Alma Mater Studiorum Università di Bologna
Archivio istituzionale della ricerca

Using electronic information resources to solve cultural translation problems: Differences between students and professional translators

(Article begins on next page)

03 May 2024

**Using electronic information resources to solve cultural translation problems.
Differences between students and professional translators**

Christian Olalla-Soler
Department of Translation and Interpretation and East Asian Studies,
Universitat Autònoma de Barcelona, Barcelona, Spain

Abstract

Purpose. This study investigates the use of electronic information resources to solve cultural translation problems at different stages of acquisition of the translator's cultural competence.

Design/methodology/approach. A process and product-oriented, cross-sectional, quasi-experimental study was conducted with 38 students with German as a second foreign language from the four years of the Bachelor's degree in Translation and Interpreting at Universitat Autònoma de Barcelona, and 10 professional translators.

Findings. Translation students use a wider variety of resources, perform more queries and spend more time on queries than translators when solving cultural translation problems. The students' information-seeking process is generally less efficient than that of the translators. Training has little impact on the students' use of electronic information resources for this specific purpose, since all students use them similarly regardless of the year they are in.

Research limitations/implications. The study has been conducted with a small sample and only one language pair from a single pedagogical context. The tendencies observed cannot be generalised to the whole population of translation students.

Practical implications. This paper has implications for translator training, as it encourages the development of efficient information-seeking processes for the resolution of cultural translation problems.

Originality/value. Unlike other studies, this paper focusses on a specific translation problem type. It provides information related to the students' information-seeking strategies for the resolution of cultural translation problems, which can be useful for translation training.

Keywords. Use of electronic information resources, quasi-experimental study, process-oriented research, cultural translation problems, acquisition of the translator's cultural competence, translation competence

Paper type. Research paper

1. Introduction

The aim of this paper is to present partial results of a quasi-experimental study on the acquisition of the translator's cultural competence in the case of German-Spanish translation. Specifically, we present the results regarding the use of electronic information resources to solve cultural translation problems at different stages of the acquisition of the translator's cultural competence. Cultural competence is defined as "the translator's capacity to mobilise and contrast his/her knowledge about the source culture and the target culture in relation to a cultural phenomenon perceived in the source text, in order to achieve an acceptable solution in the target text" (Olalla-Soler, 2017, p. 673).

Information literacy is defined as "the set of integrated abilities encompassing the reflective discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in communities of learning" (ACRL, 2016, p. 3). It has been considered an essential component of the translator's professional activity (Pinto and Sales, 2008; Massey and Ehrensberger-Dow, 2011)

and has been included in many models of translation competence (Nord, 1988; Hurtado Albir, 1996; Kelly, 2002; PACTE, 2003, 2017e; Shreve, 2006; Alves and Gonçalves, 2007; Katan, 2008; EMT, 2009; Göpferich, 2009). The emergence of online information has increased the available resources with which translators can seek information, it has made the information-seeking process more efficient (by using Boolean operators, querying specialised databases, etc.) and has almost left behind all use of paper-based information resources when translating (Massey and Ehrensberger-Dow, 2011; Hirci, 2013; Kuznik, 2017; Kuznik and Olalla-Soler, 2018).

Despite these recent developments, there is scarce research into the use of electronic information resources by translators (see section 2). Research into the acquisition of information-seeking skills of translation students is also sparse, and, in most cases, the available studies focus on information-seeking processes to solve translation problems in general. Given the high frequency in which translators must solve cultural translation problems and the importance of culture in the translation task (Gutiérrez-Bregón, 2016), it is remarkable that such a research gap exists in Translation Studies concerning the use of information resources and the acquisition of information-seeking skills to solve specific translation problems. Thus, it has become a necessity for translator trainers to investigate the use of information resources for specific purposes, as in the case of the resolution of cultural translation problems. As Sales, Pinto and Fernández-Ramos (2018) point out, translating requires a constant search for information. During the translation process, translators identify their information needs, define information-seeking strategies, select the most useful information resources, assess the results of their strategies, and apply the results to their translation process. These processes need to be trained in specific courses on information science applied to translation and in translation courses. Moreover, these processes are especially relevant when solving cultural translation problems, which are defined as "source-text elements of a cultural nature that cause a translation difficulty during the translation process" (Olalla-Soler, 2017, p. 671). Translators often need to expand and complement their internal cultural knowledge (i.e. knowledge about the source and target cultures which has been acquired before a cultural translation problem has been identified and solved in order to make efficient decisions when translating). Given that cultural knowledge is inexhaustible (Witte, 2000), translators need to develop their information-seeking skills to translate. This is also applicable to specialised translation, where information literacy plays a paramount role (Galán-Mañas, 2011; Orozco and Sánchez-Gijón, 2011) since translators may have to translate terms from specific areas of specialisation with which they may not be familiar.

This paper is intended to complement and expand the existing research on the acquisition of information-seeking skills in translator training by focusing on cultural translation problems. To this end, three research questions were posed:

Do translators and translation students differ in the way they use electronic information resources to solve cultural translation problems?

How does the use of electronic information resources to solve cultural translation problems change with the acquisition of the translator's cultural competence?

How does the use of electronic information resources to solve cultural translation problems relate to the quality of translation solutions?

Within a study on the acquisition of the translator's cultural competence (Olalla-Soler, 2017), a process and product-oriented, cross-sectional, quasi-experimental study was conducted with 38 students with German as a second foreign language from the Bachelor's degree in Translation and Interpreting at Universitat Autònoma de Barcelona (UAB), and 10 professional translators. In this paper, the results of one of the nine dependent variables of the study are presented: the use of instrumental resources for the acquisition of cultural knowledge, which is defined by Olalla-Soler (2017) as "the information-seeking strategies

used when consulting electronic resources for the acquisition of cultural knowledge during the translation of a text". The remaining eight variables focused on other aspects of the acquisition of the translator's cultural competence [1].

This article is structured as follows: the conceptual framework is firstly discussed. This section is divided into four parts: information literacy of translators, the use of information resources by professional translators, the use of information resources in the translation competence acquisition process, and the use of information resources for the resolution of cultural translation problems. Secondly, the design of the quasi-experimental study is presented. Information about the research questions, the participants, the variables and indicators under study, the data-collection tools, the data-analysis procedure, and the ethical issues that had to be addressed is presented. Thirdly, the results of the indicators under study are reported. Fourth, the results are discussed and linked to other investigations. Finally, the most relevant conclusions are presented and the limitations of the study are discussed.

2. Theoretical framework

2.1. Information literacy of translators

Since the concept of information literacy was coined (Zurkowski, 1974) many definitions have been proposed. One of the most recent and widely used definitions is the one proposed by the Association of College and Research Libraries (ACRL) in 2016. The ACRL defines information literacy as "the set of integrated abilities encompassing the reflective discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in communities of learning" (ACRL, 2016, p. 3). ACRL's definition draws upon the concept of metaliteracy (Mackey and Jacobson, 2011) and, according to the ACRL's definition, an information-literate individual is not only able to discover information and use it to cover specific information needs, but he/she also plays an active role in creating new knowledge and engages in online communities to share this knowledge in an ethical and critical way. The ability to understand how information is produced and valued reflects the social and cultural nature of information literacy, as meaning, information practices and the concept of authority may differ from one community to another (Elmborg, 2006). Information literacy is considered the basis of lifelong learning (Ward, 2006), as this set of abilities is employed in both personal and professional situations throughout a person's life in order to make decisions and solve problems effectively, strategically and with a critical mind. Given that information practices and needs may differ from one community to the other, Maybee (2006) advocates that it is essential to investigate the practices and needs of specific communities (such as user communities, professions, etc.) so as to elaborate didactic proposals for the training of information literacy.

Information literacy is essential for professional translators. Since translation is a constant decision-making and problem-solving process (PACTE, 2017c), translators rely on knowledge to make decisions. Such knowledge can be internal (i.e. acquired before a particular translation problem is identified and solved) or acquired by searching for information. Translators are not simple code-switchers and therefore their information needs are not exclusively focused on language issues. Extra-linguistic knowledge (i.e. knowledge that is not related to language, such as cultural knowledge, general encyclopaedic knowledge, or knowledge related to the field of specialisation of a text being translated) is a major source of information needs for translators. Such knowledge cannot be acquired during the translators' training period exclusively. Therefore, information literacy is essential to their profession and it is the basis for their lifelong learning.

