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RESEARCH ARTICLE

Computer Sciences Applied to Translation Undergraduate Programs in Public Universities in Argentina

La informática aplicada en la formación de grado en Traducción en las universidades públicas de Argentina

A informática aplicada na formação de graduação em tradução nas universidades públicas da Argentina

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Abstract. Since the nineties, the inclusion of technological components in the training of translators has been a need identified by translation professionals and academics. In this context, a cross-sectional exploratory study was proposed, aimed at looking into the inclusion of translation-applied computer sciences in the translation programs offered at public universities in Argentina, both in specific technology courses and in other curricular and extracurricular areas. Based on the information contained in documentary sources collected by the research project "Training in Translation and Interpretation in Argentina" (04/J025, UNComahue), and on the answers to questionnaires administered to the directors of the 18 study programs included, this article presents some preliminary conclusions: a minority of the study programs being researched contain a mandatory course on translation-applied computer sciences (no clear trends are identified as to the place of these courses in the study plans); lower complexity contents are discussed; the technologies are also discussed on other courses that are not specific to translation-applied computer technology. This analysis is the starting point for the deepening of knowledge of didactics of computer science applied to translation in Argentina in subsequent stages of this study.

Keywords: translation, translator training, university programs, translation-applied computer science, Argentina.

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Resumen. Desde la década de los noventa, la inclusión de componentes tecnológicos en la formación de traductores ha sido una necesidad señalada por profesionales y académicos de la traducción. En este contexto, se planteó un estudio exploratorio transversal, cuyo objetivo fue indagar sobre la inclusión de la informática aplicada a la traducción en las carreras de traductorado ofrecidas en universidades públicas de Argentina, en asignaturas específicas de tecnologías, y en otros espacios curriculares y extracurriculares. A partir de la información contenida en fuentes documentales reunidas por el proyecto de investigación «La formación en traducción e interpretación en Argentina» (04/J025, UNComahue), y de las respuestas a cuestionarios administrados a los directores de las 18 carreras incluidas, este artículo presenta algunas conclusiones preliminares: una minoría de las carreras objeto de estudio incluyen una materia obligatoria de informática aplicada a la traducción, no se detectan tendencias claras en cuanto a la ubicación de estas asignaturas en los planes; se abordan contenidos de menor complejidad; las tecnologías también se abordan en otras materias no dedicadas a la informática aplicada a la traducción. Este análisis constituye el punto de partida para la profundización del conocimiento de la didáctica de la informática aplicada a la traducción en Argentina en posteriores etapas de este estudio.

Palabras clave: traducción, formación de traductores, estudios universitarios, informática aplicada a la traducción, Argentina.

Resumo. Desde a década de noventa, a inclusão de componentes tecnológicos na formação de tradutores tem sido uma necessidade identificada por profissionais e acadêmicos de tradução. Neste contexto, um estudo exploratório transversal foi proposto, cujo objetivo foi indagar sobre a inclusão da informática aplicada a tradução nos cursos de Tradução oferecidos nas universidades públicas da Argentina, em disciplinas específicas de tecnologias e em outras áreas curriculares e extracurriculares. A partir das informações contidas nas fontes documentadas reunidas pelo projeto de pesquisa "A formação em tradução e interpretação na Argentina" projeto de pesquisa (04/J025, UNComahue), e das respostas dadas ao questionário pelos diretores dos 18 cursos incluídos, este artigo apresenta algumas conclusões preliminares: uma minoria dos cursos objeto deste estudo incluem uma disciplina obrigatória de informática aplicada a tradução, não são detectadas tendências claras com referência a localização dessas disciplinas nos planos; são abordados conteúdos menos complexos; as tecnologias também são abordadas em outras disciplinas que não estão dedicadas à informática aplicada à tradução. Esta análise constitui o ponto de partida para aprofundar o conhecimento da didática da informática aplicada à tradução na Argentina em etapas posteriores deste estudo.

Palavras-chave: tradução, formação de tradutores, estudos universitários, informática aplicada à tradução, Argentina.

For over 15 years, Austermühl (2001) had wondered if translators needed assistance tools for their job and if they had to be electronic. His clearly rhetorical question led him to explain the context that surrounds translation: technological, political and economic globalization fueled by the digitalization of communications boosted the information flow and significantly increased the need for translations, which showed higher levels of specialization and required an increasing diversification of production-related tasks. That context forced translators to seek information and communication technologies to ensure quality and productivity. In other words, as Kingscott (1996) and Haynes (1998) had predicted, the translation industry experienced an increasing use of computer-assisted translation tools (CAT) boosted by a higher demand of translations in less time without any loss in quality (as quoted in Bowker, 2002, pp. 11-12).

Fifteen years later, technology spreads throughout all fields of human activity, including translation: that reality authors reflected on has deepened to such an extent that translation and computer science no longer "go hand in hand and complement each other" (Castro Roig, 2011, p. 7) in many contexts, but in (almost) all of them. Undoubtedly, computer technologies are at the heart of a professional translator's work routine, assisting not only during the translation process (from receiving the source text, to identifying and managing terms and documentation, to writing the target text, proofreading, layout and delivery to the client), but also during vital tasks for the professional duty outside of this process (such as communicating with clients, specialists and colleagues, project follow-up, issuing invoices, overseeing payment, permanent training, and visualizing services offered in the market).

Both translators and translation studies experts recognize the need for translators to handle translation-applied computer tools. Proof of this is the wide variety of spreading and training of these technologies in blogs, regular academic publications, professional meetings and associations, and their inclusion in translator competence models that Kelly (2002) proposes as professional instrumental sub-competence and the PACTE group (2003) proposes as instrumental sub-competence, for example. Additionally, many research initiatives about this topic stem from the applied field of translation studies, including the Translation Technologies group (Autonomous University of Barcelona, Spain), whose contribution to the study of the connection between computer science, translation, documentation, and terminology has been so important that it gave birth to the term *translation technologies*, defined as "the group of knowledge and skills using ICT that allows translation tasks to be carried out in a more timely, efficient and accurate way" (Vilarnau, as quoted in Plaza Lara, 2014).

Moreover, several authors have suggested different classifications of translation-applied technologies, taking different criteria into account:

- Melby (1998) introduces a typology of translation technologies based on their work level (term or segment) and when are they used in the translation phase itself (before,

during, or after the translation).

- Badia et al. (1999) proposes to implement linguistic technologies in translator training in Europe and classifies them according to the level of knowledge required by the user into Introduction to Computer Sciences (Module A), Information Technologies and DTP for Translators (Module B), and Linguistic Engineering (Module C), including mandatory and optional modules that follow, complement and overlap one another.
- Vilarnau classifies software and determines a descending order based on their connection with translation, starting from translation software, to computer-assisted translation software, software to send and receive documents, secondary translation software up to general purpose software (as quoted in Plaza Lara, 2014, pp. 29-30).
- Alcina (2008) differentiates between a translator's computer equipment, communication and documentation tools, text editing and layout, linguistic tools and resources, and translation tools; and
- Martín-Mor, Piqué Huerta, and Sánchez-Gijón (2014) review the proposal by Piqué Huerta and Sánchez-Gijón (2006) and propose a differentiation between translation technologies based on whether they can be applied to get the source text, analyze it, prepare supporting material, translate and proofread it, and improve or deliver the final text.

These classifications illustrate the variety of computer resources used by translators and their importance for professional work.

