Investigating the experience of translation technology labs: pedagogical implications

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ABSTRACT

This article presents an on-going evaluation of translation technology lab sessions in a university setting. Lab sessions are practical supplements that allow student translators to develop upon what has already been learned in theory via traditional lectures. Both of these components develop the technical competencies required for professional work in translation, post-editing, and related areas. Data pertaining to the evaluation of the labs were collated and analysed using a mixed-methods approach, where the current paper focuses on the qualitative aspects. Upon examination of the data, several areas were identified as having the potential to be improved upon: attitudes, abilities, and resources. After making modifications to the labs, a follow-up study was carried out in the following academic year, the results of which were compared and contrasted with that of the first study to ascertain if the efforts to improve the labs were successful, and to guide further work.

KEYWORDS

Translation technology, translation memory, machine translation, computer-aided translation, pedagogy, mixed-methods, teaching, translation.

1. Introduction

Several sources have discussed topics of translator training in relation to technology, and highlight many complexities and difficulties of such endeavours (e.g. Kenny 2007; Kenny and Way 2001; Knight 2003; O'Brien and Kenny 2001, 2006; Pym 2002; Pym *et al.* 2006; Doherty *et al.* 2012). This article focuses on the experiences of translation technology labs and highlights issues encountered both by lecturers and students.

First of all, the initial study to identify these issues is described in detail, which is followed by the steps taken to remedy them. A follow-up study with the following cohort provides an investigation into the extent of the success of the above work and its fallout highlights further scope for feedback and improvement and future avenues for research and development; all with the aim of improving the quality of translation technology labs. We begin with a brief introduction to the context of the study by describing the module, its content and learning outcomes, and the rationale for its evaluation and development.

Labs are practical components of a module and typically follow a lecture on a weekly basis. Generally speaking, the aim of labs is to enable students to put into use the theory they have gained from the related lecture, thereby playing a more active rather than passive role in the learning process and consequently helping the students to grasp the subject matter at a deeper level: one of use and reuse. The labs in this

study are part of a module in translation technology (henceforth TT) which aims to provide student translators with technological competencies needed in their future professional careers. The module is a compulsory part of the curriculum for final year students on B.A. (4 years) and M.A. (1 year) programmes in translation studies; the majority of the cohort consisted of the latter, and focus on translation modules such as TT, translation theory, and specialised translation. This study concerns the lab content of this module in both the 2009/2010 and 2010/2011 academic years.

In terms of module structure, the students had a weekly lecture over the course of a 12-week semester. The cohort was approximately 90 students and was divided into three groups. Each group was assigned two hours of labs per week, in addition to the two-hour weekly lecture. In smaller groups, the students attended labs following this weekly lecture. Learning material was provided online which the students actively used and tended to be already familiar with prior to the labs. The labs were split into two components: translation memories (henceforth TM) and machine translation (henceforth MT). Towards the middle of the semester, students were given an assignment relating to the first topic (TM), and the final assignment was made available towards the end of the semester with a deadline close to the post-semester exam period. Undergraduate students had the option to pick one of the two assignments mid-semester and submit towards the end of the semester.

2. Learning outcomes

The intention of this TT module is to help students conceptualise a translation role that encompasses new tasks such as post-editing and working with MT. Rather than a translator who translates each sentence from scratch, the current market requires translators who understand and can use information technology (IT) and, more importantly, TT tools. Lectures are intended to provide a sound theoretical underpinning of exercises undertaken in lab sessions. Although professional levels of competency would require day-to-day use of computer-assisted translation (CAT) tools, the laboratory sessions contain repeated tasks that, once the purpose of these tasks is understood, are intended to cultivate basic competence of the tool, which can then be built upon further. The learning curve for CAT tools is widely acknowledged as being steep (García 2006: 98), but basic competence can be built on once the students begin to work as professional translators.