Almost every model of translation competence (TC), that is "the underlying system of knowledge, skills and attitudes needed to translate" (PACTE, 2017e, p. 294), includes

information literacy as a component: Nord (1988) (research competence), Hurtado Albir (1996) (professional competence), Kelly (2002) (professional instrumental sub-competence), Shreve (2006) (knowledge of translation), Alves and Gonçalves (2007) (instrumental sub-competence), Katan (2008) (professional/instrumental competence), EMT (2009) (information mining competence and technological competence), Göpferich (2009) (tools and research competence). The only TC model that has been empirically validated is that of the PACTE group (2017b), which includes instrumental sub-competence. It is defined as "predominantly procedural knowledge related to the use of documentation resources and information and communication technologies applied to translation" (PACTE, 2017e, p. 40). The model also includes bilingual sub-competence, extra-linguistic sub-competence, knowledge of translation sub-competence, strategic sub-competence, and psycho-physiological components. Strategic sub-competence is in charge of planning the translation process, of activating the different sub-competences to compensate for shortcomings in them, and of identifying translation problems and applying procedures to solve them (PACTE, 2017e, p. 40). When a shortcoming is detected in the bilingual or extra-linguistic sub-competences when solving a translation problem, strategic sub-competence activates instrumental sub-competence to engage information-seeking abilities to solve it. In fact, PACTE (2017b) found strategic, instrumental and knowledge of translation sub-competences to be specific to TC.

Despite the importance given to information literacy in TC models, only one model of information literacy of translators has been proposed so far: the INFOLITRANS model (Pinto and Sales, 2008). The model, which is based on Bruce (1997), includes various features and correlates each one of them with a competence and a set of skills. It also proposes a set of learning objectives for each level:

— The first level includes the knowledge facet (the distinction between data, information, and knowledge), cognitive competence (a competence based on acquiring the necessary knowledge to work as a translator in various situations that may arise in specific, workplace situations), and cognitive skills (a set of skills required to become familiar with the processes of generation, organisation and dissemination of information).

— The second level includes the technology facet (the use of information and communication technologies to seek, retrieve, and disseminate information in a way that improves the translation process efficiency), digital-informational competence (a competence based on processing, retrieving, evaluating and using information), and digital-informational skills (a set of skills required for using information in their work).

— The third level includes the resources facet (the efficient use of information sources), communicative competence (a competence based on knowing how to interact with others), and communicative skills (a set of skills required to be able to use all possible resources and to communicate adequately).

— The last dimension includes the processes facet (executing spiralling, strategic processes for processing, filtering and evaluating information), procedural competence (a competence based on the application of knowledge for professional purposes and situations), and strategic skills (a set of skills required to be able to define an information need, to communicate it to another person or to an information system, and to organise and plan information-seeking strategies).

All in all, according to Pinto and Sales (2008, p. 434), an information-literate translator should be able to: 1) understand the communicative process of translation and interaction in a professional setting; 2) understand the flows of information that take place in society; 3) determine the scope of the information that is required; being familiar with information

processing techniques to make the translation process more effective; 4) acquire organizational skills and incorporate the selected information into the translator's knowledge base; 5) evaluate information and its sources critically; 6) acquire skills in retrieval that are based on a proficient use of the information and communication technologies; 7) learn skills in designing electronic information systems to create databases; 8) acquire strategic skills based on knowledge of the translation commissioner and on an analysis of his/her information needs; and 9) use information ethically and legally in his/her problem-solving and decision making processes when translating.

In the study presented in this paper, the skills in information retrieval and the use of information and communication technologies to solve cultural translation problems will be investigated in the case of translation students from first to fourth year of the Bachelor's degree in Translation and Interpreting at Universitat Autònoma de Barcelona and in the case of professional translators.

2.2. The use of information resources by professional translators

In the case of the use of information resources by professional translators, the studies by Domas White, *et al*. (2008), Massey and Ehrensberger-Dow (2011), PACTE (Kuznik, 2017) and Tangsgaard Hvelplund (2017) are particularly noteworthy. Domas White, *et al*. (2008) produced a catalogue of resources that were frequently employed by professional translators. The resources were divided into primary (different types of general and specialised dictionaries) and secondary resources (special linguistic tools, annotated dictionaries, glossaries, repositories of translated items, journals, books, internet documents, encyclopaedias, etc.). Translators relied on information resources when their internal knowledge, acquired through education and experience, was not sufficient to carry out a specific translation task. Some years later, Massey and Ehrensberger-Dow (2011) found that Swiss translators employed similar resources. Specifically, the most frequently used resources were online ones (online search engines, online multilingual dictionaries, and online terminology databases), especially in the case of translators who were under 50 years old. Little variation in the type of resources used depending on the type of translation problems encountered was also observed.

PACTE compared the performance of a group of professional translators and a group of foreign language teachers (Kuznik, 2017). The translators used a greater variety of resources and performed more queries than the teachers, both in direct and in inverse translation. The translators spent more time seeking for information in direct translation than in inverse translation. The opposite trend was observed in the group of teachers. The most frequent queries performed by the translators were searches using keywords (for example, in search engines) and searches for equivalents (in bilingual dictionaries). In the case of the translators, a positive relationship was found between the translation quality and the variety of resources used, the number of queries performed, and the variety of queries used.

Tangsgaard Hvelplund (2017) analysed the use of digital resources during translation by 18 translators. Translators devoted 19.4 per cent of the total translation time to information-seeking, although the percentage varied according to the text type translated. Longer fixations and larger pupils were found during resource consultation than during translation drafting, which indicated heavier cognitive load during translation drafting. The most frequently resources used were (from greater to lesser usage): bilingual dictionaries, internet search engines, reference works and websites, monolingual dictionaries, and conversion tools. These results are in agreement with the resources identified by Domas White, et al. (2008) and Massey and Ehrensberger-Dow (2011). However, Tangsgaard Hvelplund (2017) also found that there was a considerable variation in the use of digital resources from one translator to the other, indicating that the choice of the resources consulted by translators is based on the specific deficiencies and needs of each translator.

2.3. The use of information resources in the translation competence acquisition process
The studies by Enríquez Raído (2011), Massey and Ehrensberger-Dow (2011), Hirci (2013), Kuznik and Olalla-Soler (2018), and Sales, Pinto, and Fernández-Ramos (2018) are particularly worth mentioning. Enríquez Raído (2011) investigated the web search behaviour of four postgraduate translation trainees in New Zealand. When translation trainees employed information resources to translate, the quality of their translations was higher than when they did not use them. However, the trainees' information-seeking processes were often highly repetitive (with frequent repeated visits to the same resources) and unplanned, as the students were not able to identify their information needs prior to formulating the first query.

In addition to the lack of planning of the students' information-seeking processes, Massey and Ehrensberger Dow (2011) observed in their study that students searched for information to solve an extra-linguistic problem in multilingual online dictionaries, while translator trainers used parallel texts and search engines, which provided more adequate information than bilingual dictionaries. In a study on the information behaviour of first-year translation students, Sales, Pinto, and Fernández-Ramos (2018) obtained similar results: they often did not select the most appropriate information sources in relation to their information need (such as contextualising the text they should translate and searching for specific information).

Many studies highlight the students' preference for the use of electronic or online resources. Massey and Ehrensberger Dow (2011) noted that translation students tended to use online resources more frequently than paper-based resources, while the difference in the case of professional translators was not so pronounced. Hirci (2013) compared the use of information resources by two groups of translation students from the years 2005 and 2012. The students in 2012 preferred employing online resources and felt that paper-based resources were not sufficient to translate, since their access was more restrictive and time consuming. Kuznik and Olalla Soler (2018) investigated the acquisition of instrumental sub-competence in five groups of students from the first year of the degree in Translation and Interpreting at UAB to their entry into the labour market and observed that the students from all the years preferred to employ online resources. In addition to that, the students formed a homogeneous collective, since a very small variation was recorded in relation to the variety of resources used. In all groups, more queries were carried out in direct translation than in inverse translation. No correlation was found between the translation quality and the variety of resources used, the number of queries performed, and the variety of queries used. This indicates a remarkable variation regarding the efficient use of information resources as translator training advances.

These findings indicate that: 1) translators and, specially, translation students use electronic resources more frequently than paper-based resources; 2) resource consultation implies a higher cognitive load than translation drafting; 3) there is a high variation in the use of information resources in the case of professional translators, since they select them depending on their needs and deficiencies, while students use information resources mostly in a homogeneous way; 4) translation students do not assess the results of their queries often, and this affects the quality of their solutions, and 5) on many occasions, translation students do not select the information resources depending on the translation problem type that they are solving, which results in a negative impact on translation quality.

2.4. The use of information resources for the resolution of cultural translation problems
Cultural translation problems are referred to as extra-linguistic problems and, sometimes, also as problems of intentionality (Nord, 1988; Hurtado Albir, 2001). Problems of intentionality are defined as "difficulties in grasping the source text information (intertextuality, speech acts, presuppositions, implicatures) (Hurtado Albir, 2017, p. 42). To solve cultural translation problems, the translator applies his/her own internal cultural knowledge and, if he/she does not have sufficient knowledge, he/she may use information-seeking strategies. Since cultural

knowledge is inexhaustible (Witte, 2000), mastering information-seeking strategies to fill gaps in cultural knowledge is a crucial component of the translator's cultural competence. However, no (inter)cultural competence model mentions the need to develop a specific information-seeking skill within this competence (Witte, 2000; Bahumaid, 2010; PICT, 2012; Yarosh, 2012). All models refer to the possession of cultural knowledge and its application when translating, but the translators' information needs related to this type of knowledge are not accounted for, which has a different nature to linguistic knowledge and requires specific information resources (Pinto and Sales, 2008; Massey and Ehrensberger-Dow, 2011).

