring translation competence acquisition. *Meta*, 47(3), 375-402.
- PACTE (2003). Building a translation competence model. In F. Alves (Ed.), *Triangulating translation: Perspectives in process-oriented research* (pp. 43-66). Amsterdam, Philadelphia: John Benjamins.
- PACTE (2005). Investigating translation competence: Conceptual and methodological issues. *Meta*, 50(2), 609-619.
- PACTE (2008). First results of a translation competence experiment: Knowledge of translation and efficacy of the translation process. In J. Kearns (Ed.), *Translator and interpreter training. Issues, methods and debates* (pp. 104-126). London, NY: Continuum.
- PACTE (2011). Results of the validation of the PACTE Translation Competence Model: Translation project and dynamic translation index. In S. O'Brien (Ed.), *Cognitive explorations of translation* (pp. 30-56). London, NY: Continuum.

- PACTE (2014). First results of PACTE Group's experimental research on translation competence acquisition: The acquisition of declarative knowledge of translation. *MonTI, Minding Translation, Special Issue 1*, 85-115.
- Palomares Perraut, R., & Pinto Molina, M. (2000). Aproximación a las necesidades, hábitos, y usos documentales del traductor. *Terminologie et Traduction*, 3, 98-124.
- Pavlovic, N. (2007) Directionality features in collaborative translation processes: A study of novice translators (Unpublished doctoral dissertation). Universitat Rovira i Virgili, Tarragona.
- Pinto, M., & Sales, D. (2007). A research case study for user-centered information literacy instruction: Information behaviour of translation trainees. *Journal of Information Science*, 33(5), 531-550.
- Pinto, M., & Sales, D. (2008). INFOLITRANS: A model for the development of information competence for translators. *Journal of Documentation*, 64(3), 413-437.
- Pinto, M., & Sales, D. (2008) Towards user-centered information literacy instruction in translation. The view of trainers. *The Interpreter and Translator Trainer*, 2(1), 47-74.
- Prassl, F. (2010). Translators' decision-making processes in research and knowledge integration. In S. Göpferich, F., Alves & I. M., Mees (Eds.), *New approaches in translation process research* (pp. 57-81). Copenhagen Studies in Language 39. Copenhagen: Samfundslitteratur.
- Pym, A. (2009). Using process studies in translator training: Self-discovery through lousy experiments. In I. M., Mees, F., Alves & S. Göpferich (Eds.), *Methodology, technology and innovation in translation process research. A tribute to Arnt Lykke Jacobsen* (pp. 135-155). Copenhagen Studies in Language 38. Copenhagen: Samfundslitteratur.
- Ronowics, E., Hehir, J., Kaimi, T., Kojima, K., & Lee, D. S. (2005). Translators frequent lexis store and dictionary use as factors in SLT comprehension and translation speed—A comparative study of professional, paraprofessional and novice translators. *Meta*, 50(2), 580-596.
- Sales, D. (2008). Towards a student-centered approach to information literacy learning: A focus group study on the information behaviour of translation and interpreting students. *Journal of Information Literacy*, 2(1), 41-60.

- Sales, D., & Pinto, M. (2011). The professional translator and information literacy: Perceptions and needs. *Journal of Librarianship and Information Science*, 43(4), 246-260.
- Séguinot, C. (2000). Management issues in the translation process. In S. Tirkkonen-Condit & R. Jääskeläinen (Eds.), *Tapping and mapping the processes of translation and interpreting: Outlooks on empirical research* (pp. 143-148). Amsterdam: John Benjamins Publishing Company.
- Seliger, H. W., & Shohamy, E. (1989). *Second language research methods*. Oxford: Oxford University Press.
- Sirén, S., & Hakkarainen, K. (2002). Expertise in translation. *Across Languages and Cultures*, 3(1), 71-82.
- Snell-Hornby, M. (1995). *Translation studies: An integrated approach* (Revised edition). Amsterdam, Philadelphia: John Benjamins Publishing Company.
- Varantola, K. (1998). Translators and their use of dictionaries: User needs and user habits. In B. T. S. Atkins (Ed.), *Using dictionaries: Studies of dictionary use by language learners and translators* (pp. 123-149). Tübingen: Max Niemeyer.
- Wakabayashi, J. (2003). Think-alouds as a pedagogical tool. In B. J. Baer & G. S. Koby (Eds.), *Beyond the ivory tower: Rethinking translation pedagogy* (pp. 61-82). Amsterdam, Philadelphia: John Benjamins Publishing Company.
- White, M. D., & Iivonen, M. (2001). Questions as a factor in web search strategy. *Information Processing and Management*, 37(5), 721-740.
- White, M. D., Matteson, M., & Abels, E. G. (2008). Beyond dictionaries: Understanding information behavior of professional translators. *Journal of Documentation*, 64(4), 576-601.
- Wilson, T. D. (1999). Models in information behavior research. *Journal of Documentation*, 55(3), 249-270.