As a current market-leading TM tool (Lagoudaki 2008a), SDL Trados Studio 2009 was used for most of the TM exercises. Despite reports that SDL Trados users (of 231 translators surveyed in Lossner 2010) were cautious about upgrading to Trados Studio 2009, it was felt that this recent iteration was best suited to equip students for future translation

work. In addition, other tools and their unique selling points were explained to students and they were encouraged to try free versions, if available. They were also introduced to the concept of open-source software and open-source translation tools. Lab session plans were open to change as close as possible to the lab sessions in order to encompass the most timely and up-to-date information that could be found. These updates demonstrated to the students that the process of computer-assisted translation is constantly in transition.

3. Lab content

Lab sessions began with an overview of basic computing to ensure that the students were familiar with IT and nomenclature that would be used in the subsequent classes. Following this, they were introduced to SDL Trados Studio, and the work-spaces within the software that they would need to familiarise themselves with for setting up a project, checking analysis results, interactively translating documents, and managing TMs. They were then introduced to the alignment process using WinAlign and shown how to recycle, convert, and invert the direction of TMs. This was followed by an introduction to concordance tools and to Omega-T, an open source TM tool. Having installed Omega-T, they converted TMs that they had created using SDL Trados Studio 2009 to a compatible interchange format - in this case Translation Memory eXchange (TMX) - and translated a document interactively within Omega-T. This also made the students aware of the necessity of standards and interchange formats.

With regard to the MT component (for a more detailed description of this component post-evaluation, see Doherty *et al.* 2012), the theory and necessary background knowledge is provided in the relevant lecture prior to the labs. Therefore, MT, its paradigms, and its usage have already been conceptualised by students. After an introductory lab session on MT paradigms and systems, the focus moved to MT evaluation by means of test suites and automatic metrics (such as edit distance), pre-processing MT content by means of controlled language, and post-editing MT output using online MT systems (such as Systran's BabelFish, Google Translate, and PROMT). Finally, by using Google Translator Toolkit, an open-source translation environment, students merged their knowledge from TM and MT to translate and post-edit in this online collaborative environment.

4. Structure of study

4.1 Rationale

As the lab sessions primarily focus on technological competencies, there is a requisite for the content to be constantly updated to reflect current developments and demands of both industry and academia. Constant changes can result in disruption in the learning process and may lead to

possible failures in both the labs and the overall module, for both the student and the lecturer. With this in mind, a consistent and repeatable evaluation was necessary to ensure that the implemented changes were successful, that no further hindrances arose.

4.2 Aims

The primary aim of the study was to evaluate the current experience of translation students in their labs. Once issues were identified, the aim was to propose and implement possible solutions, and to re-evaluate after each semester/academic year.

4.3 Data sources

Due to the exploratory nature of the initial study, there was a focus on the lecturers collecting data from experiences both in the labs from the point of view of the students (e.g. comments and issues raised, and observable difficulties/behaviours) and the lecturers themselves, and outside of the lab in terms of preparation and reflection. Reflective journals were kept by the lecturers and were updated on a weekly basis, where immediate issues, e.g. software not working, were communicated so that they could be addressed before the next session. The reflective journals kept by each lecturer provided a great deal of rich qualitative data.

At the end of the semester, these data were compared and contrasted to the results of the online survey filled out by the students, which contained qualitative and (mostly) quantitative measures on a five-point scale. The survey was designed for the evaluation of this module and therefore specifically related to the content of the lectures and labs. It was found to be valid and reliable prior to its use here (see Flanagan 2009).

4.4 Methods

Firstly, the data were collated from each reflective journal and the results of the online surveys. Due to the exploratory design of the study and the need to emphasise and focus on the individual in the lab setting, a thematic approach was taken, with a particular focus on the qualitative results. A phase of qualitative coding was carried out to identify themes, which could encompass the problems encountered. This consisted of each lecturer grouping the journal content into themes. The findings of both lecturers were then combined and refined. These themes were further explored by relevant literature, which provided support, solutions and context for the findings.

5. Results

The themes identified from the data were: attitudes, the students' abilities, and resources. Each theme will now be described in greater detail and a corresponding redress will be taken in the following section - Section 5.2 Identified Solutions.