Olalla-Soler's (2017) model of the translator's cultural competence includes a sub-competence linked to the ability to acquire cultural knowledge. It is defined as the ability to efficiently acquire, store, and recover knowledge related to the working cultures by means of the translator's internal (cognitive) resources and external resources (information resources). This model is made up of three other sub-competences: *cultural knowledge* (knowledge about the cultures involved in the act of translation), *culture-related contrastive skills* (contrastive strategies between the source and target cultures in relation to a cultural phenomenon) and *culture-related attitudinal components* (attitudes that favour understanding between cultures and help in the awareness of the influence of the own culture). The translator's cultural competence is linked to translation competence and the sub-competences of which it is composed (PACTE, 2017e).

Given the high frequency in which translators must solve cultural translation problems, culture is of paramount importance in the translation task (Gutiérrez-Bregón, 2016). However, a research gap concerning the use of information resources and the acquisition of information-seeking skills to solve specific translation problems exists in Translation Studies. Investigation on the use of information resources for specific purposes has become a necessity for translator training, as well as in the case of the resolution of cultural translation problems. In order to do so, the quasi-experimental study presented in the following section was conducted.

3. Research design

The design of the cross-sectional, quasi-experimental study was based on PACTE's (2014) translation competence acquisition experiment (TCA). Although acquisition processes should be investigated with longitudinal studies with repeated single-sample measurements, it was decided to use a cross-sectional design due to the methodological limitations of longitudinal studies when long periods of time and many repeated measurements are involved. These are: the excessive length of time for data collection, the possible high subject-abandonment rate, and the complexity of validating parallel data collection instruments. Although the results obtained do not strictly describe an acquisition process and their generalisation is not appropriate, several factors that influence the process of acquiring the translator's cultural competence have been controlled: the subject's age (minimum and maximum age ranges were established for each year), the pedagogical input received (the students that had not passed a previous course of German as a second foreign language or of translation from German into Spanish or Catalan were not selected), the completion of stays abroad (the students who had completed a stay abroad in a German-speaking country longer than a month were not selected), and the subject's professional experience (the students who had translated more than 50 pages professionally in the moment of participating in the study were not selected), among others. These factors were controlled by means of an initial questionnaire in which information of the samples of students and of translators was gathered. All the students that did not meet the pre-established criteria were not selected to participate in the study. In this way, it was intended to control the students' pedagogical context to facilitate the comparison between groups and, thus, be able to attribute the changes recorded to the effect of the acquisition of this competence.

3.1. Research questions

The following research questions about the use of electronic information resources to solve cultural translation problems in different stages of acquisition of the translator's cultural competence were addressed:

1. Do translators and translation students differ in the way they use electronic information resources to solve cultural translation problems?

2. How does the use of electronic information resources to solve cultural translation problems change with the acquisition of the translator's cultural competence?

3. How does the use of electronic information resources to solve cultural translation problems relate to the quality of translation solutions?

3.2. Participants

The population under study consisted of translation students with German as a second foreign language and Spanish as their mother tongue. A sample of students with German as a second foreign language and without experience as professional translators was selected from each of the four years of the Bachelor's degree in Translation and Interpreting at UAB. The sample of students comprised 38 subjects (Table 1). The students' performance was compared to that of ten translators with the German-Spanish language combination and a minimum of ten years' experience as professional translators. Translation was their main professional activity, since it provided at least 70 per cent of their income. Unlike the sample of students, the professional translators had already acquired translation competence and consequently cultural competence, and at that moment they were not receiving any kind of training.

3.2.1. Pedagogical context

In the Bachelor's degree in Translation and Interpreting at UAB, information-seeking strategies are taught in the compulsory course "Information Science Applied to Translation and Interpreting", which is offered in the second year. In this course, students learn to use information resources, to identify information needs, to plan their information-seeking processes, and to critically assess information resources and the outputs of their queries. More specific information resources are presented in the specialised translation courses.

3.3. Variables and indicators

The independent variable is the degree of cultural competence acquisition, understood as the year in which the sample students participating in the study were in: first year, second year, third year, and fourth year.

Nine dependent variables were defined for which 25 indicators had been designed. In this article, the results of the variable *use of instrumental resources for the acquisition of cultural*

Table 1. Main characteristics of the sample

	n	Age (median)	German (L3) level according to CEFR	L1	Has he/she failed any of the previous courses?	Years of experience as professional translator (mean)	Is translation his/her main professional activity?
1st year	12	18	A1	Spanish	No	No experience	-
2nd year	8	19.5	A2	Spanish	No	No experience	-
3rd year	9	20	B1	Spanish	No	No experience	-
4th year	9	22	B2	Spanish	No	No experience	-
Translators	10	36	C1-C2	Spanish	-	16.4	Yes

knowledge are presented. The term "instrumental resources" has been taken from PACTE's "instrumental sub-competence" (PACTE, 2017e), which is linked to information literacy. This variable is intended to collect data on the use of information resources during the translation of a text to acquire cultural knowledge and solve cultural translation problems. In our study, only data on the use of electronic information resources were collected, since in PACTE's translation competence acquisition experiment (Kuznik and Olalla-Soler, 2018) it was found that students hardly used paper-based resources (a 2 per cent of a total of 3,459 queries were performed using paper-based resources).

Four indicators were measured (Kuznik, 2017; Kuznik and Olalla-Soler, 2018):

1. Variety of resources: number of distinct types of electronic resources that the subjects use to seek information when translating the cultural translation problems of the text.

2. Number of queries: number of queries performed by the subjects in electronic resources when translating the cultural translation problems of the text.

3. Variety of queries: number of distinct types of queries in electronic resources that the subjects perform to seek information when translating the cultural translation problems of the text.

4. Time spent on queries: time that the subjects spend consulting electronic information resources when translating the cultural translation problems of the text.

The four indices are combined with acceptability, an indicator of the translation quality, to observe the relationship between the use of electronic information resources for the acquisition of cultural knowledge and the quality of the proposed solutions to the cultural translation problems. According to PACTE (2017a, p. 119) translation is acceptable when it "effectively communicates the meaning of the source text; fulfils the function of the translation (within the context of the translation brief, readers' expectations, genre conventions in the target culture), and makes appropriate use of language". Following PACTE's methodology, acceptability was measured in five specific segments of interest of the text to be translated that were validated with two expert judgments (see section 3.4.1). For each segment of interest, a degree of acceptability was established (PACTE, 2017a, pp. 120–121):

— Acceptable solution (numerical value: 1): the solution activates all the relevant connotations of the source text in the target text as regards the meaning of the source text, function of the translation, and language use.

— Semi-acceptable solution (numerical value: 0.5): the solution activates some of the relevant connotations of the source text in the target text, and maintains the coherence of the target text with regard to the meaning of the source text, function of the translation, and language use.

— Non-acceptable solution (numerical value: 0): the solution activates none of the relevant connotation of the source text in the target text, or introduces connotations that are incoherent with regard to the meaning of the source text, function of the translation, and/or language use.

For the assessment of the solutions, criteria were established based on the solutions proposed by the subjects who participated in the pilot test of the quasi-experimental study (Olalla-Soler, 2017). To reduce the possible bias that could exist in the assessment was undertaken by only one evaluator, two evaluators participated in the assessment process. Both were teachers of the Degree in Translation and Interpretation of the Universitat Autònoma de Barcelona and professional translators. One was native to the German language and the other was native to Spanish. The evaluation was done jointly. For more details on the assessment of acceptability, see PACTE (2017a).

3.4. Data collection and analysis

The data-collection instruments and the method of analysis applied are presented in this section.

3.4.1. Data-collection instruments. Two instruments were used to collect data: the subjects' translations of a text and screen recordings.

The text used was an article entitled 'Lautstark gegen die Ostalgie', written by Hauke Friedrichs and published in 2009 in *Die Zeit Online*, which was preceded by a translation brief. The text talks about the victims of political measures in the German Democratic Republic, who protested against the use of GDR symbols for commercial and touristic purposes. The text was shortened with the help of an expert in German text typology (see Appendix) and, in 2010, underwent a first expert judgement by five professional translators and translator trainers at UAB to validate a first selection of culturemes as segments of interest. According to Molina (2001), culturemes can be classified in four types according to the nature of the concept they refer to: linguistic culture, cultural patrimony, natural environment, and social culture. It was considered to be relevant for this study that the segments of interest that were to be analysed covered these four cultureme types. In November 2013, the text underwent a second judgement to ensure that the topic was still accessible despite the elapsed time. After the second judgement, the following segments of interest were selected (Olalla-Soler, 2017):

— *Ostalgie* (linguistic culture): part of the article title and reference to the topic based on a culturally-marked neologism.