APPENDIX A
TRANSLATION TASK 1

Top 12 Pain Management Tools

Consequences of Pain

Pain can affect people in a number of different ways. Aspects of life which can be altered and changed as a result of pain include:

- Social interaction
- Emotional reactions
- Physical body
- Current job
- Psychological conditions

In order to prevent and reduce the effects of pain on these areas of life, management of pain through pain treatment is necessary. As a means of avoiding inadequate pain treatment, many will seek out pain rehab at a pain treatment center.

12 Ways to Manage Pain

Exercise – This can help to increase overall strength and flexibility. Swimming and walking are two beneficial types of exercise, which may decrease pain.

Take medication – Specific types of doctor-recommended medication may be helpful in reducing pain. Non-aspirin pain relievers, anti-inflammatory drugs, anti-depressants, and opioid medications are among the drug types used.

Use specialized equipment at home – For some people with chronic pain, simply walking around the house is a hassle. The use of assistive devices such as crutches, splints, and elevated toilet seats can help to alleviate many of the problems which arise due to pain, allowing individuals to be more mobile in their own home.

APPENDIX B
TRANSLATION TASK 2

Draw the Line

Alcoholic drinks may be part of family celebrations and traditions in your home, but new research shows they can harm young people under age 21. Alcoholic beverages can irreversibly damage a child's developing brain—making it harder for them to learn in school, harder to remember information, and more susceptible to alcoholism or drug addiction.

Because the brain is still developing until age 20, it is more important than ever that all parents and adults understand why youth must not drink until they are age 21. In Arizona, it is prohibited to serve hard liquor, beer or wine to anyone under age 21—even in your own home. But our youth are trying to drink anyway, so adults need to help them understand why it's important to wait.

Enabling kids to drink hurts their health, can program them for addiction, and it's against the law.

Governor Janet Napolitano and the Arizona Underage Drinking Prevention Committee have launched a public awareness campaign to help you understand:

- How alcohol harms a young person's developing brain
- That families have more influence than they think when it comes to convincing kids they should wait
- That underage drinking is not culturally accepted in the United States and can lead to legal problems

APPENDIX C
INITIAL QUESTIONNAIRE

Initial Questionnaire

The responses that you give in this questionnaire will be kept confidential.

Thank you for your cooperation. Your honest and detailed responses will be greatly appreciated.

1. Gender: Male Female

2. Age: _____

3. Country of birth: _____

4. What is your native language? English Spanish Other _____

5. What language did you speak at home as a child? English Spanish Other _____

6. What languages do you speak at home? English Spanish Other _____

Comments: _____

7. In what languages did you receive the majority of your *precollege* education?

English Spanish Other _____

Comments: _____

8. What year are you in school?

Freshman Sophomore Junior Senior Graduate Student Other _____

9. What is your major? _____

10. Do you work in any of these fields?

Business Legal Medical Technical/Scientific Other I don't work

11. Have you worked as a translator? Yes No If yes, for how long? _____

Field of specialization: Generalist translator Business Legal Medical

Technical Other _____

12. Do you earn a living by translating? Yes No

13. Have you received any formal training in translation? Yes No

For how long? _____ Where? _____

14. Which translation courses have you completed at Arizona State University?

Business Legal Medical Technical/Scientific Translation Theory

Other _____

APPENDIX D

QUESTIONNAIRE ON NOTIONS ABOUT TRANSLATION

Questionnaire on Notions about Translation

The responses that you give in this questionnaire will be kept confidential.

Thank you for your cooperation.

What is your opinion about the following statements?

(If you do not understand a question, please circle the part that you do not understand)

Definitions: target reader = audience of the translated text (who will read it)
target language = the language into which you are translating
target culture = the culture of the audience that speaks/uses the language of the text
target text = the translation you are creating