5.1 Themes identified

5.1.1 Attitudes

From a combination of observations and comments provided both from the reflective journals and the online survey, it was evident that the attitudes of the students were an essential area, which needed to be addressed due to their fundamental impact on the learning process. Most importantly, the motivation for learning differed within the group. Unsurprisingly, the final year undergraduate students tended to see the labs as a necessary component for completing the module and attaining a desired result in their final year of studies, whereas the M.A. students had a greater interest and eagerness to learn, probably stemming from their selection of the post-graduate course in the first place, and the realisation and expectations they had of the translation industry.

An interesting example is given by Lagoudaki (2006: 35) who found that over 82% of translators used TM. Perhaps such findings have filtered down to students of translation who seem to perceive the ability to use translation technologies as an advantage or even prerequisite for entering into the translation market. The motivation for learning has, of course, a great impact on the approach the student has to learning and, consequently, the strategies adopted to attain the desired goals. A case in point was the attendance of students of each cohort. While the undergraduate students tended to attend far fewer labs once they had chosen the topic of their assignment, the postgraduate students' attendance was consistently excellent throughout.

With regard to MT, the attitudes of student translators, and indeed of non-translators in general, tend to be very sceptical, cautious, and in most cases prematurely biased. However, it is argued here that by embracing TM and MT, translators can reap the benefits of such technologies and keep up with, if not ahead of, this inevitable curve - after all, translation and technology are not mutually exclusive. It has also been found that the use of MT is now considered more common practice (Champollion 2003: 12; He *et al*. 2010: 622), especially with the prevalence of free online MT systems, e.g. Google Translate (translate.google.com) and Systran (systran.co.uk). However, such systems can be seen to be part of the problem in that they do not represent the full potential of MT, and commercial products tend to have better results, especially when

implemented in a particular scenario/work-flow and customised to the user's needs or domain/genre. Another interesting finding is presented by Lagoudaki (2008b: 266), who found that the amount of translator experience had an impact on their acceptance of MT whereby experience appeared to correlate with less acceptance. Given that the students had little or no experience as professional translators, it was surprising that they were already largely against MT.

5.1.2 Abilities

The theme of abilities was very prominent in that a huge variance of skills existed within such a demographically diverse cohort. Abilities in IT skills and knowledge were of great importance for the labs and some students struggled greatly, even with extra assistance, while others finished in a fraction of the time. Lagoudaki (2006: 22) reports that 51% of TM users received no formal training in their use, and given such a changing industrial environment where the translator needs to be competent with a growing variety of formats (such as XML, HTML, DTP, XLIFF, and other proprietary formats) and software packages, familiarity with basic Microsoft packages alone is no longer sufficient.

This variance in abilities was reflected in levels of experience in translation and other professional work. The post-graduates tended to have some experience after their undergraduate studies, which added to their skill-sets and brought additional insight to the labs, especially for those who had direct experience in the translation industry and offered a *real-world* perspective on the topics of the labs. The variance in ability was problematic in terms of providing an adequate workload and time frame for the lab content. Accommodating the students whose abilities were advanced and took little time to navigate through the material had to be balanced with assisting the students who struggled with basic IT skills (such as word processing, using a web browser, and file management).

5.1.3 Resources

The study showed the importance of resources available for TT lab sessions. In order to provide the students with experience of a variety of TM tools, and in doing so, to show the underlying concepts of reuse that are shared by those tools, we found it helpful to use or introduce several different tools such as Omega-T and Wordfast. The relative affordability and the availability of open-source packages allowed such software to be easily provided in an attempt to allow the students to consider the costs and features set that they would choose in a TM tool, especially as many of them would potentially work as freelance translators. Attempts to use a variety of tools, however, may be hampered depending on institutional flexibility and technology restrictions. In our case, the university uses a single image for machines in the TT lab. This image contains the operating

system and software to be used for the academic year, and is set up in September when the academic year commences. Human resources available restrict the time available for installing and testing software within this system. In addition, updates and new iterations that are released during the academic year cannot be easily added to the system image, and may require waiting until the following September to be incorporated.

A further institutional restriction was the disk space available to students. Our university limits students' personal directories to 50MB, which was less than the space required for some translation tools that automatically set up projects that are saved in large files within a nest of folders. In addition, although some programs may not save particularly large files within a project, more disk space may be required while these projects are edited or created.

One of the main learning outcomes intended from the TT lab sessions was an ability to conceptualise the processes underlying the tools used prior to the lab and a reflection thereafter. In structuring the lab content, the intention was for the student to understand these concepts before applying them in the use of a tool. Lab sessions began with succinct explanations of what was to be done that day, stressing the purpose of the exercises rather than allowing students to blindly follow instructions. These introductions were kept short as, as Pym identified, there may be difficulties for a lecturer in a lab scenario who is effectively "competing with the screens" that are in front of each student (2002: 116). Students who were less familiar with technology tended to be more rigid in following instructions due to their unease with the software. We tried to focus particular attention on these students and to pause the class to reiterate and discuss the purpose of exercises.

Fig. 1 - The TT lab from the lecturer's desk

5.2 Identified solutions

This section provides the solutions proposed to resolve the issues identified in the previous section.

5.2.2 Attitudes

In order to draw students into the labs and maintain their interest, the rationale and aims for each individual lab were emphasised at the beginning of each lab. This attempted to address students' questions such as: why are we doing this? What has this to do with what we did last week? How does this relate to my future work as a translator? Can I actually use any of this knowledge in my translation work? As a consequence of providing clear and concise reasons to attend class, both attendance and time keeping improved and continued at excellent levels.

5.2.3 Abilities

Firstly, in order to provide additional support to students who required more experience with basic IT skills, an extended preparation class was provided at the beginning of the semester, and further additional support was offered on an *ad hoc* basis. To account for students who finished early, smaller discussions of the topic at hand were initiated as said students usually finished at the same time as their immediate neighbours. This resulted in them being somewhat more engaged and less likely to leave the lab early, thereby disrupting other students and potentially leaving a feeling of lower competency on the part of the others. The small-scale discussions should not have been an inconvenience to the other students as the labs generally accommodated for students talking to

each other throughout, especially to share advice and problems which would then be drawn out into a class discussion where appropriate. Additionally, this led to the more advanced students having new ideas about the topic in question and to go through the exercise again using, for example, a different language pair or MT system.

5.2.4 Resources

In terms of resources available, we found it necessary on several occasions to liaise with the institutional IT department in order to setup and maintain the required software throughout the semester. In some instances, this proved to be a difficulty when problems arose during the labs and the lecturers had a restricted level of access and therefore needed external assistance to solve the problem. While the IT department was entirely supportive and effective, this inevitably led to disruptions to the lab, and sometimes, the carrying over of work into the following week. Similarly, we were limited as to what software we could use in the lab sessions. To counteract problems that the students experienced due to hard disk space restrictions, their allowance was increased sufficiently by the IT department. Furthermore, discussion and explanation time was allotted to class time when structuring the sessions, and content was updated on a continuous basis, so that the latest developments in TT and current issues and content from industry could be mentioned in the class. Inclusion of current industrial trends stemmed from this and led to content such as controlled language, post-editing, and open-source tools being emphasised.

6. Follow-up study

Following the identification of the issues as described above, the proposed solutions were implemented in the labs for the following academic year (2010/2011). Data were again gathered at the end of the semester via the online survey and we will now highlight areas relating to the issues to be resolved.

Qualitative feedback from the students highlighted their appreciation and enjoyment of the hands-on, practical approach. Many stated that being urged to be critical about using technologies and identifying the advantages and disadvantages was something new for them and, in retrospect, of great importance. They reported additional learning from the debates and discussions in the labs, and appreciated being given the rationale for learning as it provided them with clear reasons and aims, and related the topic to that of the rest of the module and in the broader sense. Furthermore, students strongly believed that knowledge of TM and MT would be very helpful for their future career. They were also confident that they could use the technologies for the required purposes, and

showed a strong interest in the possibility of taking other modules in TT and related topics.

On the negative side of the feedback came overwhelming issues with software, especially basic packages such as Microsoft Office and SDL Trados Studio 2009 being unresponsive and crashing resulting in the loss of data, time, and, increased frustration and reluctance to carry out the steps several times over. Additionally, it was evident that students sought many more contact hours in both the lectures and the labs, as they felt that the lecture hours were far too few, and that additional topics that could be of interest and benefit to them could be covered in the labs given additional hours, rather than presented as self-study options.

7. Limitations and lessons learned

These lab sessions were evaluated using a qualitatively focused mixed-methods approach employing an embedded design, which involved constant qualitative appraisal by means of lecturer-student and lecturer-lecturer communication and cooperation. The lecturer-lecturer interactions were fuelled by the content of the reflective journals, and, towards the end of the semester, students took part in an anonymous survey, the contents of which were incorporated into the overall results. An obvious limitation to these approaches is the largely subjective nature of the reflective journals, which was alleviated, in part, by having more than one lecturer/journal. In marrying the results with those of the online survey, which was mostly quantitative data but required a contextual framework, which it is argued, was adequately created by means of the largely qualitative work from the journals and lecturer-student interactions.

Additionally, the presence of a different cohort each academic year provides a degree of uncertainty, and, of course, a new menu of variables and possible issues, and equates to possibilities that the data may be skewed by inconsistencies between the cohorts. Consequently, this presents a difficulty in attribution of causes of and solutions to problems, i.e. the issues encountered may not be due to the content and delivery of the labs but rather to the characteristics of the cohort. Thereby, any possible successes of solutions implemented may also be due to this sampling difference. However, this is an issue common to many research studies in pedagogy, and must be acknowledged and overcome (e.g. test-retest methods), if progress is to be made.

Further limitations were in the curtailment of contact hours that were assigned to TT in the 2010/2011 academic year, whereby the lectures designed to go hand-in-hand with the labs were reduced by half. This presented new issues, such as students' lack of familiarity with the theoretical components and background knowledge and resulted in insufficient time to introduce and fully implement all previous findings for

the following cohort. Therefore, further introductory information that was previously given in the lecture had to be given before each lab. However, it was found that the latter invited further discussion throughout the lab and provides an interesting addition for future cohorts. The curtailed hours were reinstated in the subsequent academic years.

8. Discussion

The study highlighted several areas of interest for translation studies and pedagogy in general. The increasing technological demands placed upon students of various disciplines require greater and more in-depth skills, knowledge, and hands-on experience to be provided during training, especially in areas where certain technologies may be a prerequisite for professional roles. For students of humanities and social sciences, getting to grips with technology may be more of a challenge than that of their peers in other disciplines. This can result in a reluctance to engage with, or fear of technology, which could limit the student's own potential both during and after their studies.

Attitudes, or a "tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour" (Eagly and Chaiken 1993: 1) can be said to develop from the ABC model (Van den Berg *et al*. 2006) wherein the affect (emotionality), behaviour, and cognitive components merge to form an overall attitude towards something, be it a person, object, or school of thought. Attitudes are predominantly formed as a result of the student's own direct experiences, or if none are present, from others. Indeed it was apparent that our cohorts placed more weight on the opinions of others they had encountered by means of observational learning (Bandura 1977). As stated, very few of the students of each cohort had any direct experience with TM or MT, so the presence of their initial and very negative attitudes towards these technologies presents an interesting example of a *learned* attitude, the origins of which are beyond the scope of this study, but are of interest to further work, especially in terms of the promotion of TT tools such as TM and MT and how they are of use to both translators and the general public.

With regard to abilities, the presence of attitudes is also of importance in that if a skill is perceived to be of value and benefit, a motivation to learn would consequently arise. If a negative attitude exists towards, for example, using a CAT tool, then the student is unlikely to want to learn how to use the tool and related technologies. Obviously, such tools are not a blanket solution to problems, nor are they suitable or desirable for all translators, e.g. literary translation. However, many of the skills gained in the process of learning to use these technologies are transferable, and can be used not only for other TMs and MT systems, but also for a much broader range of tasks and conceptual developments for students.

The issue of limited resources is, of course, not novel to research projects such as this. Yet, even with a plethora of software packages and up-to-date facilities, various glitches and institutional restrictions can bring any lab or class exercise to a halt, resulting in an unpleasant impression among students and would-be adopters and meaning further disruptions to scheduled aims and progression. This is of particular concern in early or first interactions with technology where ideas, for example, of MT not working are reinforced when, in fact, it doesn't work for a variety of other reasons unrelated to the MT system itself.

The results of the follow-up study (2010/2011 cohort) further highlight issues with 'buggy' software and the need for more contact hours; both in terms of lectures and labs on the respective topic. Aside from these recurring issues, the proposed solutions to the previous year's problems seemed to have relative success in that such issues were not mentioned by the new cohort, and some of the changes implemented were actually complemented by the new cohort, e.g. reiterating the rationale as explained during the accompanying lecture at the beginning of the lab.

Overall, it appears that the uptake of translation technologies amongst translation students can be a positive and rewarding experience for those concerned. Despite possibly unavoidable initial teething problems, students seem to develop a good understanding of the lecture and lab content and some even venture beyond as is evident in their assignment work over both years. As stated in the rationale above, the struggle to remain up-to-date and provide both an academic and industrial perspective with the lab content needs to be viewed as a continuous process, one which both the student and the lecturer can enjoy and benefit from.

9. Future work

The results of this study were a series of recommendations for TT labs highlighting students' attitudes to TT, the need to cater for different levels of IT abilities, application of sufficient resources, and careful structuring of the lab sessions. Beyond this study, we feel it would be useful to extend this research to a longitudinal evaluation of TT teaching methods at our institution. We feel that we would benefit by sharing our information and experiences with others in the field and other interested parties in related areas.

The academic year of 2012/2013 sees the study continued in its fourth consecutive year. We aim to continue to implement improvements and evaluate them and, of course, maintain a continuous appraisal of the labs. In addition, we plan to include psychometric measures concerning computer self-efficacy (Compeau and Higgings 1995) into the online

survey in order to shed light on the students' own conceptual and skills development as they progress through and complete the semester.

Finally, we will supplement our findings with learning theories to provide more formal and supported guidelines for labs in the humanities and social sciences, as this is an area that has been hitherto neglected. Further collaboration with industrial contacts is a necessity in order to maintain a fresh and critical perspective in the hope that further guidelines can be provided and realised in the content of future labs to ensure our students remain informed and educated in an unbiased fashion, and enter the translation marketplace with strong technical competencies.

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Bibliography

- **Bandura, Albert** (1977). *Social Learning Theory*. New Jersey: Prentice Hall.
- **Bowker, Lynne** (2002). *Computer-aided Translation Technology: A Practical Introduction.* Ottawa: University of Ottawa Press.
- **Champollion, Yves** (2003). "Convergence in CAT: Blending MT, TM, OCR & SR to boost productivity." *Proceedings of Translating and the Computer 25*, *20-21 November, London,* 13.
- **Compeau, Deborah R. and Christopher A. Higgins** (1995). "Computer self-efficacy: Development of a measure and initial test." *MIS Quarterly*, 19(2), 189-211.
- **Doherty, Stephen, Dorothy Kenny and Andy Way** (2012). "Taking statistical machine translation to the student translator." *Proceedings of the Tenth Biennial Conference of the Association for Machine Translation in the Americas.* San Diego: California, U.S.A., no page numbers.
- **Eagly, Alice H. and Shelly Chaiken** (1995). "Attitude strength, attitude structure and resistance to change." Richard E. Petty and Jon A. Krosnick (eds) (1995). *Attitude Strength.* Mahwah, NJ: Erlbaum, 413–432.
- **Flanagan, Marian** (2009). "Exploring the goals of teaching machine translation to translation students: a small-scale online study." *Proceedings of the IATIS Conference 10th July 2009, Melbourne, Australia,* 96.

- **García, Ignacio** (2006). "Translation memories: A blessing or a curse?" Anthony Pym, Alexander Perekrestenko and Bram Starink (eds) (2006). *Translation Technology and Its Teaching*. Tarragona: Universitat Rovira i Virgili, 97-105.

- **Kenny, Dorothy** (2007). "Translation memories and parallel corpora: challenges for the translation trainer." Dorothy Kenny and Kyongjoo Ryou (eds) (2007). *Across Boundaries: International Perspectives on Translation.* Newcastle-upon-Tyne: CSP, 192-208.

- **— and Andy Way** (2001). "Teaching Machine Translation and Translation Technology: a Contrastive Study." Mikel L. Forcada, Juan Antonio Pérez-Ortiz and Derek Lewis (eds) (2001). *MT Summit VIII. Proceedings of the Workshop on Teaching Machine Translation IAMT/EAMT*, 13-17.

- **Knight, Kevin** (2003). "Teaching Statistical Machine Translation." *Proceedings of MT Summit IX Workshop on Teaching Machine Translation*, 2003. http://www.isi.edu/natural-language/mt/teaching-mt.pdf (consulted 04.08.2012).

- **Lagoudaki, Elina** (2006). "TM Survey 2006." *Proceedings of Translating and the Computer 28, 16-17 November, London,* 1-29.

- **—** (2008a). *Expanding the Possibilities of Translation Memory Systems: From the Translator's Wishlist to the Developer's Design*. PhD Thesis. London: Imperial College.

- **—** (2008b). "The value of machine translation for the professional translator." *Proceedings of 8th AMTA conference, Hawaii*, 262-269.

- **Lossner, Kevin** (2010). "Results of the Trados user survey." http://www.translationtribulations.com/2010/08/results-of-trados-user-survey.html (consulted 12.01.2011).

- **Moorkens, Joss** (2012). *Measuring Consistency in Translation Memories: A Mixed-Methods Case Study*. PhD Thesis. Dublin City University.

- **O'Brien, Sharon** (1998). "Practical experience of computer-aided Translation Tools in the software localization industry." Lynne Bowker, Michael Cronin, Dorothy Kenny and Jennifer Pearson (eds) (1998). *Unity in Diversity: Current Trends in Translation Studies*. Manchester: St Jerome, 115-122.

- **— and Dorothy Kenny** (2001). "In Dublin's fair city: Teaching translation technology at Dublin City University." *Language International* 13(5), 20-23.

- **— and Dorothy Kenny** (2006). "Translation technology in the translator training syllabus." Anne Gallagher and Muiris Ó Laoire (eds) (2006). *Language Education in Ireland: Current Practice and Future Needs*. Dublin: Irish Association for Applied Linguistics, 185-192.

- **O'Hagan, Minako and David Ashworth** (2002). *Translation Mediated Communication in a Digital World: Facing the Challenges of Globalization and Localization*. Clevedon: Multilingual Matters.

- **Pym, Anthony** (2002). "Asymmetries in the teaching of translation technology." Anthony Pym, Alexander Perekrestenko and Bram Starink (eds.) (2006) *Translation Technology and its Teaching*. Tarragona: Universitat Rovira i Virgili, 113-124.

- **—, Alexander Perekrestenko and Bram Starink** (2006). *Translation Technology and its Teaching (With Much Mention of Localization).* Tarragona: Intercultural Studies Group.

- **Van den Berg, Helma, Antony Stephen Reid Manstead, Joop van der Pligt, and Daniël H. J. Wigboldus** (2006). "The impact of affective and cognitive focus on attitude formation." *Journal of Experimental Social Psychology* 42, 373-379.

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