On the other hand, since the nineties, several authors agree on the need to start developing the aforementioned sub-competence starting at the first levels of training so that future translators understand and know how to use the range of tools available to assist them in their tasks (Alcina, 2008; Bowker, 2002; Martín-Mor et al., 2014; Olvera Lobo et al., 2007; Piqué Huerta, 2002; Piqué Huerta & Sánchez-Gijón, 2006; Salinas, 2013; Samson, 2005, 2013; among others). Meanwhile, the inclusion of these resources in translator training has become necessary due to market demands (Gouadec, 2007), though the industry occasionally states that translators are not prepared enough for current challenges (Kiraly, 2005, p. 1099; Samson, 2005, p. 104).

Even though these statements have been made a long time ago, the question of how to blend the development of knowledge and skills related to computer tools or technologies applied to translation throughout translator training still remains on the junction of translation-applied computer science and translation training. The fast pace of technological change constantly challenges institutions and their faculty to watch out for and adapt to these changes.

Therefore, knowing the inclusion status of technologies in study plans of translator training institutions becomes both interesting and necessary for translation training, in order to reflect on goals reached throughout the years and pending challenges when faced

with changes that loom over the translation industry. In Spain, the inclusion of technologies in the training of translators and interpreters has been analyzed, both at undergraduate and postgraduate level. Colominas and Piqué (2013) conclude that, even though all programs guarantee minimum contents of translation technologies in their study plans, these contents, the allocated credit hours and their distribution throughout training are scattered, reflecting the challenge for universities to train professionals in an ever-changing world. In turn, Plaza Lara (2016) analyzes the changes experienced by Translation and Interpreting programs in Spain regarding courses that involve the development of instrumental competence after the commonly named Bologna Process, and concludes that this training has been able to adapt to new job demands regarding the European Higher Education Area. On the other hand, in regards to the postgraduate level in Spain, Veiga Díaz (2013) notes that technological tools are largely included, which reflects a close relationship between the professional world and training.

In Argentina, however, the situation of the inclusion of computer science in translator training is only partially known. Dal Dosso (2007) contributes the first analysis of information and communication technologies (ICT) in university programs of translator training in Argentina, based on a sample of six universities (five private and one public) located in the Federal Capital. This study found that the level of inclusion of ICT was not ideal at the time and the first implementations of these technologies were not accompanied by proposals for teacher training. It also points out an educational, technological and professional gap in training concerning the professional market. A few years later, the scarce appearance of these tools in translation programs was still under preliminary observation nationwide (Chaia, 2012; Salinas, 2013). Despite the great value of these contributions, in the light of the location of analyzed samples, the chronological distance to the conclusions drawn or the reach and depth of the analyses, the presence of translation-applied computer tools in translation programs in Argentina can be considered a topic that has yet to be explored.

This is the context where we considered it appropriate to explore the inclusion of translation-applied computer tools in translation undergraduate programs in Argentina. The objectives of the Research Project "Translation and Interpreting Training in Argentina" (04/J025, Comahue National University) give way to the main goal of this research, which is to investigate the inclusion of translation-applied computer science in translation programs offered in public universities of the aforementioned country.

Specifically, the aim is to identify courses on translation-applied computer science, that is courses whose main goal is to improve the management of computer tools and resources used during the translation process[1], as well as discovering other areas in which contents on translation-applied computer science are included (other mandatory or optional courses,

1 These tools and resources include both the ones specifically created for translation setting and others that, though they were not designed exclusively to be used in this context, they are significantly useful for translators, in line

etc.). The aim is also to identify which contents are discussed and with which kind of activities, examine their infrastructure or resources to practice computer science, explore whether this topic is being researched, and identify goals and challenges detected by the faculty of these courses, among others.

After a brief description of the method used in this study, we will present the results obtained in the proposed first two stages and the first phase of the third stage, which will allow us to obtain preliminary quantitative data on the inclusion of translation-applied computer science in undergraduate programs in public universities in Argentina.

METHOD

Design

Since the background review shows that there is relatively few information about the presence of translation-applied computer tools in translation programs in Argentina, an exploratory research that allows us to deepen our knowledge on this topic has been designed to identify trends and differences that may be the catalyst for future research. It refers to a cross-sectional non-experimental study, since data of the whole population is collected to be analyzed at once (Hernández, Fernández & Baptista, 2010).

Participants

We obtained a list of translation undergraduate programs offered at public universities in Argentina when collecting relevant data from the information gathered in the research project (see Table 1).

We found that there are 10 public universities in Argentina with translation undergraduate programs, consisting of 18 programs that provide degrees in English, French, Portuguese, German, Italian, and in a language according to suitability criteria (in the case of the University of Buenos Aires). These programs comprise the population to be analyzed.

Data Collection Techniques

This cross-sectional exploratory study was planned in three stages:

1. **Identification of public universities offering translation undergraduate training in the country.** From the data collected in the exploratory phase of the research project "Training in Translation and Interpretation in Argentina" (04/J025, UNCo), the population being researched was identified and any information on relevant institutions and programs was collected;

with proposals such as those from Samson (2005) and Martín-Mor et al. (2014).

Table 1
Translation undergraduate programs in public universities in Argentina

Autonomous University of Entre Rios (UAPAR)	English Public Translation (ECC) English Public Translation (ECC) Italian Public Translation French Public Translation
University of Buenos Aires (UBA)	Public Translation (language according to suitability criteria)
Catamarca National University (UNCA)	National Public Translation in French National Public Translation in English
Comahue National University (UNCO)	Public Translation in English
Cordoba National University (UNC)	German National Public Translation French National Public Translation English National Public Translation Italian National Public Translation
Cuyo National University (UNCU)	English-Spanish Bilingual Translation
La Plata National University (UNLP)	National Public Translation in English Language National Public Translation in French Language
La Rioja National University (UNLAR)	National Public Translation in English Language
Lanús National University (UNLA)	Public Translation in English
Rosario National University (UNR)	Portuguese Public Translation

Note: ECC = extracurricular course aimed at professionals with a degree in Translation or English or Portuguese Teacher granted by a non-university higher level institution with a minimum duration of 4 years and a total of credit hours equal to no less than 2,200 hours (Regulation CS Number 285/14).

2. **Identification of courses on translation-applied computer science.** The courses that, by their name, focus on improving the management of translation-applied computer tools were collected from study plans of the relevant programs, and
3. **Main data collection.** At this stage, questionnaires were distributed in two phases:
   a. Questionnaire 1: Aimed at program directors (or heads of departments). It is designed to collect general data on the inclusion of translation-applied computer science in the population being researched. The questionnaire, which includes open and close-ended questions, investigates five aspects described on Table 2. This questionnaire is included in Appendix A.

b. Questionnaire 2: Aimed at teachers in charge of courses on translation-applied computer science and computer science not applied to translation that is nonetheless used or included in their programs. It seeks to obtain further information about the data described on Table 3. This questionnaire is included in Appendix B.

Table 2

Data collected through Questionnaire 1(aimed at program directors or heads of departments)

Data	Details discussed	Number of questions
Data on the program and the person answering the questionnaire.		Seven
Courses on translation-applied computer science (according to the classification by Martín-Mor et al., 2014)	• Name, • Credit hours, • Place in the study plan, • Duration, • Year of implementation, • Mandatory nature of the course • Details of the teacher in charge	Nine
Courses on computer science not applied to translation but that include these contents in their programs	• Name, • Place of the course in the study plan • Details of the teacher in charge	Five
Available technological resources for teaching and learning translation-applied computer science in the institution and extracurricular activities over the last three years that involve the use of translation-applied computer science	• Types of technological resources • Name of the activity • Type of activity, • Year of implementation • Details of the person in charge of the activity	Ten
Satisfaction of director or head of department with the inclusion of translation-applied computer science in the program	• Level of satisfaction • Goals achieved • Pending challenges	Three

Table 3
Data collected through Questionnaire 2 (teachers in charge of courses)

Data	Details discussed	Number of questions
Data on the people answering the questionnaire and the course.	• Details of the institution, program and course • Details of the teacher in charge • Number of lecturers	Seven
Translation-applied computer science	• Topics discussed on the course • Inclusion of "cloud" resources • Inclusion of open-source resources • Availability of software licenses	Four
Training in translation-applied computer science	• Practical-theoretical nature • Tasks performed • Task goals • Final approval • Integration with other courses	Five
Satisfaction of director or head of department with the inclusion of translation-applied computer science in the program	• Level of satisfaction • Goals achieved • Pending challenges	Three

We expect that the results of the data analysis from the first two stages of documentary sources (study plans and minimum contents of courses) obtained with this design can be evaluated and qualified by studying the answered questionnaires of the third stage. On the other hand, Questionnaire 2 will allow us to deepen the general knowledge of the inclusion of translation-applied computer science in translation undergraduate programs in Argentinian public universities obtained from Questionnaire 1: we will be able to compare the intentions expressed by program directors or heads of departments with the teaching experience of the courses.

It is worth mentioning that this article will present the results and conclusions of the first two stages and the first phase of the third stage of the study, which are therefore preliminary in nature.

Procedure

In the first stage of this study, we analyzed the available information on the database collected by the research project that originated this research. This provided relevant information about the subject of the study. We collected data on public universities and the translation undergraduate programs they offer. The data obtained from the research project's information was subsequently completed based on the content available on the websites of relevant study programs. Based on the study plans and, to a lesser extent, the course programs obtained from the research project and websites of relevant study programs, we collected data on two areas for the second stage:

1. Courses on translation-applied technologies, a lot of which were analyzed by program, year of implementation, allocated credit hours in relation to the total credit hours of the program, mandatory or optional nature, place in the program, and minimum contents (according to the study plan), and

2. Other courses that, despite not being specific to translation-applied technology, include related topics among their minimum contents. We analyzed which contents related to the subject were discussed on these courses and how many of them were included in each program.

For cases where study plans were not available online, each institution was contacted in order to obtain these documents.

For the first phase of the third stage, program directors or heads of departments received relevant questionnaires drafted with the free online tool Google Forms[2], which allows to easily submit questions via email and automatically gather information in spreadsheets. The questionnaires, which included both open and close-ended questions with options or scales, provided quantitative and qualitative data to validate, complete and qualify the information from the two previous stages. Unfortunately, it was not possible to obtain answers in every case, so this stage also presents partial information.

RESULTS

The first stage of this exploratory study provides a first approach to the subject of our study. Table 4 shows a list of the programs that include a subject or course on translation-applied computer science, as it was previously defined.

Table 4 shows that out of the 10 public universities (18 translation programs) that offer translation programs, five (six programs) include courses on translation-applied computer science (see Figure 1). Additionally, it is worth mentioning that, although the study plans of two institutions (six programs), UNC and UNLP, do not take into account this type of courses, they do take into account regular but optional workshops to make up for the formal shortcomings of their study plans: the former organized interteaching workshops related to translation-applied computer science[3], and the latter conducts two levels of Computer-assisted Translation Tools Course annually. Finally, three institutions (three programs), UNCU, UNLA and UADER (French), include courses that comprise general computer science (Computer Science Workshop, Computer Science Modules, and Computer Science, respectively), as reflected by their names. This allows us to get a picture of the number of subjects (mandatory and optional) related to general computer science and translation-applied computer science in the 10 public universities that offer translation programs in Argentina (see Figure 2): only two institutions (UBA and UNR) lack areas related to these fields.

2 Available at https://www.google.com/forms/about/

3 There is still no accurate information on this matter.

Table 4
Programs with courses on translation-applied computer

University	Program	Course on Translation-applied Computer	Course Implementation Year
UNCA	National Public Translation in French	• Computer-assisted Translation	-
	National Public Translation in English	• Computer-assisted Translation	-
UNCO	Public Translation in English	• Translation Tools Workshop	2015
UNC	German National Public Translation	• Interteaching Workshops (optional)	-
	French National Public Translation	• Interteaching Workshops (optional)	-
	English National Public Translation	• Interteaching Workshops (optional)	-
	Italian National Public Translation	• Interteaching Workshops (optional)	-
UNCU	English-Spanish Bilingual Translation	• Computer Resources in Translation Workshop	2013
UNLP	National Public Translation in English Language	• Computer-assisted Translation Tools Course (optional)	2010
	National Public Translation in French Language	• Computer-assisted Translation Tools Course (optional)	2010
UNLAR	National Public Translation in English Language	• Translation-applied Computer Science	2014
UNLA	Public Translation in English Language	• Translation-applied Technology	2016

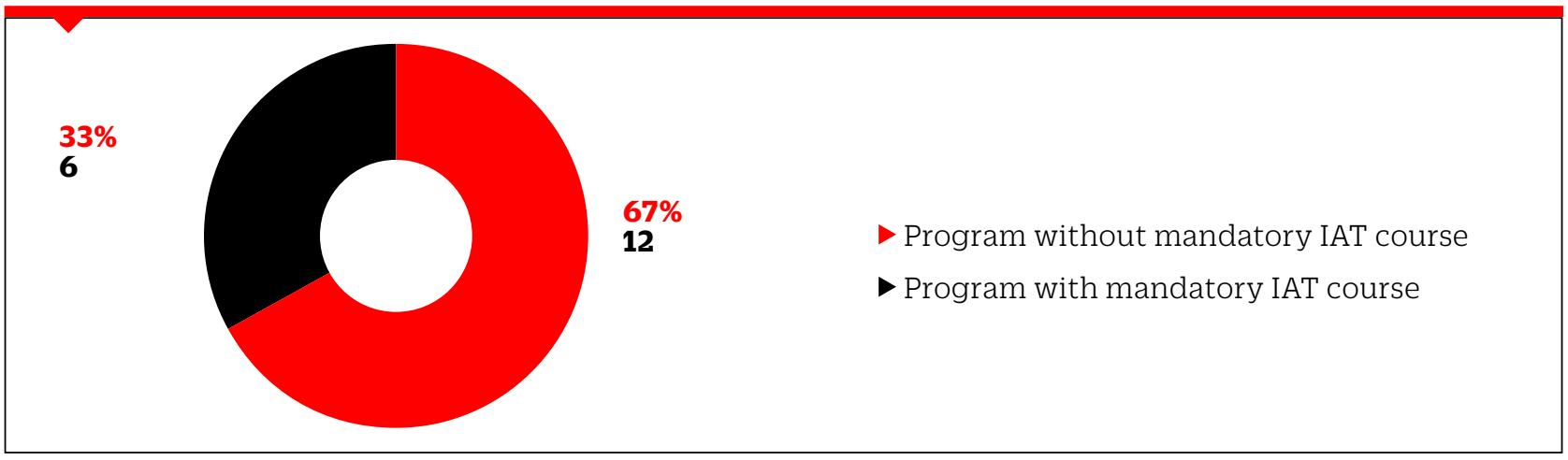

Figure 1. Courses on computer science in translation undergraduate programs in Argentina

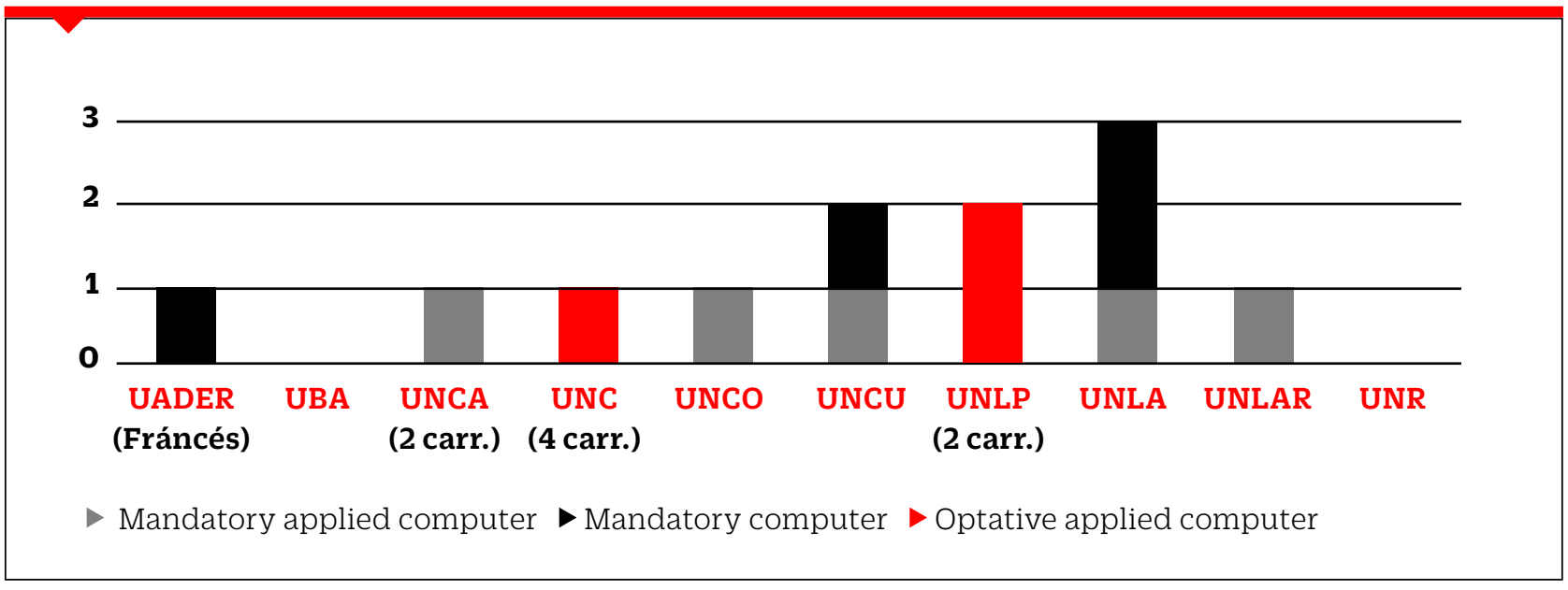

Figure 2. Number of courses on translation-applied computer science

This first general analysis raises questions about the credit hours allocated to these areas, their distribution throughout the study plans, the contents discussed, and proposed activities. So far, we only have general information. Data on UBA, UADER (Portuguese, English and Italian) and UNCA are missing, whereas data on UNC is incomplete. We expect to complete these results with the information obtained from the third stage of the study.

Regarding the credits hours allocated to courses on translation-applied computer science, there is information about four of the five institutions (UNCO, UNCU, UNLA, UNLAR) that include them in their translation study plans. (See Figure 3).

The data in Figure 3 allows us to conclude that these courses encompass 2.16% of the total credit hours of the program at the most in all cases, though in cases with courses on general computer science, the cumulative hours among both areas is barely above 4% of the total.

Due to the lack of national guidelines on the contents that should be included in translator training, we refer to the White Paper on the Degree in Translation and Interpreting (ANECA, 2004) of Spain. This Paper suggests that 10% of the credits (360 hours) must belong to instrumental contents (p. 129), including: documentary research techniques, terminological methodology and management, and translation-applied technologies (p. 122). Assuming a load equal to all subfields (Colominas & Piqué, 2013), each of them should take up about 120 hours. The comparison on Figure 3 with the available guidelines in Spain shows that only the study programs including a course on general computer science and a course on translation-applied computer sciences (UNLA and UNCU) have similar credit hours to the number suggested by ANECA.

As for the content distribution of translation-applied computer science, there is an uneven distribution (See Figure 4). Both study programs (UNLA and UNLAR) that place this

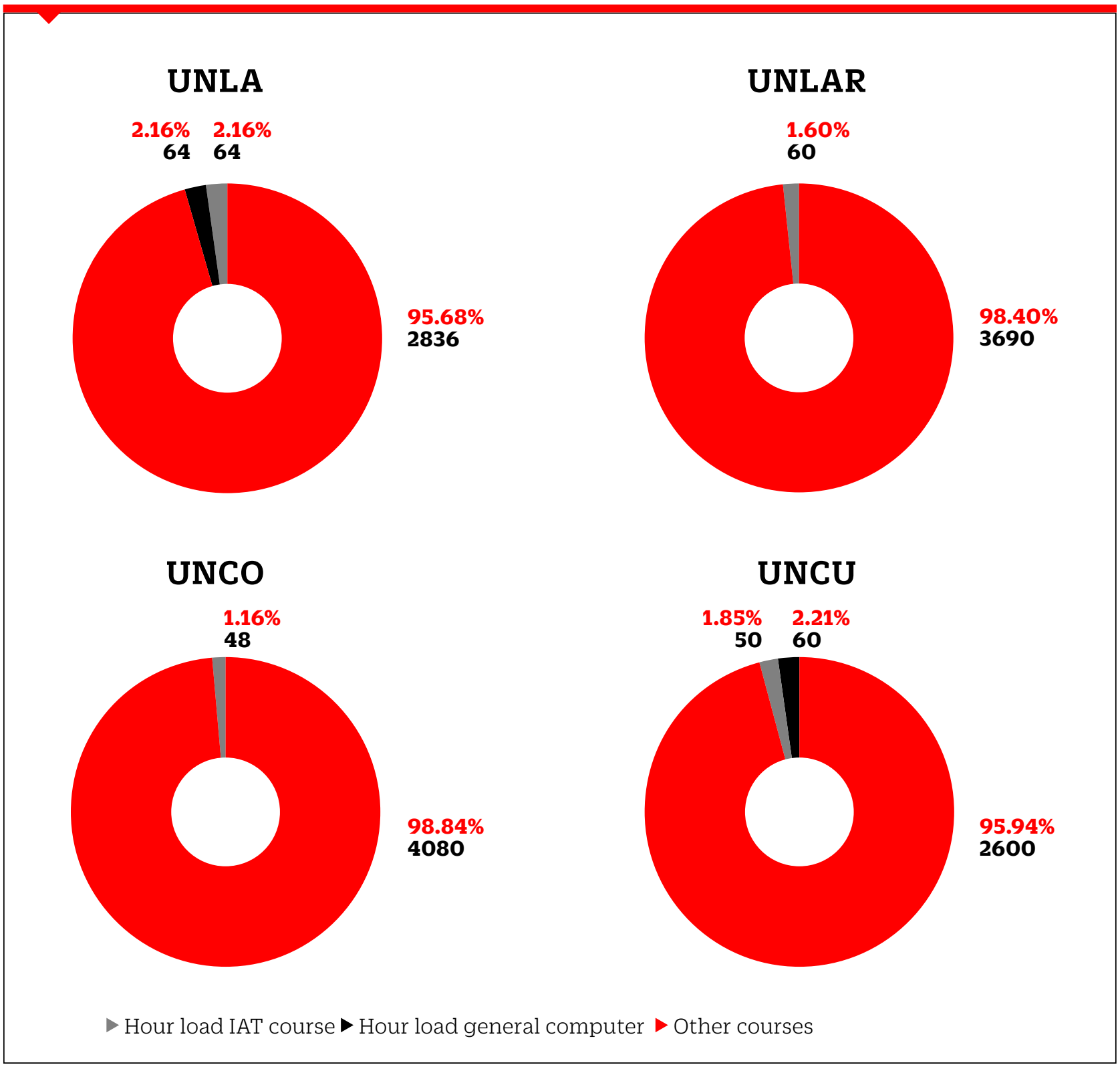

Figure 3. Translation-applied computer science or general computer science credit hours

course in second year (fourth quarter) have a four-year duration, so these contents are placed in the middle of the study program. On the other hand, out of the four study programs that place this course in fourth year, three are four-year programs (UNCU and UNCA), and one is a five-year program (UNCO), so only the latter would allow a transfer of the course contents of translation-applied computer science to those of translation practice during a longer period of time.

As for the contents discussed on the courses on computer science and translation-applied computer science, we have obtained data on their minimum contents from the study plans

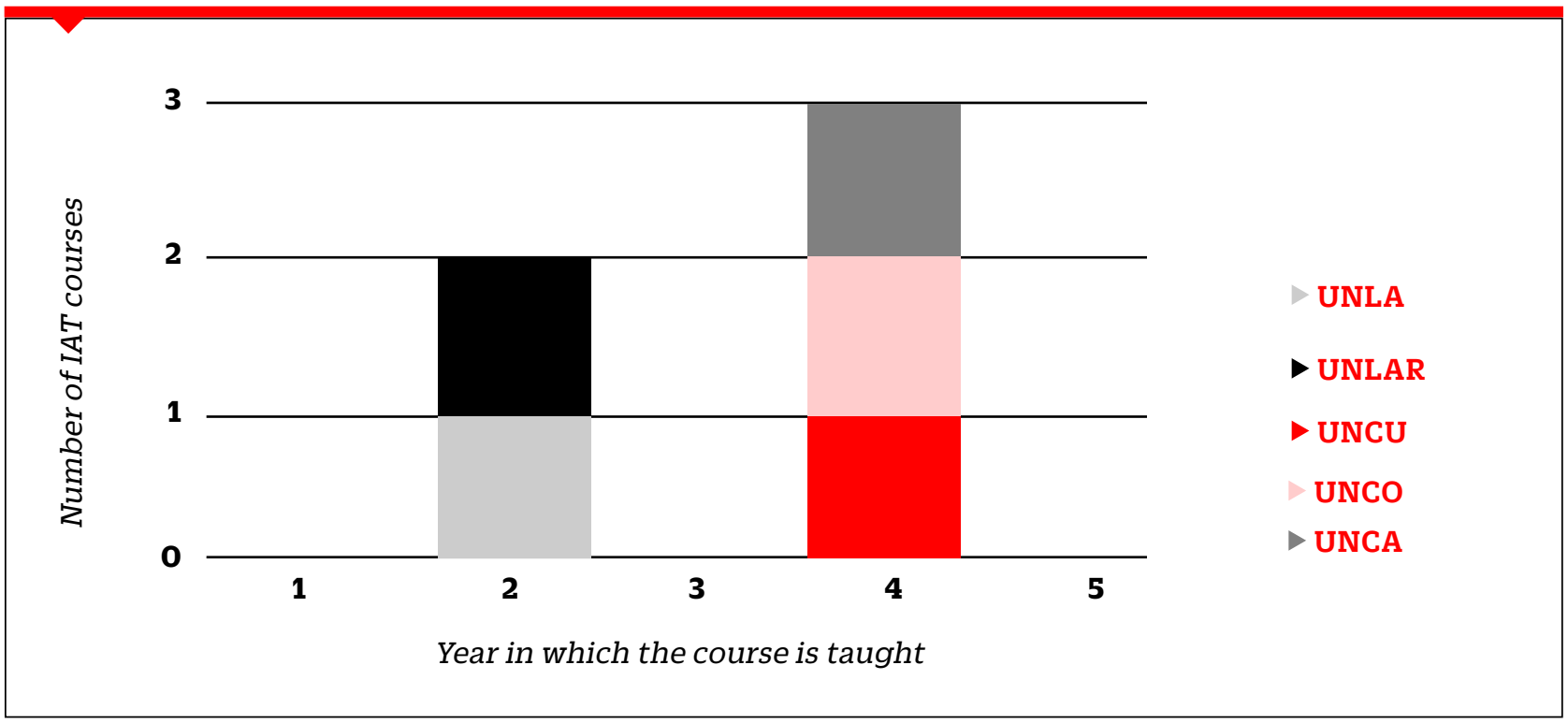

Figure 4. Distribution of courses on translation-applied computer science

made available to us so far (UNCO, UNLA, UNCU and UNLAR). This provides an initial approach to the topic that will further once the third stage of the study is completed (See Figure 5).

As shown in Figure 5, translation memories and word processors each take up 12% of the minimum contents mentioned in study plans, followed by Internet search, spreadsheets, and terminological management, with 9%. Within the other contents, we can find topics such

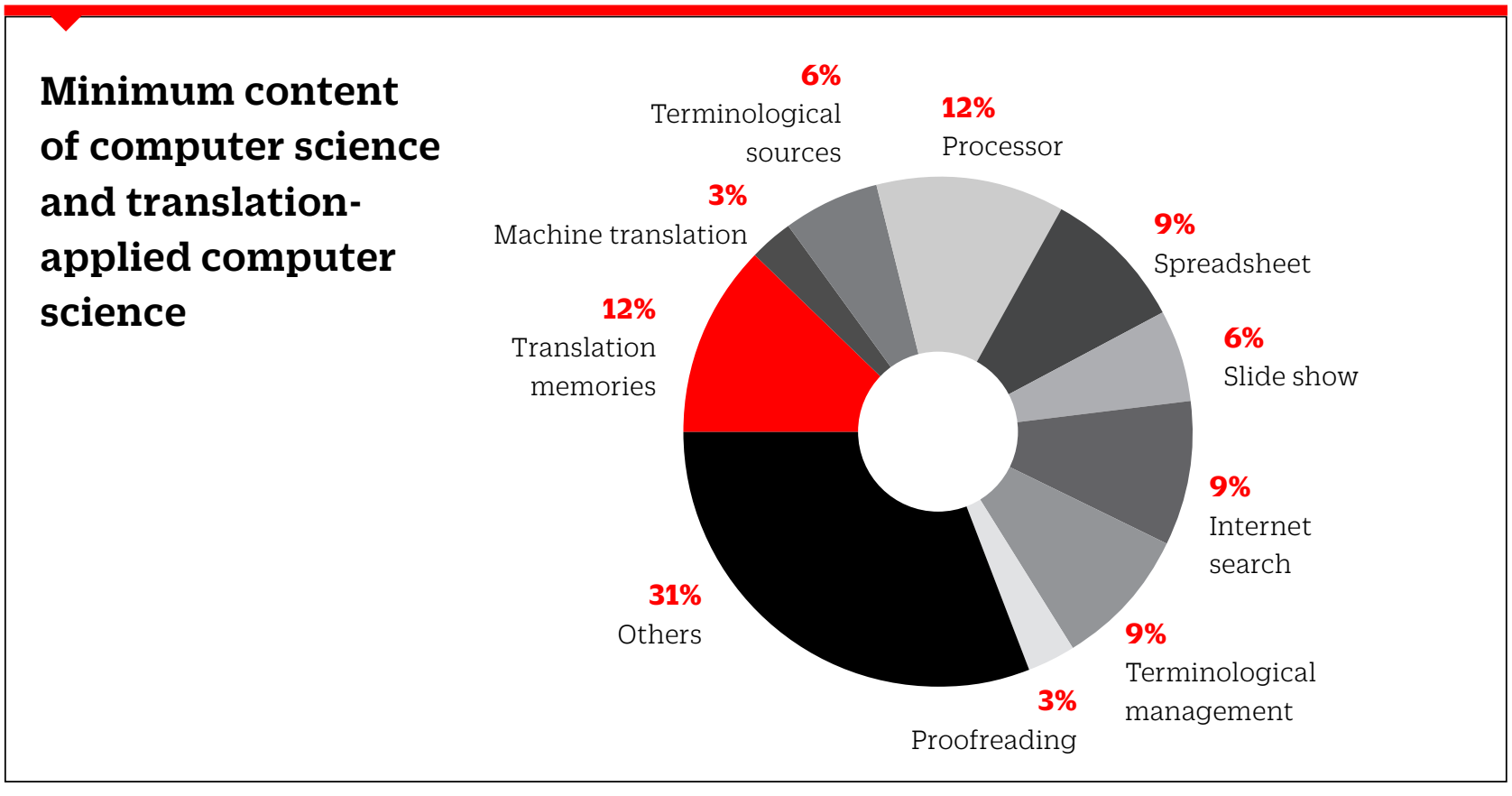

Figure 5. Minimum content of computer science and translation-applied computer science

as professional forums, overall view of translation-applied computer science, software and computer tools, work stations, scanning, hardware, and Microsoft Windows operating system.

We must keep in mind that the contents related to computer science or translation-applied computer science can be included in other courses that are not specific to the development of instrumental competence in these topics. Again, from the analysis of minimum contents of the study plans we were able to gain access to (complementary terms at UADER, UBA, UNCO, UNLAR, UNLP, UNC, UNR, UNLA, UNCU) and the answers provided by program directors or heads of departments to the questionnaires from the second stage of this study, it is possible to identify the presence of the aforementioned contents in other courses of the study plans (see Figure 6).

Figure 6 shows that translation memories and Internet search are two topics frequently mentioned on the minimum contents of other courses from study plans of translation undergraduate programs in Argentina, along with topics such as terminological sources and management, and other contents such as professional forums, overall view of translation-applied computer science, software and computer tools, work stations, scanning, hardware, and Windows operating system.

The inclusion of topics such as proofreading, image editing, and subtitling is noteworthy, though other topics such as layout, website localization, project management, and machine translation post-editing are still missing.

Minimum content of computer science and translation-applied computer science in other subjects

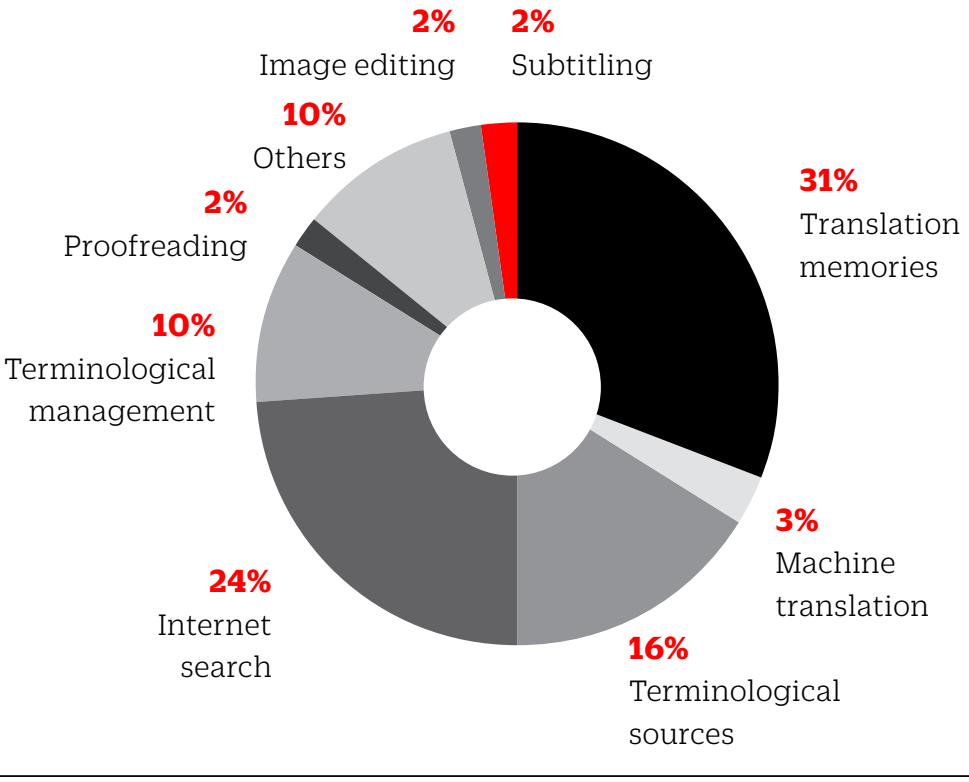

Figure 6. Content of computer science and translation-applied computer science in other courses

Translation-applied computer science in other subjects

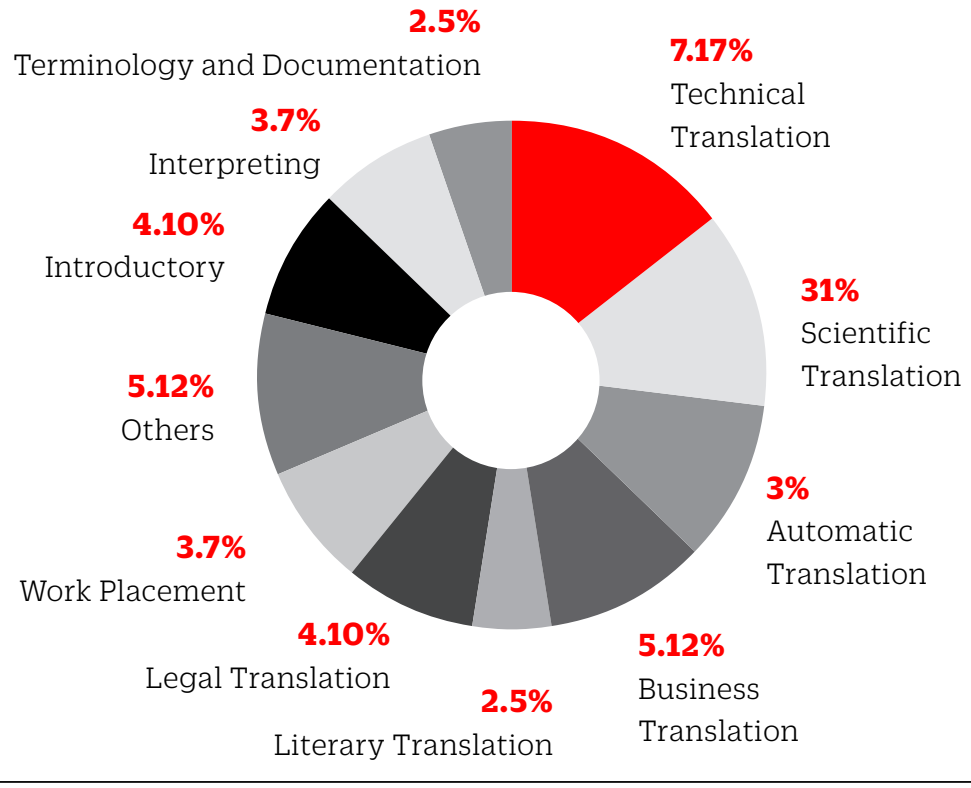

Figure 7. Computer science included in other courses.

Using the same documents for data collection, we can notice that these topics are mentioned in minimum contents of different courses (see Figure 7). They are mentioned predominantly in courses such as Technical and Scientific Translation, followed by Business and Legal Translation, Introductory subjects[4], among others (Inverse Translation [UBA], General Translation and new specializations [UNLAR], Journalism Translation [UNLAR], CAT Workshop [UNLP], interteaching workshops [UNC]).

Lastly, we can observe the number of courses that include topics related to computer science and translation-applied computer science in their minimum contents per program (except in the cases of UNCA and translation programs at UADER) (See Figure 8). This suggests that an average of 12.55% of mandatory courses include translation-applied computer science in their minimum contents. We must explain this observation and add that this percentage does not imply credit hours allocated nor the depth of the approach to these contents, but it does provide a glimpse of the cross-section of contents related to translation-applied computer science, which seems to be lower in UNLP, UNCU, and UADER's ECC; and higher in UNLAR.

4 These include courses such as Translation I (UBA), Translation Methods and Techniques (UNC), Translation and Translation Studies (UNC), Translation and Translation Studies II (UNLAR).

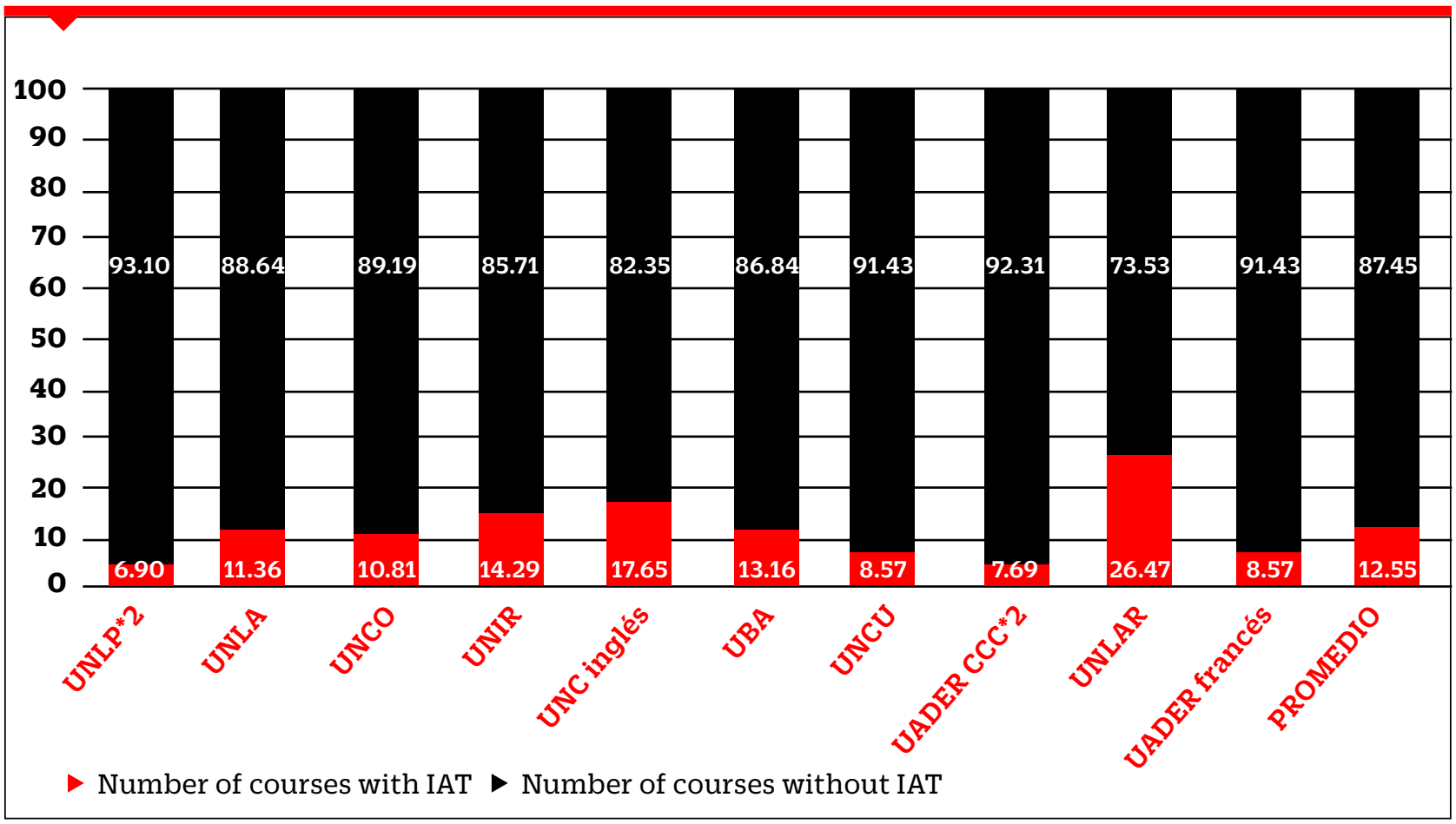

Figure 8. Percentage of courses with content on computer science

DISCUSSION

Although the data we have so far is partial since we did not gain access to the minimum contents of all the study plans of translation programs offered by public universities in the country and we have yet to obtain the results of the third stage of the study, we can draw a series of preliminary conclusions from the information obtained so far:

- Only 33% of translation undergraduate programs in Argentina include any mandatory course on translation-applied computer science (one course in 100% of the following cases: UNCA, UNCO, UNCU, UNLA and UNLAR). The courses began to take place between 2013 and 2016, so there is an initiative to adjust the study plans to the new translation market demands.
- The comparison between this information and the data obtained by Colominas y Piqué (2013) and Plaza Lara (2016) shows that, whereas all study programs in Spain have courses on computer science and translation-applied computer science (in many cases, courses that discuss solely a particular topic; for example, software and website localization, or project management), not all translation programs include these courses in Argentina.
- The courses on translation-applied computer science represent, on average, 1.69% of the total credit hours, a percentage significantly lower than the estimated percentage

of 3.33% of the total credits suggested by ANECA (2004) for contents of technology applied to translation and interpreting (Colominas & Piqué, 2013).

- If we also include the courses on general computer science (optional modules at UNLA, mandatory workshop at UNCU, and mandatory level at UADER French), the average rises to 2.78% of the total credit hours[5].
- Out of the four-year study programs, the course on translation-applied computer science is placed on the second year at UNLA and UNLAR (fourth quarter), whereas it is placed on fourth year at UNCU and UNCA (seventh quarter and full-year, respectively). On the other hand, the five-year program at UNCO places the course on translation-applied computer science on fourth year (seventh quarter). There does not seem to be a clear trend but there is a longer period of time to transfer the instrumental competences acquired to the rest of practical courses on translation at UNLA, UNLAR and UNCO.
- The contents more frequently included in these courses are translation memories, word processors, Internet searches, spreadsheets, and terminological management.
- However, as opposed to the observations by Colominas y Piqué (2013) in Spain, the inclusion of content such as quality control, layout, website localization, image editing, project management, subtitling, and machine translation post-editing is not explicit in the courses on computer science and translation-applied computer science.
- Some institutions make up for, or complement, the lack of courses on translation-applied computer science by including technologies in other courses: Technical and Scientific Translation, Business and Legal Translation, among others. Terminological sources are added to the main contents of computer science courses.
- In descending order, UNLAR, UNC (English) and UNR have more courses including computer tools for translation (between 26.47% and 14.29%). This piece of information indicates the cross-section of technology implementation, but it does not mean that more credit hours are allocated to these contents.
- Finally, the limited appearance of contents such as proofreading, subtitling, image editing, and the absence of more advanced contents of translation-applied computer science, such as layout, project management, machine translation post-editing, and localization illustrate the challenge that lays ahead of the translator training institutions in Argentina in order to provide an education that fulfills the current market demands.

5 The previous percentages exclude the areas of translation-applied computer science that were not considered in current study plans, such as Computer-assisted Translation Course at UNLP or interteaching workshops at UNC: both proposals are presented as ways to make up for the lack of a formal course on translation-applied computer science in the translation study plans of these institutions.

It is necessary to emphasize the preliminary nature of the conclusions previously presented due to the limitations of data collection instruments (study plans, course programs and questionnaires): on one hand, not all institutions publish their complete study plans online, and we also had trouble contacting some universities to request the missing documents and get answers to the questionnaires; on the other hand, the minimum contents showed on the study plans not always reflect the topics specifically discussed on the courses.

Due to these limitations, it is necessary to proceed with the third stage of this study in order to complete the data and gain a deeper understanding of the subject of the study from the information provided by the same teachers of the courses on translation-applied computer science and other courses.

It is possible that the third stage sheds light on the depth of the topics discussed both on courses specific to translation-applied computer science and other courses, in order to specify, for example, whether they only provide a theoretical introduction to the topics or they lead to practices that seek a concrete management of the relevant tools per topic, or what type of activities are performed.

In addition, it is yet to be known what promotes the transfer from instrumental competences related to technologies to practical courses on translation.

When faced with the current professional environment translators must perform in, there is a clear need for technology training both to make the most of the possibilities provided by these resources and to have competitivity. Translation training programs must rise to the challenge of an ever-changing field such as technology and foster training in communities where technologies are analyzed and implemented in situations as real as possible, and experiences are shared in order to gradually develop an autonomous management of these tools. The data presented represents a concrete approach to the inclusion status of translation-applied computer science in translation undergraduate programs in public universities in Argentina, which allows us to shed light on the answer of these universities to this challenge, identify goals and shortcomings in order to glimpse possible paths to provide a translation undergraduate training that allows our students to better perform in the work world.

REFERENCIAS

Alcina, A. (2008). Translation technologies: Scope, tools and resources. *Target*, *20*(1), 80–103. doi: https://doi.org/10.1075/target.20.1.05alc

ANECA (2004). *Libro Blanco del título de grado en traducción e interpretación*. Recuperado de https://goo.gl/bK1dYw

Austermühl, F. (2001). *Electronic Tools for Translators*. NewYork: Routledge.

Badia, T., Freigang, K.-H., Haler, J., Horschmann, C., Huber, D., Maia, B., … Schmidt. (1999). *LETRAC Curriculum Modules*. Recuperado de http://www.iai-sb.com/docs/D3.pdf

Bowker, L. (2002). *Computer-aided Translation Technology: A Practical Introduction*. Canada: University of Ottawa Press.

Castro Roig, X. (2011). Prólogo. In G. González, D. Santilli, & M. Desalvo (Eds.), *Herramientas informáticas*. Buenos Aires: Editorial Colegio de Traductores Públicos de la Ciudad de Buenos Aires.

Chaia, G. (marzo 2012). *La formación de traductores en Argentina*. Trabajo presentado en el I Ateneo Interuniversitario: Diagnóstico y acciones para el desarrollo de la Traductología, La Plata, Argentina.

Colominas, C. & Piqué, R. (2013). Les tecnologies de la traducció en la formació de grau de traductors i intèrprets. *Tradumàtica: Tecnologies de La Traducció*, *11*, 297–312. doi: https://doi.org/10.5565/rev/tradumatica.43

Dal Dosso, H. (2007). *La inclusión de las TIC en los programas universitarios de formación de traductores de la Argentina*. Recuperado de https://goo.gl/gY5SLZ

Gouadec, D. (2007). *Translation as a Profession*. Amsterdam/Philadelphia: John Benjamins Publishing Company.

Haynes, C. (1998). *Breaking Down the Language Barriers*. London: Aslib.

Hernández, R., Fernández, C. & Baptista, P. (2010). *Metodología de la investigación* (5.ta ed.). México: McGraw-Hill/Interamericana.

Kelly, D. (2002). Un modelo de competencia traductora: bases para el diseño curricular. *Puentes*, *1*, 9–20. Recuperado de https://goo.gl/1o57Nf

Kingscott, G. (1996). The impact of technology and the implication for teaching. In C. Dollerup & V. Appel (Eds.), *Teaching Translation and Interpreting 3, New Horizons* (pp. 295–300). Amsterdam and Philadelphia: John Benjamins.

Kiraly, D. (2005). Project-Based Learning: A Case for Situated Learning. *Meta: Journal Des Traducteurs*, *50*(4), 1098–1111. doi: https://doi.org/10.7202/012063ar

Martín-Mor, Á., Piqué Huerta, R. & Sánchez-Gijón. (2014). *Cambios en el paradigma de la traducción digitalizada*. Recuperado de https://goo.gl/3C2LoZ

Melby, A. (1998). *Eight Types of Translation Technology*. Recuperado de https://goo.gl/pCY7vd

Olvera Lobo, M. D., Robinson, B., Castro Prieto, R. M., Quero Gervilla, E., Muñoz Martín, R., Muñoz Raya, E., … Díez Lerma, J. L. (2007). A Professional Approach to Translator Training (PATT). *Meta: Journal Des Traducteurs*, *52*(3), 517. doi: https://doi.org/10.7202/016736ar

PACTE. (2003). Building a Translation Competence Model. In Alves, Fabio (Ed.), *Triangulating Translation: Perpectives in Process Oriented Research* (pp. 43–66). Amsterdam: John Benjamins. Recuperado de https://goo.gl/pnswhb

Piqué Huerta, R. (junio 2002). *Apuntes para un modelo pedagógico de enseñanza a distancia de la tradumática*. Trabajo presentado en el Primer Simposi sobre l'Ensenyament a distància i semipresencial de la Tradumàtica, Bellaterra. Recuperado de https://goo.gl/U3BC9h

Piqué Huerta, R., & Sánchez-Gijón, P. (julio 2006). *La digitalización del proceso de traducción*. Trabajo presentado en el Primer Congreso Internacional de Traducción Especializada, Buenos Aires. Recuperado de https://goo.gl/Tt1USC

Plaza Lara, C. (2014). *La enseñanza de la traducción asistida por ordenador: análisis didáctico-curricular y propuesta de integración de la subcompetencia instrumental-profesional en el aula* (Tesis doctoral). Recuperada de http://riuma.

uma.es/xmlui/handle/10630/8126

Plaza Lara, C. (2016). Instrumental Competence in Translation and Interpreting Curricula in Spain: Pre-EHEA vs. EHEA Bachelor's Degrees. *Current Trends in Translation Teaching and Learning E*, *3*, 258–310.

Resolución CS n.º 285. Universidad Autónoma de Entre Ríos, Paraná. Argentina, 10 de octubre de 2014.

Salinas, S. (octubre 2013). *Sobre la necesidad de la incorporación de las tecnologías de la traducción a los traductorados de Argentina*. Trabajo presentado en el XIV JELENS - I CLELENS - Desafíos de la glotodiversidad en el siglo XXI: enseñanza, investigación y extensión, Santa Rosa, Argentina.

Samson, R. (2005). Computer-assisted translation. In M. Tennent (Ed.), *Training for the New Millenium* (pp. 101-126). Amsterdam/Philadelphia: John Benjamins Publishing Company.

Samson, R. (2013). El aprendizaje de las herramientas informáticas en la formación del traductor. *Tradumàtica: Tecnologies de La Traducció*, *11*, 247–256. Recuperado de https://goo.gl/K1KCwi

Veiga Díaz, M. T. (2013). La formación especializada en el nivel de posgrado en España: másteres y doctorados en traducción con componente tecnológico. *Tradumàtica: Tecnologies de La Traducció*, *11*, 313–325. doi: https://doi.org/10.5565/rev/tradumatica.41

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