1. As you are reading the text you are going to translate, you are already thinking about how to translate it.
 I strongly disagree I disagree I agree I strongly agree
2. Since words don't always have the same shade of meaning in different languages, something is always lost in translation.
 I strongly disagree I disagree I agree I strongly agree
3. It is the client who decides how the translator has to translate a text.
 I strongly disagree I disagree I agree I strongly agree
4. The aim of every translation is to produce a text as close in form to the original as possible.
 I strongly disagree I disagree I agree I strongly agree
5. Most translation problems can be solved with the help of a good dictionary.
 I strongly disagree I disagree I agree I strongly agree
6. The most important thing when translating is to think of the target reader.
 I strongly disagree I disagree I agree I strongly agree
7. To be able to understand a text you must find out what the words mean.
 I strongly disagree I disagree I agree I strongly agree
8. If the original text is very different from the same type of text in the target language (e.g., instruction manuals, commercial letters, etc.) you should adapt the translated text to the requirements of the target culture.
 I strongly disagree I disagree I agree I strongly agree
9. Since you can't know the meaning of all the words in a text, a bilingual dictionary is the best solution.
 I strongly disagree I disagree I agree I strongly agree
10. A text should be translated in different ways depending on who the target reader is.
 I strongly disagree I disagree I agree I strongly agree
11. All translated text should keep the same paragraphs and divisions in the target text as in the original.
 I strongly disagree I disagree I agree I strongly agree

12. The main difficulty when translating a text is to find typical expressions in the target language.
- I strongly disagree I disagree I agree I strongly agree
13. To be able to translate well, you should concentrate on the vocabulary and the syntax (word order in a sentence) of the original and reproduce them in the target text.
- I strongly disagree I disagree I agree I strongly agree
14. When translating a specialized text, terminology is not the biggest problem.
- I strongly disagree I disagree I agree I strongly agree
15. The best way to translate a text is to translate word-for-word, except in the case of proverbs, set phrases and metaphors.
- I strongly disagree I disagree I agree I strongly agree
16. As soon as you find a word or expression you don't know the meaning of, you should look it up straightaway in a bilingual dictionary.
- I strongly disagree I disagree I agree I strongly agree
17. When translating, one of the most difficult problems to solve is that of cultural references (e.g., institutions, traditional dishes, etc.).
- I strongly disagree I disagree I agree I strongly agree
18. When you translate, you translate first one sentence, then the next, and so on until you come to the end of the text.
- I strongly disagree I disagree I agree I strongly agree
19. When you translate, you should be aware of the norms and conventions of the target text language.
- I strongly disagree I disagree I agree I strongly agree
20. It is not enough to know two languages to be able to translate well.
- I strongly disagree I disagree I agree I strongly agree
21. The most important thing when translating a text is to make sure that the target readers react in the same way to the target text as do the readers of the original text.
- I strongly disagree I disagree I agree I strongly agree
22. When you find a cultural reference in a text (e.g., a traditional dish) you should look for an equivalent in the target culture.
- I strongly disagree I disagree I agree I strongly agree
23. If you begin to translate a text using certain criteria (e.g., respecting the format of the original text, adapting the text to target reader, etc.) these should be kept throughout the text.
- I strongly disagree I disagree I agree I strongly agree
24. When you translate a text, you should not be influenced by the target reader.
- I strongly disagree I disagree I agree I strongly agree
25. The best way to translate a text is sentence by sentence (line by line).
- I strongly disagree I disagree I agree I strongly agree

26. The problems you find when translating a text are the same no matter what kind of text you are translating.

I strongly disagree I disagree I agree I strongly agree

27. If you find a word in a text that you don't understand, you should try to work out the meaning from the context.

I strongly disagree I disagree I agree I strongly agree

APPENDIX E

QUESTIONNAIRE ABOUT THE THINK-ALLOUD PROTOCOL

Questionnaire about the Think-aloud Protocol

The responses that you give in this questionnaire will be kept confidential.

Thank you for your cooperation. Your honest and detailed responses will be greatly appreciated.

Answer the following questions about the Think-Aloud Protocol you just completed.

1. How would you rate your *ability* to verbalize during the translation process? Circle the number you think is most appropriate (“0” is “it was very easy” and “10” is “it was very difficult”).

It was very easy 0 1 2 3 4 5 6 7 8 9 10 It was
very difficult

2. What were the factors that contributed to making it easy or difficult to verbalize?

(Clear/unclear instructions, personal communication skills, disposition to verbalize, emotions, confidence, experience, extrovert personality, individual characteristics, insecurity, nervousness, new learning experience, shyness, time, technology, etc.)

3. How diligent were you with the task? Circle the number you think is most appropriate (“0” is not involved at all and “10” is very involved).

Not very diligent 0 1 2 3 4 5 6 7 8 9 10 Very diligent

4. How much did the Think-Aloud Protocol interfere with the translation process? Circle the number you think is most appropriate (“0” is it did not interfere all and “10” is interfered a lot).

Not at all 0 1 2 3 4 5 6 7 8 9 10 A whole lot

5. How did the Think-Aloud Protocol help you (check all that apply)?

To think of the translation process as just as important as the final product (the translated text).

To think of translators as thinkers and problem solvers.

To be aware of your problem-solving strategies.