— *Spreemetropole* (natural environment): reference to Berlin by referring to the river that flows through the city.

— *Grenzeruniformen* (cultural patrimony): play of contrasts between the reference to the soldiers who guarded the Berlin Wall (perceived as very negative by German citizens) and the parody for tourists performed by actors dressed up as Berlin Wall soldiers.

— *Arbeiter- und Bauernstaat* (social culture): reference to communism used as synonym for the former German Democratic Republic.

— *Unrechtstaat* […] *DDR-Regime* […] *SED-Diktatur* (referential chain): characterisation of the former German Democratic Republic government and the Socialist Unity Party of Germany by using synonyms with negative connotations.

Process data were recorded using Camtasia© (version 8), a screen recorder used in PACTE's TCA experiment (2014). With this software, data was gathered regarding the type of electronic information resources used by the subjects. The main reason why this software was chosen is related to ecological validity: the software does not interfere with the subject at any time during the quasi-experimental study.

3.4.2. Analysis. In this study, the focus of the analysis was both the use of information resources to solve cultural translation problems (variety of resources, number of queries, variety of queries, and time spent on queries) and the quality of the translation product (acceptability of the translation solutions).

Variety of resources. The data for this indicator was obtained from translation recordings. To classify resources into types, PACTE's categorisation was used (Kuznik, 2017, p. 222; Kuznik and Olalla-Soler, 2018, pp. 31-32), which was defined on the basis of the data gathered in PACTE's exploratory studies (2017b):

— Search engines, such as *Google* or *Yahoo*.

— Bilingual dictionaries: online or electronic bilingual dictionaries, such as *Pons.de* or *Dix.Osola*.

— Monolingual dictionaries: online or electronic bilingual dictionaries, such as *DRAE* or *DIEC*.

— Dictionaries of synonyms: online or electronic dictionaries of synonyms, such as *WordReference* o *Linguee*.

— Encyclopaedias: online or electronic encyclopaedias, such as *Larousse* or *Wikipedia*.

— Databases: online or electronic databases, such as *IATE* or *Termcat*.

— Corpora: online or electronic corpora, such as *RAE's* corpora or Google used as a corpus.

— Online or electronic-specialised or field-specific portals (news items, tourist information, information related to the subject of the texts to be translated, etc.).

During the visualisation of the recordings, the resources used in each segment of interest were logged, as well as the category to which they belonged. For analytical purposes, when two or more resources of the same resource type were logged, they were categorised as a single resource type. However, in some cases some resources were used in different ways (such as Wikipedia, which can be used as an encyclopaedia or as a bilingual dictionary if the language of the article is changed). In those cases, the same resource was categorised as different resource types depending on the queries that the subject carried out. Once the screenings were completed, it was calculated how many types of resources each subject consulted. The mean and standard deviation was then calculated for each group of students and for the group of translators.

Number of queries. The data for this indicator was obtained from the translation recordings. To calculate the indicator, the number of queries performed for each segment of interest by subject was added together. The mean and standard deviation for each group of students and for the group of translators was then calculated. In total, 840 queries were computed.

Variety of queries. The data for this indicator was obtained from the translation recordings. To classify queries into types, PACTE's categories were used (Kuznik, 2017, p. 223; Kuznik and Olalla-Soler, 2018, pp. 39-40), which were defined on the basis of the data gathered in PACTE's exploratory studies (2017b). In these studies, the queries performed by various groups of professional translators were logged and later classified in the following categories:

— Searches using keywords. Searches were carried out using a search engine, no matter how many words were introduced at one time, whether they were separated by a space or using Boolean connectors.

— Searches for equivalents. Equivalence in terms was sought.

— Searches for definitions. Definitions of terms were sought.

— Exact searches. Inverted commas were used to delimit items.

— Searches for synonyms. Synonyms for terms were sought.

— Searches in context. Electronic corpora or a search engine was used as a corpus to determine the use or frequency of use of expressions in context.

— Searches in websites. The option CTRL+F was used to search for information on a website.

— Cache searches. A cache was used to obtain information.

— Searches using preferred region. The search was narrowed down by selecting a region.

— Searches using preferred language. The search was narrowed down by specifying a language.

— Searches using preferred date. The search was narrowed down by specifying a time period.

— Searches followed by correction. A solution provided by the search engine was accepted and used to correct the outcome of the initial search.

These categories were employed so that it would be possible to compare the results obtained in this study with those of PACTE (Kuznik and Olalla-Soler, 2018). However, we consider that all these categories are not equally likely to be employed when translating, as they are dependent on the resource that has been accessed. For example, searches using preferred region, language, or date are often limited to search engines and in most cases they cannot be regarded as being equal to other query types such as searches for equivalents or for definitions.

During the visualisation of the translation process recordings, the queries performed for each segment of interest were logged, as well as the category to which they belonged. The number of different types of queries by subject was calculated. The mean number of query types used was then calculated for each group of students and for the group of translators.

To analyse how the types of queries are combined, the number of query types that the subject had used for each segment of interest was computed. Depending on the number of combined queries, these were classified into the following categories (Kuznik, 2017, p. 223; Kuznik and Olalla-Soler, 2018, p. 41), which were also defined on the basis of the data gathered in PACTE's (2017d) exploratory studies:

— No query: no query was performed before proposing a translation solution;

— Simple query: only one type of query was performed before proposing a translation solution;

— Double query: two types of queries were performed before proposing a translation solution;

— Combined query: three to five types of queries were performed before proposing a translation solution;

— Multiple queries: more than five types of queries were performed before proposing a translation solution.

The frequency of use of each category is calculated for each group of students and for the group of translators.

Time spent on queries. The data for this indicator was obtained from the translation recordings. The total time spent on queries for the five segments of interest was added up. The percentage of the time spent on queries compared to the total time spent translating was obtained by calculating the percentage of time spent on queries in relation to the total time spent on translation drafting. The mean and standard deviation for each group of students and for the group of translators are reported for both results.

Acceptability of the translation solutions to the segments of interest. The data for this indicator was obtained from the subjects' translations. The acceptability mean of the five segments of interest for each subject was first computed. Afterwards, the acceptability mean by group was calculated.

To measure the relationship between the acceptability and the variable indicators (variety of resources, number of queries, variety of queries, and time spent on queries), the intervals of the indicators were divided into three categories with the same range. Since these indicators did not have a fixed minimum and maximum values, the three intervals were calculated by using the lowest and the highest value obtained by the whole sample in each indicator as a minimum and a maximum value. For example, the lowest score obtained by the whole sample in the indicator variety of resources was 0 and the highest score was 7.

The range from 0 to 7 was divided into three intervals with the same range: $0 - 2.33$, $2.34 - 4.66$, and $4.67 - 7$. Once these intervals were established, the mean acceptability of the subjects of each group who were in each of these intervals was calculated.

Statistical analysis. To determine if there were any differences between groups, the normality of the data was first checked by creating *Q-Q* plots and by running Shapiro-Wilk normality tests for each group and each indicator. The data were not normally distributed in any group and in any indicator, so non-parametric tests were used. A Johnckheere-Terpstra test was run to observe if there were any differences between consecutive pairs of years in each indicator. A one-tailed Mann-Whitney *U* test was applied to determine if there were any differences between fourth-year students and professional translators. An alpha level of 0.05 was set for the Johnckheere-Terpstra tests and a level of 0.025 for the one-tailed Mann-Whitney *U* tests. Effect sizes are reported for all tests. A mean effect size of 0.39 (95% CI [0.18; 0.61]; Mdn = 0.36) was found.

3.5. Ethical issues

We prepared a confidentiality and data protection agreement according to the Spanish organic law 15/1999 for the protection of data. Subjects signed this document if they agreed to the following terms:

— The translation process would be recorded.

— The gathered data would be treated confidentially and subjects would not be individually identified in future publications.

— The data would not be given to third parties without the subjects' prior consent.

— The data gathered would have no effect on the subjects' academic records.

— The subjects had the right to obtain a copy of the results.

4. Results

4.1. Acceptability of the translation solutions to the segments of interest

The acceptability of the translation solutions to the segments of interest slightly increased as training advanced ($T_{JT} = 361.00$; $z = 2.923$; $p < 0.01$; $r = 0.48$), as shown in Table 2.

While the acceptability means obtained by first-year students and second-year students were very similar, the difference between second-year students and third-year students was more remarkable and so was the difference between third and fourth-year students. Despite this increase in quality, fourth-year students did not reach the acceptability level of professional translators ($M = 0.61$; $SD = 0.14$): $U = 19.50$; $p < 0.05$, one-tailed; $r = 0.53$.

4.2. Variety of resources

The variety of information resources used to solve the cultural translation problems of the text did not increase with training ($T_{JT} = 284.5$; $z = 1.246$; $p = 0.213$; $r = 0.21$), as shown in Table 3.

Table 2. Acceptability of the translation solutions to the segments of interest by group: mean and standard deviation (in parentheses)

	Acceptability
1st year	0.22 (0.14)
2nd year	0.26 (0.09)
3rd year	0.34 (0.16)
4th year	0.43 (0.18)
Professional translators	0.61 (0.14)

It increased from first to third year, and then decreased in the fourth year. Fourth-year students employed a wider variety of resources than the professional translators, although the difference was not statistically significant ($U = 26.0$; $p = 0.119$, one-tailed; $r = 0.35$).

The three most frequently used resources were the same from first to fourth year: bilingual dictionaries (usage variation ranging from 30.2 per cent in the third year to 50.2 per cent in the first year), general search engines (from 23 per cent in the first year to 29.7 per cent in the third one) and encyclopaedias (from 10.8 per cent in the first year to 18.9 per cent in the third one). In the case of translators, the three most frequently used resources were general search engines (37.8 per cent), bilingual dictionaries (22.4 per cent), and encyclopaedias (18.8 per cent).

4.2.1. Relationship between acceptability of the translation solutions to the segments of interest and variety of resources

There was no clear tendency regarding the relationship between acceptability and the variety of resources employed as training progressed (Table 4).

Regardless of the variety of resources employed, in each year the acceptability index was higher than in previous years. In the fourth year, acceptability increased when the variety of resources used was scarce, whereas, in the case of translators, the opposite trend was observed.

4.3. Number of queries

As in the case of the variety of resources employed, the number of queries performed to solve the cultural translation problems of the text did not increase with training ($T_{JT} = 255.00$; $z = 0.383$; $p = 0.702$; $r = 0.06$). Again, it increased from first to third year, and then decreased in the fourth year (Table 5). There was almost no variation among groups (greatest range = 4.2).

Table 3. Variety of resources by group: mean, standard deviation (in parentheses) and percentage of resources employed

	Variety of resources	%
1st year	3.91 (1.04)	48.87
2nd year	4.00 (2.00)	50.00
3rd year	5.11 (1.36)	63.87
4th year	4.38 (1.30)	54.75
Professional translators	3.50 (1.51)	43.75

Table 4. Acceptability mean based on the variety of resources employed

	Variety of resources		
	Low (0 – 2.33)	Medium (2.34 – 4.66)	High (4.67 - 7)
1st year	-	0.20	0.27
2nd year	0.20	0.27	0.30
3rd year	-	0.35	0.34
4th year	0.70	0.50	0.40
Professional translators	0.50	0.60	0.67

Table 5. Number of queries by group: mean and standard deviation (in parentheses)

	Number of queries
1st year	19.36 (7.86)
2nd year	21.50 (13.74)
3rd year	23.56 (10.57)
4th year	19.38 (5.32)
Professional translators	8.80 (4.64)

The fourth-year students performed twice as many queries as the professional translators ($U = 4.0$; $p < 0.001$, one-tailed; $r = 0.90$).

4.3.1. Relationship between acceptability of the translation solutions to the segments of interest and number of queries

In the first, second, and third years, acceptability was generally higher when many queries were performed (Table 6). In the fourth year, the opposite trend was observed and acceptability was higher when fewer queries were performed. In the case of professional translators, the opposite trend occurred again.

4.4 Variety of queries

No tendency was observed in the variety of queries employed to solve the cultural translation problems of the text as training advanced ($T_{JT} = 271.50$; $z = 1.019$; $p = 0.308$; $r = 0.17$), as shown in Table 7. Again, it increased from first to third year, and then decreased in the fourth year. There was almost no variation among groups (greatest range = 0.69, 5.31 per cent).

No statistically significant difference was observed between fourth-year students and professional translators ($U = 32.50$; $p = 0.258$, one-tailed; $r = 0.36$).

The three most frequently used queries were the same for the four years: searches for equivalents (from 44.3 per cent in the third year to 58.7 per cent in the first one), searches using keywords (from 23.2 per cent in the fourth year to 30.7 per cent in the third one), and searches for definitions (from 16.9 per cent in the first year to 23.1 per cent in the third one). In the case of translators, the most frequently used queries were: searches using keywords (37.6 per cent), searches for equivalences (32.9 per cent) and searches for definitions (28.2 per cent).

4.4.1. Relationship between acceptability of the translation solutions to the segments of interest and variety of queries

The students of all years and the professional translators obtained a higher acceptability level when using a medium variety of queries (Table 8).

4.4.2. Combination of query types

The results of the combinations of query types are shown in Table 9. In parentheses, the order from highest (1) to lowest (3) use is reported for each group.

In all groups except that of translators, the use of queries was more frequent than the resolution of segments of interest without queries. In the case of the translators, there

Table 6. Acceptability mean based on the number of queries carried out

	Number of queries		
	Low (0 - 17)	Medium (18 - 34)	High (35 - 51)
1st year	0.20	0.20	0.40
2nd year	0.20	0.30	0.30
3rd year	0.33	0.32	0.50
4th year	0.63	0.36	-
Professional translators	0.59	0.80	-

Table 7. Variety of queries by group: mean and standard deviation (in parentheses)

	Variety of queries	%
1st year	2.91 (0.54)	22.38
2nd year	2.75 (0.89)	21.15
3rd year	3.44 (0.53)	26.46
4th year	3.00 (0.53)	23.08
Professional translators	2.60 (1.07)	20.00

appears to be a balance between the use of queries and the resolution of cultural translation problems without queries.

In the first and second year, simple queries were the most frequently used, although the frequency of use of the other combination types was similar to that of simple queries. In the third year, the differences between query types were more pronounced and the preferred type were combined queries (three to five queries per segment of interest), followed by double queries and, finally, simple queries. The most frequently used combination type in fourth year was the same as in the third one (combined queries), which was closely followed by simple queries.

The group of translators used double combinations most often, followed at some distance by combined queries and simple queries.

4.4.3. Relationship between acceptability of the translation solutions to the segments of interest and combination of query types

The resolution of cultural translation problems without queries led to a higher acceptability in all groups even when most of the cultural translation problems were solved with queries (except in the case of the translators), as shown in Table 10.

From the first to the third years, combined queries led to better results, although in the third year there was little difference between combined queries and the rest of combination types. Both in the case of the fourth-year students and that of the translators, double queries led to a higher acceptability.

Table 8. Acceptability mean based on the variety of queries employed

	Variety of queries		
	Low (0 – 1.33)	Medium (1.34 – 2.66)	High (2.67 - 4)
1st year	-	0.30	0.20
2nd year	0.10	0.30	0.28
3rd year	-	-	0.34
4th year	-	0.70	0.43
Professional translators	0.50	0.70	0.60

Table 9. Percentage use of each combination of query types by group

	No query	Simple	Double	Combined	Multiple
1st year	26.00	26.00 (1)	23.40 (3)	24.70 (2)	0.00
2nd year	23.20	28.60 (1)	21.40 (3)	26.80 (2)	0.00
3rd year	28.60	11.10 (3)	25.40 (2)	34.90 (1)	0.00
4th year	21.40	28.10 (2)	17.90 (3)	32.60 (1)	0.00
Professional translators	57.10	8.60 (3)	22.90 (1)	11.40 (2)	0.00

Table 10. Acceptability mean based on the combination of query types

	Combination of query types				
	No query	Simple	Double	Combined	Multiple
1st year	0.45	0.22	0.14	0.39	-
2nd year	0.62	0.27	0.33	0.41	-
3rd year	0.89	0.36	0.34	0.39	-
4th year	0.92	0.53	0.60	0.41	-
Professional translators	0.71	0.58	0.66	0.56	-

4.5. Time spent on queries

The same pattern observed in the previous indicators is also present in the time spent on queries, since it did not increase with training ($T_{JT} = 247.50$; $z = 0.170$; $p = 0.865$; $r = 0.03$), as shown in Table 11. The time spent on queries increased from first to third year and then decreased in the fourth year. All years are homogenous, since there was almost no variation among groups (greatest range = 0:01:43) and the percentage of time spent on queries compared to the total time spent translating varied 0.94 points only.

The fourth-year students spent twice as much time on queries as the professional translators ($U = 7.0$; $p < 0.001$, one-tailed; $r = 0.83$).

4.5.1. Relationship between acceptability of the translation solutions to the segments of interest and time spent on queries

There is no clear relationship between the time spent on queries and the quality of the proposed solutions, as shown in Table 12.

Amongst the first-year students, there is hardly any difference between the acceptability obtained by the subjects who spent a low amount of time on queries and those who spent an average time. In the case of the second year, the more time spent on queries, the higher the degree of acceptability. The tendency observed in the second year was maintained in the third one. In the fourth year, the subjects who spent an average amount of time on queries obtained a higher level of acceptability than those who spent a lower amount of time.

5. Discussion

In this section the results obtained are discussed and related to those of other investigations. Since this study is based on that of the translation competence acquisition from Kuznik and Olalla-Soler (2018), the results will be primarily related to those of that study. In Kuznik's and Olalla-Soler's (2018) study, the translation problems that subjects had to solve were of different types: linguistic, extra-linguistic, textual, and of intentionality. Thus, the purpose was to investigate the use of information resources in general (only one of the five segments of interest was an extra-linguistic, cultural problem), while the study presented in this article focused on cultural translation problems.

5.1. Variety of resources

There might be an increase in the variety of resources used because, with training, more types of information resources are known and used. In the fourth year, the variety decreases, which

Table 11. Mean time spent on queries by group and percentage of time spent on queries compared to the total time spent translating: mean and standard deviation (in parentheses)

	Mean time spent on queries	Percentage of time spent on queries compared to the total time spent translating
1st year	0:05:54 (0:02:20)	7.05 (2.72)
2nd year	0:06:23 (0:04:08)	7.64 (3.93)
3rd year	0:06:40 (0:03:37)	7.83 (2.70)
4th year	0:04:57 (0:02:02)	7.99 (2.83)
Professional translators	0:02:14 (0:01:10)	5.15 (2.59)

Table 12. Acceptability mean based on the time spent on queries

	Time spent on queries		
	Low (0:00:00 - 0:05:11)	Medium (0:05:12 - 0:10:22)	High (0:10:23 - 0:15:33)
1st year	0,27	0,20	-
2nd year	0,25	0,27	0,30
3rd year	0,43	0,23	0,50
4th year	0,44	0,50	-
Professional translators	0,61	-	-

may be due to the fact that these subjects use fewer resource types to translate given their level of development of cultural and translation competences. This trend is also observed in the group of translators, who use a smaller variety of resources due to the conscious selection of resources and possibly because of a better planning of queries.

The lack of a relationship between the variety of resources used and the quality of the proposed solutions may be due to the fact that the variety of resources employed when solving cultural translation problems responds primarily to the individual needs of each student (Tangsgaard Hvelplund, 2017) and not so much to the acquisition of cultural competence.

Despite the positive fact that there seems to be a slight progression towards a conscious selection of information resources as training advances, it should be highlighted that all students use bilingual dictionaries as their main information resource, which is not the most appropriate one for cultural translation problems. It is also relevant that search engines are the second most frequently used resource in the case of students and the first one in the case of translators. Search engines are generally used as a first step in all information-seeking processes initiated by the students, which could indicate that their information-seeking strategy is not defined before starting the process, but it is rather built upon the results provided by the search engine. This could negatively affect the students' efficacy of their information-seeking process. Thus, defining a strategy prior to initiating the process should be trained and emphasised in translator training.

The resolution of cultural translation problems entails the use of a greater variety of resource types than in the case of solving translation problems in general ((Kuznik and Olalla-Soler, 2018, p. 32; 1st year: 2.62; 2nd year: 3.71; 3rd year: 3.44; 4th year: 3.00). In all the years under study, bilingual dictionaries are the most frequently used resource along with search engines and encyclopaedias. These data coincide with those obtained by Massey and Ehrensberger-Dow (2011), who observed that translation students used bilingual dictionaries to solve extra-linguistic problems, although these were not the most appropriate ones to find the type of information required. This was also seen by Enríquez Raído (2011), who observed that, in some cases, students selected resources without having considered what their information need was. As Massey and Ehrensberger-Dow did, we refer to Varantola (1998, p. 189) to explain this fact: "translators try to find non-dictionary type information in dictionaries because it is not readily or systematically available in other sources". It is also worth noting that Tangsgaard Hvelplund (2017) found the same order of use for the same resources in the case of general translation problem solving: bilingual dictionaries, search engines, and reference works and websites, in order of use.

5.2. Number of queries

The increase in the number of queries in the initial years may be the result of an increasing knowledge of information resources (the course on information science is taught during the second year). The translators carry out fewer queries than the fourth-year students, possibly because of a better planning of the queries, a clearer definition of the information required and a higher level of cultural knowledge, as demonstrated in Olalla-Soler (submitted). We consider this result to be one of the most negative results. All groups of students double the number of queries performed by the professional translators, and most of these queries are performed in bilingual dictionaries, search engines and encyclopaedias. This indicates that students do not modify their information-seeking strategy during the whole information-seeking process even when they observe that their queries are unfruitful. Translation trainers should incorporate translation activities to help students to assess their information-seeking strategy and to adapt it when the results of their queries are not fruitful enough. For example, students could be asked to translate a text and to carry out a maximum of three to four queries for each problem they encountered. This would force them to plan an information-seeking strategy and to modify it rapidly as soon as they noticed that it does not yield the expected results.

Comparing the results obtained in this study to those reported in Kuznik and Olalla-Soler (2018, p. 38) (1st year: 11.95 queries; 2nd year: 14.96; 3rd year: 11.04; 4th year: 10.36), the number

of queries is proportionally higher when subjects seek information to solve cultural translation problems. This may be due to a rather ineffective information-seeking process if the results obtained in the indicator variety of resources are considered. In that indicator, it was observed that bilingual dictionaries (the most used resource) were not the most adequate resource for finding extra-linguistic, cultural information. As a result, the students may engage in a repetitive, poorly organised and ineffective information-seeking process. This was also observed by Enríquez Raído (2011). This possible explanation is further reinforced by taking into account the results of the indicators' relation to acceptability, where it has been found that, in initial years, acceptability is higher when many queries are performed, although, in general, the level of acceptability is low. If the fact that these students perform many queries to achieve unacceptable solutions is considered, and that resource consultation implies a higher cognitive load than translation drafting (Tangsgaard Hvelplund, 2017), it must be admitted that the information-seeking process of the students is generally inefficient.

5.3. Variety of queries

In all the years, seeking information has been necessary to provide solutions to the cultural translation problems. This is not the case of the translators, since their level of cultural knowledge is higher than that of the students (Olalla-Soler, submitted). In more advanced years, there is a tendency to use many combinations of queries (two to five queries), indicating that the information-seeking process may not yet be sufficiently efficient. However, both the students and the translators carry out similar query types (searching for equivalents, definitions, and they perform searches using keywords). While these query types might be the most productive ones for translators, there are many other types that might be useful to refine queries and to retrieve information efficiently. This is also an important matter that should be addressed in translator training, specifically in information science applied to translation courses.

The most remarkable finding is probably the one obtained by measuring the relationship between acceptability and query-type combinations: acceptability is always higher when subjects apply their internal cultural knowledge. This may be due to two facts: 1) the resources used and the queries made are generally not adequate to solve cultural translation problems, and 2) the students use information resources even when they already possess knowledge related to the translation problems. This was evidenced in the variable cultural knowledge (Olalla-Soler, submitted), where subjects had to explain without information resources the meaning of a series of culturemes of the text that they would later translate. Some of these culturemes were the segments of interest that were later analysed. The results showed that, even when the subjects could adequately explain the meaning of the culturemes, they used information resources when translating them. This may be either because the students do not trust their cultural knowledge (as opposed to the translators), or because there is a tendency among students to jump directly into seeking information without first considering applying their internal cultural knowledge, or a combination of both explanations. Both explanations would suggest that translator training should take into account the students' use of information resources: on the one hand, students should learn to identify their information needs before starting an information-seeking process. This includes being able to identify the cultural translation problem, reflecting on the cultural knowledge already available, and defining an information-seeking strategy in which the most appropriate resources and types of queries are selected. On the other hand, students should be able to develop self-confidence in the classroom in order to rely more on their internal cultural knowledge and not on external information sources.

No remarkable differences were observed when comparing the results obtained with those reported in Kuznik and Olalla-Soler (2018, p. 40) (1st year: 2.43; 2nd year: 3.29; 3rd year: 2.85, 4th year: 2.75). Thus, there does not seem to be a difference between the types of queries performed when acquiring knowledge to solve cultural translation problems and translation problems in general. The most frequent query type is the search for equivalents in all years, as bilingual dictionaries are the most used resource. Again, the most frequent queries are inadequate for the information needs posed by this type of translation problem. The explanation offered by Varantola (1998) may again elucidate this fact: students expect to find non-dictionary type information in dictionaries because this information is not systematically found in other resource types.

5.4. Time spent on queries

The time spent on queries is stable from the first to the fourth years. This may be caused by the following: 1) students tend to use information resources without establishing their information needs or planning queries, as also reported by Enríquez Raído (2011); 2) the resources used are not helpful for solving cultural translation problems, as also noted by Massey and Ehrensberger-Dow (2011), and 3) students do not rely on their internal cultural knowledge. Differences exist, however, in the way in which the translators and the students use information resources to acquire cultural knowledge: the translators perform fewer queries and spend less time on them. This indicates that professional translators possess more internal knowledge to solve cultural problems than fourth-year students. Again, these results highlight the need to develop a critical attitude towards the indiscriminate use of information resources when translating. Consequently, translation trainers should include translation tasks in the classroom that help students become aware of the effects of an unplanned information-seeking strategy.

Considering that in Kuznik's and Olalla-Soler's (2018) study only one of the five segments of interest analysed was an extra-linguistic, cultural problem, information-seeking processes for cultural translation problems is much more time-consuming than information-seeking for other problems ((Kuznik and Olalla-Soler, 2018, p. 34; 1st year: 9.52 minutes; 2nd year: 11.25; 3rd year: 8.96; 4th year: 8.36). The mean time spent on queries in Kuznik and Olalla-Soler (2018) is 9:52, while, in the present study, it is 5:58. Thus, it can be concluded that the time spent on queries for the resolution of cultural problems is proportionately higher.

From an information literacy perspective, the results obtained clearly show that many of the skills presented in Pinto's and Sales' (2008) model of information literacy for translators were not acquired at the end of training. Specifically, it was explicitly observed that the students from all the years were not familiar with information processing techniques to gain knowledge efficiently and their skills in retrieval based on a proficient use of information and communication technologies were not as developed at the end of training as in the group of professional translators. It was derived from the results that other skills may not have been acquired: determining the scope of the information that is required and evaluating information and its sources critically. Given the differences between observed between the translators and the students, we consider the skills mentioned in this paragraph to be the core skills that an information-literate translator requires.

6. Conclusions

The most relevant conclusions of the study in relation to the three research questions that had been posed are presented below.

1. Students make use of electronic information resources in a different way from that of professional translators when solving cultural translation problems. Students use a greater variety of information resources, perform many more queries and spend

more time on information-seeking processes than professional translators. While there seems to be a very slight tendency for students to make more efficient use of electronic information resources for cultural problem-solving as the acquisition of cultural competence progresses, in general, students engage in repetitive, ineffective information-seeking processes that lead to translation solutions of modest quality. This seems to be due to a selection of information resources that are inadequate to address their information needs, a lack of planning of the information-seeking process and a lack of confidence in their internal cultural knowledge.

2. The differences between consecutive years are either small or statistically insignificant, which indicates a certain homogeneity among the subjects in the use of electronic information resources, as well as a poor development of the ability to acquire cultural knowledge. From a descriptive standpoint, all the indicators analysed show a slight increase from the first to the third year and a decrease in the fourth year, which is possibly due to this slight improvement in the efficiency of the information-seeking process, although the fourth-year students still use electronic information resources very differently from professional translators.

3. In general, there is no clear relationship between the use of electronic information resources to solve cultural translation problems and the quality of the translation solutions. This may be due to the low efficiency of the students' information-seeking process and to the individual differences of the subjects since, despite the homogeneity in the use of these resources, some subjects achieve successful solutions despite their repetitive information-seeking processes.

These findings have clear implications both for translator's cultural competence models and for the training of translators in this competence. The information-seeking process for solving cultural translation problems is more intensive, requires specific information resources and takes more time than the information-seeking process for solving other types of translation problems. Thus, translator's cultural competence models should include cultural knowledge acquisition skills as a key component because of the vastness of cultural knowledge (and the need to be able to acquire cultural knowledge with information resources) and the specific characteristics of the information-seeking process for solving cultural translation problems.

The lack of differences between consecutive years and the marked distance between the students at the end of their training and the professional translators clearly indicate that the teaching of the ability to acquire cultural knowledge in the training of translators requires much more attention. If the information-seeking process of students is ineffective and repetitive, as observed in these results, the cognitive load of engaging in this type of processes may become too heavy for students and may have a negative effect on the quality of their translations. Thus, it is particularly important for translator training to explicitly include the teaching of information literacy for solving cultural translation problems. Being acquainted with information resources does not imply an efficient information-seeking process. It is essential for the student to be aware of these processes when translating, to identify the information needs arising from cultural translation problems, to be familiar with and select the most appropriate resources for his/her information needs, to plan what he/she will look for and how he/she will search for it in the selected resources and, finally, to critically evaluate the information resource and the outcome of his/her query. Thus, translator training should not only focus on information resources and how to use them, but on information literacy as a whole. We consider that information literacy should be trained deliberately by including learning activities that help students to reflect on and think critically about their information-seeking abilities. For example, students could be asked to translate a text with limited queries for each translation problem, or students could be asked

to translate a text while being screen-recorded and then view their translation process recordings and write a report on their information-seeking processes. We are convinced that electronic information resources are an extremely useful tool for translators when they are used adequately in a planned information-seeking process that engages all information literacy skills that a translator requires.

6.1. Limitations of the study

This quasi-experimental study has certain limitations, since it has been conducted with a small sample and only one language pair from a single pedagogical context. Consequently, the quasi-experimental study should be repeated with larger samples, more language pairs, more texts and more segments of interest, and different pedagogical contexts, and it should include a control group formed by bilingual subjects who are not professional translators. In this way, it would be possible to: 1) obtain more accurate data, 2) compare the results obtained with those of other language combinations, and 3) clearly establish the differences between the characteristic behaviour of professional translators and the common one with bilingual speakers in relation to the use of electronic information resources for the resolution of cultural translation problems. Future studies should also include a wider scope and investigate information literacy of translators as a complex set of skills.

Note

[1] The remaining eight dependent variables that were analysed were: knowledge of the source culture (the translator's declarative knowledge of the source culture), cultural contrastive skill (the skills for applying cultural knowledge when identifying, interpreting and translating cultural translation problems in a text), culture-related attitudinal components (attitudinal characteristics that affect the development of the sub-competences of cultural competence), decision-making (decisions made during the translation process that involve the use of automatized and non-automatized cognitive resources and the use of different information sources), identification and solution of translation problems of a cultural nature (the subjects' identification and solution of translation cultural problems when carrying out a translation task), efficacy of the translation process (the relationship between time taken to complete a translation task and translation quality), knowledge of translation (the subject's implicit knowledge about the principles of translation), and translation project the subject's approach to the translation of a specific text and of the units it comprises in a specific context).

References

Alves, F. and Gonçalves, J.L.V.R. (2007), "Modelling translator's competence. Relevance and expertise under scrutiny", in Gambier, Y., Shlesinger, M. and Stolze, R. (Eds.), *Doubts and Directions in Translation Studies: Selected Contributions from the EST Congress, Lisbon 2004*, John Benjamins, Amsterdam, pp. 41–55.

ACRL (2016), "Framework for Information Literacy for Higher Education", available at: http://www.ala.org/acrl/standards/ilframework (accessed 10 July 2018).

Bahumaid, S. (2010), "Investigating cultural competence in English-Arabic translator training programs", *Meta: Journal des Traducteurs*, Vol. 55 No. 3, pp. 569–588.

Bruce, C. (1997), *The Seven Faces of Information Literacy*. Adelaide: Auslib.

Domas White, M., Matteson, M. and Abels, E.G. (2008), "Beyond dictionaries: Understanding information behavior of professional translators", *Journal of Documentation*, Vol. 64 No. 4, pp. 576–601.

Elmborg, J. (2006), "Critical information literacy: Implications for instructional practice", *The Journal of Academic Librarianship*, Vol. 32 No. 2, pp. 192–199.

EMT (2009), "Competences for professional translators, experts in multilingual and multimedia communication", available at: http://ec.europa.eu/dgs/translation/programmes/emt/key_documents/emt_competences_translators_en.pdf (accessed 3 March 2017).

Enríquez Raído, V. (2011), *Investigating the Web Search Behaviors of Translation Students: An Exploratory and Multiple-Case Study*, PhD diss., Universitat Ramon Llull.

Galán-Mañas, A. (2011), "Translating authentic technical documents in specialised translation classes", *JoSTrans. The Journal of Specialised Translation*, No. 16, pp. 109–125.

Göpferich, S. (2009), "Towards a model of translation competence and its acquisition: the longitudinal study 'TransComp'", in Göpferich, S., Jakobsen, A.L. and Mess, I.M. (Eds.), *Behind the Mind: Methods, Models and Results in Translation Process Research*, Vol. 3, Samfundslitteratur, Copenhagen, pp. 11–37.

Gutiérrez Bregón, S. (2016), "La competencia intercultural en la profesión del traductor: aproximación desde la formación de traductores y presentación de un estudio de caso", *Trans. Revista de Traductología*, No. 20, pp. 57–74.

Hirci, N. (2013), "Changing trends in the use of translation resources: The case of trainee translators in Slovenia", *ELOPE: English Language Overseas Perspectives and Enquiries*, Vol. 10 No. 2, p. 149–165.

Hurtado Albir, A. (1996), "La enseñanza de la traducción directa 'general'. Objetivos de aprendizaje y metodología", in Hurtado Albir, A. (Ed.), *La Enseñanza de la Traducción [Col. Estudis sobre la Traducció 3]*, Universidad Jaume I, Castellón de la Plana, pp. 31–55.

Hurtado Albir, A. (2001), *Traducción y Traductología. Introducción a la Traductología*, Cátedra, Madrid.

Hurtado Albir, A. (2017), "Translation and translation competence", in Hurtado Albir, A. (ed.) *Investigating Translation Competence by PACTE Group*, John Benjamins, Amsterdam, pp. 3–35.

Katan, D. (2008), "University training, competencies and the death of the translator. Problems in professionalizing translation and in the translation profession", in Musacchio, M.T. and Henrot, G. (Eds.), *Tradurre: formazione e professione*, CLEUP, Padova, pp. 113–140.

Kelly, D. (2002), "Un modelo de competencia traductora: bases para el diseño curricular", *Puentes*, No. 1, pp. 9–20.

Kuznik, A. (2017), "Use of instrumental resources", in Hurtado Albir, A. (Ed.), *Researching Translation Competence by PACTE Group*, John Benjamins, Amsterdam, pp. 219–242.

Kuznik, A. and Olalla-Soler, C. (2018), "Results of PACTE group's experimental research on translation competence acquisition. The acquisition of the instrumental sub-competence", *Across Languages and Cultures*, Vol. 19 No. 1, pp. 19-51.

Mackey, T. P. and Jacobson, T. E. (2011), "Reframing information literacy as a metaliteracy", *College & Research Libraries*, Vol. 72 No. 1, pp. 62–78.

Massey, G. and Ehrensberger-Dow, M. (2011), "Investigating information literacy: A growing priority in translation studies", *Across Languages and Cultures*, Vol. 12 No. 2, pp. 193–211.

Maybee, C. (2006), "Undergraduate perceptions of information use: The basis for creating user-centered student information literacy instruction", *The Journal of Academic Librarianship*, Vol. 32 No. 1, pp. 79–85.

Molina, L. (2001), *Análisis descriptivo de la traducción de los culturemas árabe-español*, PhD diss., Universitat Autònoma de Barcelona.

Nord, C. (1988), *Textanalyse und Übersetzen. Theoretische Grundlagen, Methode und Didaktische Anwendung einer übersetzungsrelevanten Textanalyse*, J. Gross Verlag, Heidelberg.

Olalla-Soler, C. (2017), *"La competencia cultural del traductor y su adquisición. Un estudio experimental en la traducción alemán-español"*, PhD diss, Universitat Autónoma de Barcelona, Bellaterra.

Olalla-Soler, C. (Submitted), "Applying internalised source-culture knowledge to solve cultural translation problems"

Orozco, M. and Sánchez-Gijón, P. (2011), "New resources for legal translators", *Perspectives*, Vol. 19 No. 1, pp. 25–44.

PACTE. (2003), "Building a translation competence model", in Alves, F. (Ed.), *Triangulating Translation: Perspectives in Process Oriented Research*, John Benjamins, Amsterdam, pp. 43–66.

PACTE. (2014), "First results of PACTE group's experimental research on translation competence acquisition: The acquisition of declarative knowledge of translation", *MonTI : Monografías de Traducción e Interpretación*, Special issue 1, pp. 85–115.

PACTE. (2017a), "Acceptability", in Hurtado Albir, A. (Ed.), *Researching Translation Competence by PACTE Group*, John Benjamins, Amsterdam, pp. 119–130.

PACTE. (2017b), "Conclusions. Defining features of translation competence", in Hurtado Albir, A. (Ed.), *Researching Translation Competence by PACTE Group*, John Benjamins, Amsterdam, pp. 281–302.

PACTE. (2017c), "Decision-making", in Hurtado Albir, A. (Ed.), *Researching Translation Competence by PACTE Group*, John Benjamins, Amsterdam, pp. 191–210.

PACTE. (2017d), "Developing the research design", in Hurtado Albir, A. (Ed.), *Researching Translation Competence by PACTE Group*, John Benjamins, Amsterdam, pp. 63–79.

PACTE. (2017e), "PACTE translation competence model. A holistic, dynamic model of translation competence", in Hurtado Albir, A. (Ed.), *Researching Translation Competence by PACTE Group*, John Benjamins, Amsterdam, pp. 35–41.

PICT. (2012), "Intercultural competence. Curriculum framework", available at: http://www.pictllp.eu/download/curriculum/PICT-CURRICULUM_ENGLISH.pdf (accessed 7 July 2017).

Pinto, M. and Sales, D. (2008), "INFOLITRANS: a model for the development of information competence for translators", *Journal of Documentation*, Vol. 64 No. 3, pp. 413–437.

Sales, D., Pinto, M. and Fernández-Ramos, A. (2018), "Undressing information behaviour in the field of translation: A case study with Translation trainees", Journal of Librarianship and Information Science, Vol. 50 No. 2, pp. 186–198.

Shreve, G.M. (2006), "The deliberate practice: Translation and expertise", *Journal of Translation Studies*, Vol. 9 No. 1, pp. 27–42.

Tangsgaard Hvelplund, K. (2017), "Translators' use of digital resources during translation", *Hermes*, No. 56, pp. 71–87.

Varantola, K. (1998), "Translators and their use of dictionaries: User needs and user habits", in Atkins, B.T.S. (Ed.), *Using Dictionaries. Studies of Dictionary Use by Language Learners and Translators*, Niemeyer, Tübingen, pp. 179–192.

Ward, D. (2006) "Revisioning information literacy for lifelong meaning", *The Journal of Academic Librarianship*, Vol. 32 No. 4, pp. 396–402.

Witte, H. (2000), *Die Kulturkompetenz des Translators*, Stauffenberg Verlag, Tübingen.

Yarosh, M. (2012), *Translator Intercultural Competence: The Concept and Means to Measure the Competence Development*, PhD diss., University of Deusto.

Zurkowski, P.G. (1974), *The Information Service Environment Relationships and Priorities*, National Commission on Libraries and Information Science, Washington, DC.

Appendix. The text to be translated

Translate the following text into Spanish for a special monograph on the 25th anniversary of the fall of the Berlin Wall to be published in *El País*.

Lautstark gegen die Ostalgie [linguistic culture]

Geschäftemacher posieren an der ehemaligen Mauer in Berlin in DDR-Uniformen. SED-Opfer protestieren am Jahrestag des Mauerbaus gegen diese Vermarktung der Diktatur

Die Männer sehen müde aus, sie haben trotz des Kaisergeburtstagswetters graue Gesichter und graue Haare. Sie sitzen auf einem Geländer vor dem S-Bahnhof Potsdamer Platz. Sie recken Schilder in die Höhe. "138 Tote an der Mauer", "Verbot von DDR-Symbolen jetzt" und "Alles schon vergessen" steht auf den Transparenten.

Die Alten haben nicht vergessen. Deswegen sind sie hierher gekommen, auf den Platz im Herzen der Spreemetropole [natural environment], der bis 1989 geteilt und eine Ödnis war. "Los geht's", ruft einer, und dann marschieren die Alten los. Ihre Müdigkeit ist vergessen. Sie haben eine Mission.

40 Teilnehmer laufen einige Meter zu den Mauerfragmenten, die am Rande des Platzes stehen. Sie drängen sich an asiatischen und amerikanischen Touristen vorbei, bilden vor den Mauerresten einen Halbkreis und verhindern, dass zwei junge Männer in Grenzeruniformen [cultural patrimony] auf einem Boxer-Kardan sich weiter mit Touristen fotografieren lassen und deren Reisepässe mit einem "Original DDR-Visum" des Unrechtsstaats [referential chain] versehen.

Wegen der Schauspieler und der DDR-"Verherrlichung", wie sie es nennen, sind die Alten hier. Sie sind Opfer des DDR-Regimes [referential chain], haben in Haft gesessen, die meisten wegen Republikflucht. Sie sind empört, dass "Ostalgier" und Geschäftemacher ein fast beschauliches, skurriles Bild der SED-Diktatur [referential chain] zeichnen. Und sie sind wütend, dass Studenten in die Rolle von Beamten des untergegangenen Arbeiter- und Bauernstaates [social culture] schlüpfen, um Geld zu verdienen. [...]

Aus *Lautstark gegen die Ostalige* (bearbeitet), von Hauke Friederichs. *Die Zeit* (13.8.2009)
Quelle: http://www.zeit.de/online/2009/34/berliner-mauer-streit?page=1