Revealed that good translations are the fruit of careful analysis and deliberation.

Other _____

It did not help me at all.

APPENDIX F

QUESTIONNAIRE ABOUT THE TRANSLATED TEXT

Questionnaire about the Translated Text

The responses that you give in this questionnaire will be kept confidential.

Thank you for your cooperation. Your honest and detailed responses will be greatly appreciated.

Answer the following questions about the text you have just translated.

(If you do not have enough space below each question, copy the number of the question on a piece of paper and write the answer there. You can consult the original text and your translation.)

1. What is the function or the purpose of the text you translated?

2. Can you tell from the formal conventions which genre the text belongs to? (For example, recipe, instructions, letter to editor, etc.)

3. Did you identify the main idea of the text before you began to translate? Yes No

4. Did you read the whole text through before you started to translate? Yes No

5. How difficult do you think this text is to translate? Circle the number you think is most appropriate (“0” is very easy and “10” is very difficult).

Very easy 0 1 2 3 4 5 6 7 8 9 10 Very difficult

6. What are the general characteristics of the text that make you think the text is easy or difficult to translate?

7. How familiar were you with the topic of the text? Circle the number you think is most appropriate (“0” is not familiar at all and “10” is very familiar with the subject).

Not at all 0 1 2 3 4 5 6 7 8 9 10 Very familiar

8. What were your priorities when translating the text? (e.g., understanding the original text, looking for equivalent words in the dictionary, maintaining or changing the word order in a sentence, translating word by word/sentence by sentence/paragraphs, transferring the meaning of the original text, adding words or sentences, paying attention to the purpose of the text, keeping the same paragraphs and divisions in the target text as in the original).

9. What were the main problems you found when translating this text? Name 5 and answer the following questions about each.

<p>Problem 1: (Specify the fragment that caused the problem.)</p>	Why was it a problem?
	What were your priorities when solving it?
	Explain as clearly as possible what you did to solve it.
	Are you satisfied with the solution? <input type="checkbox"/> Yes <input type="checkbox"/> No
	Why?

<p>Problem 2: (Specify the fragment that caused the problem.)</p>	Why was it a problem?
	What were your priorities when solving it?
	Explain as clearly as possible what you did to solve it.
	Are you satisfied with the solution? <input type="checkbox"/> Yes <input type="checkbox"/> No
	Why?

Problem 3: (Specify the fragment that caused the problem.)	Why was it a problem?
	What were your priorities when solving it?
	Explain as clearly as possible what you did to solve it.
	Are you satisfied with the solution? <input type="checkbox"/> Yes <input type="checkbox"/> No
	Why?

Problem 4: (Specify the fragment that caused the problem.)	Why was it a problem?
	What were your priorities when solving it?
	Explain as clearly as possible what you did to solve it.
	Are you satisfied with the solution? <input type="checkbox"/> Yes <input type="checkbox"/> No
	Why?

Problem 5: (Specify the fragment that caused the problem.)	Why was it a problem?
	What were your priorities when solving it?
	Explain as clearly as possible what you did to solve it.
	Are you satisfied with the solution? <input type="checkbox"/> Yes <input type="checkbox"/> No
	Why?

10. Did you read your translation over before considering it finalized? Yes No

How many times? _____ How many changes did you make? _____

APPENDIX G
QUESTIONNAIRE ABOUT RESOURCES

Questionnaire about Resources

The responses that you give in this questionnaire will be kept confidential.

Thank you for your cooperation. Your honest and detailed responses will be greatly appreciated.

1. Which instruments do you think can help a translator translate?

2. If you find an English expression that you do not understand in a text, what do you do first?
Please order the following options, putting 1 by the one you would choose first and a 3 by the one you would choose last.

- Consult a bilingual dictionary _____
Try to understand the meaning of the word from the context _____
Consult a monolingual English dictionary _____
Other (please specify) _____
-

3. If you find an English expression that you understand, but for which you think your translation does not express the meaning clearly enough, what do you do first to find an adequate “equivalent”? Please order the following options, putting a 1 by the one you would choose first and a 3 by the one you would choose last.

- Consult a bilingual dictionary _____
Try to express the same idea in as many ways as possible _____
Consult a monolingual Spanish dictionary _____
Other (please specify) _____
-

4. How often do you use paper dictionaries when translating?

- Never Occasionally Frequently Always

5. How often do you use electronic dictionaries when translating?

- Never Occasionally Frequently Always

6. What electronic resources do you use when translating?

7. How often do you use the Internet?

- Never Occasionally Frequently Daily

8. Have you ever learned how to perform Web searches and/or use certain Web resources by yourself? Yes No

If yes, please explain briefly what you have done:
