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‘Click Next’: On the merits of more student autonomy and less direct instruction in CAT teaching

Lucas Nunes Vieira,\textsuperscript{a*} Xiaochun Zhang\textsuperscript{a} and Guoxing Yu\textsuperscript{b}

\textsuperscript{a}School of Modern Languages, University of Bristol, Bristol, United Kingdom;

\textsuperscript{b}Graduate School of Education, University of Bristol, Bristol, United Kingdom

*corresponding author

School of Modern Languages
University of Bristol
17 Woodland Road
Bristol
BS8 1TE
United Kingdom
E-mail: l.nunesvieira@bristol.ac.uk
‘Click Next’: On the merits of more student autonomy and less direct instruction in CAT teaching

Teaching computer-assisted translation (CAT) can require providing students with direct instructions on how to operate specific CAT tools. As opposed to subjects like translation theories, the teaching of CAT is often expected not only to instigate critical reflection but also to develop students’ instrumental software skills. Striking a balance between these two expectations is not always straightforward, however. This article presents an exploratory investigation that attempted to reduce the use of direct instructions in CAT teaching. We used different combinations of eye tracking, keylogging and screen recordings to examine the performance of students with no CAT experience in three autonomous learning tasks. We found that most students were able to complete the tasks with reasonable success despite the lack of direct instructions. We draw on the education literature to discuss the results and call for further research on the role of tool-specific instructions in the teaching of CAT.

Keywords: computer-assisted translation; CAT; translation teaching; translation technology; translation pedagogy; CAT training

1. Introduction

Technology is increasingly central to translation as a practice and discipline. Being able to use computer-assisted translation (CAT) tools effectively is officially recognised as a component of translation competence (EMT 2017), which underlines the importance of these tools in the translation curriculum. CAT tools provide translators with a suite of technologies intended to improve the translation product and process. One of their main specific functions is to allow translators to re-use segments from previous translations saved in translation memories. CAT tools also include terminology and project management features, and nowadays most of them provide access to machine translation suggestions to be edited and used in the translation process.

CAT tools can be complex, however. Translators often find them ‘irritating’ (O’Brien et al. 2017), and some tools represent a learning curve for those with no
experience. This means that using these tools efficiently requires training. Indeed, many CAT tool developers offer their own educational materials with explicit instructions on how to use the software, which is sometimes followed by exams intended to certify translators’ skills in using a specific tool. The teaching of this subject in academic settings may also involve explicitly directing students on how to use CAT programs. In explaining prior CAT teaching practice, Liu (2014) states that for students with little experience ‘the teacher normally plays a central role—explaining everything and giving instructions at the [sic] each step in the learning process’ (p. 238). The use of instructions on how to use specific tools is also apparent in statements such as ‘any training must involve the particular steps required to operate a given tool […] trainers certainly need to provide students with step-by-step instructions’ (Bowker 2015, 95).

Direct instructions focused on specific tools are known to have downsides, however. They have been reported to turn students into ‘passive learners’ (see Liu 2014, 238), and it is recognised that tool-specific instructions on their own are not effective (Bowker 2015, 95). In teaching audio-visual translation, it has been suggested that a focus on technical details of specific tools may detract from broader and more critical aspects of reflective practice (Nornes 2017, 103). The very need for bringing technical CAT training into the classroom has also been called into question. Pym (2002/2006, 118) suggests that the self-learning opportunities provided by software help documentation and online materials may well be sufficient, for instance. There is thus little consensus on the merits and extent of direct technical instructions in the teaching

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of CAT in higher education. Step-by-step tool-specific training is in some instances described as necessary and in others as undesirable or indeed avoidable.

This paper therefore contributes to the discussion on CAT teaching by presenting a series of exploratory studies aimed at examining the feasibility of increasing student autonomy while reducing the use of direct instructions in CAT activities. Specifically, we check to see if translation students with no previous CAT experience can complete a simple document translation task in a CAT tool with no direct instructions from the teacher on how to use the software.

In the education literature, ‘direct instruction’ – in the singular to signify a broader method rather than a given set of instructions – is usually opposed to constructivist teaching approaches that are often referred to in different ways, including ‘discovery learning’ and ‘learning by doing’ (Klahr and Nigam 2014; Reese 2011). Learning by doing is defined as ‘learning from experiences resulting directly from one’s own actions’ (Reese 2011, 1). This contrasts with ‘learning from watching others perform, reading others’ instructions or descriptions, or listening to others’ instructions or lectures’ (ibid.). What we regard as ‘direct instruction’ in this article involves this second type of learning. In a CAT context, we deem direct instructions to constitute instructor-provided commands that tell students where to click and what operations to perform in a specific CAT tool. What we test here is beginning students’ capability of coping without this type of instructions. In the tasks we present (see Methodology) reducing the use of direct instructions also meant reducing teacher intervention, so we see these tasks as requiring greater autonomy from students in that they are left to develop their own problem-solving techniques. We note that the present paper does not propose a structure for a CAT course, however. Nor does it propose a set activity to be implemented in the classroom from beginning to end. The design of our tasks is
exploratory. They were carried out strictly for research purposes before the start of the regular teaching programme. The tasks adopted an extreme reduction in the use of direct instructions to provide an empirically informed discussion that is hoped to stimulate future research on the feasibility of promoting greater student autonomy at the early stages of CAT teaching.

We structure the remainder of the article as follows. First, we provide a review of previous work on CAT teaching methods and relevant concepts from the education literature. We then describe our methodology, including details of the tasks, students and materials. We subsequently present the results of three exploratory studies that attempted to minimise the role of direct instructions in a CAT task. Finally, we conclude with a discussion of the findings and some suggestions for future practice and research.

2. Literature review

Instructional methods that downplay the role of direct instructions have been discussed at length in the education literature. Early conceptualisations of these methods include ‘independent learning’ (Moore 1973) and, as mentioned in the Introduction, the ‘learning-by-doing’ principle (Dewey 1916, 217). These teaching approaches can be broadly classed as part of constructivist theories of learning (Piaget 1977).

Constructivist teaching methods have been widely researched in translation (Kiraly 2000). Discussions of their application to CAT are to date limited, though for two examples see Alcina et al. (2007) and Mileto and Muzil (2010).

Constructivist methods can take several shapes and the terminology has not been used consistently in the literature. These methods have been referred to as ‘practical experience versus book-learning’, ‘proof upon practice’ and ‘discovery versus instruction’ for instance (Reese 2011). While these methodologies overlap and intersect
in different ways, here we draw mostly on ‘discovery learning’ (e.g. De Jong 2005; Svinicki 1998) as a framework for what we set out to investigate. As the name suggests, in the discovery learning paradigm students ‘discover’ information instead of simply receiving it from the instructor. There is ample evidence that discovery teaching methods lead to enhanced student performance (Freeman et al. 2014). In a large-scale analysis of the literature, Freeman et al. conclude that trainers should adopt an ‘ask, don’t tell’ approach to the teaching of scientific subjects, for example (p. 8413).

However, there are also compelling cases in favour of direct instruction by those who question the merits of leaving students to discover information that is already available or which can be easily provided to them (for a review, see Trninic 2018).

In CAT teaching, the focus of recent research has been mainly on syllabus design and reflections on existing approaches and course structures (e.g. Chan 2010; Kenny and Way 2001; Pym, Perekrestenko, and Starink 2006; Mitchell-Schuitevoerder 2014; Rodríguez-Castro 2018; Enríquez-Raido 2013). There have also been studies that discuss the importance of giving students the autonomy of selecting, using, and honing their own tools, for example in the case of teaching activities involving machine translation (e.g. Kenny and Doherty 2014; Shuttleworth 2017). Aspects of CAT tool interfaces and how students and translators interact with them have also been investigated, with suggestions for how CAT tools might be improved and simplified (e.g. Kappus et al. 2017).

Research on specific instruction styles for CAT teaching, on the other hand, is less common. One instance is Doherty and Moorkens (2013), who evaluate translation technology labs. They describe these labs as a practical component aimed ‘to enable students to put into use the theory they have gained from the related lecture’ (p. 122). Based on a survey of problematic aspects of this lab-teaching mode, they emphasise the
importance of contextualising practical activities to avoid situations where students fail to see how technical tasks relate to broader aspects of their education (p. 129). Similarly, Liu (2014) proposes a structure for contextualised CAT activities and suggests that CAT teaching should replicate real-world practices.

Proposals for project-based CAT teaching that mirror real commissions are also worth noting (e.g. Guerberof and Moorkens 2019). This method may by default downplay the role of direct instructions given its emphasis on experiential learning. However, student-led projects that mirror professional contexts are arguably easier to implement once students are familiar with the basics of how CAT tools work. In Guerberof and Moorkens (2019), for instance, the project-based activities take place in students’ last year of study, whereas our focus here is on an initial stage where students have not yet been introduced to basic CAT concepts or indeed to CAT itself.

To our knowledge, the possibility of reducing the use of direct instructions while students are still learning the basics of CAT has not to date been empirically investigated. The rationale for examining such a possibility lies in the previously mentioned premises that (1) direct instructions may not be required since students might be able to autonomously develop technical skills; and (2) that technical intricacy may inadvertently get in the way of broader conceptual issues, which in the case of CAT may include critical reflection on translation technology itself, its role in translation production chains or how it changes translation practices. Below we describe details of our exploratory tasks.
3. Methodology

The investigation’s overall methodology comprises three exploratory studies. In the first study, seven MA translation students attempted to complete a translation task in the CAT tool memoQ. In the second study, which took place after a three-week interval, the same group of students carried out a task of broadly similar design in a different CAT tool, namely SDL Trados Studio. In the third study, we replicated aspects of the SDL Trados Studio task with ten MA translation students from a subsequent cohort. None of the students had experience of CAT prior to participating in the research. In the remainder of the article, we refer to the three exploratory studies as studies I, II and III, respectively. The sequencing of the studies and overall structure of the investigation is illustrated in Figure 1.

![Figure 1. Sequence of studies and student groups](image)

3.1. CAT tools

The CAT tools used in the investigation are standard desktop tools that need to be installed locally on the computer. Study I was based on the project manager edition of version 8.1.7 of memoQ. Studies II and III were both based on SDL Trados Studio

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2 The investigation was reviewed by the research ethics committee at the authors’ institution.
4 See [https://www.sdltrados.com/products/trados-studio/](https://www.sdltrados.com/products/trados-studio/)
Professional 2017. These are highly prevalent tools among professional translators (see EC, CIOL, and ITI 2017, 27).

The tools’ default interface was used for all tasks. While these two tools have broadly the same layout, their interfaces are nonetheless different. Using two separate tools was required in studies I and II because these studies involved the same group of students. Using a different tool in study II therefore helps to maintain the discovery element of that task (see Introduction and Literature review) in that the different tool was expected to present new challenges to those students. Since a new tool is expected to raise rather than lower the difficulty of study II, we do not see this as an issue in the current exploratory investigation.

3.2. Selection of materials

In examining the merits of downplaying direct instructions in CAT teaching, our focus is on the technical aspects of CAT tools and not on how to translate a given text. For this reason, we selected simple texts containing information that would be familiar to the students. The texts consisted of directions on how to use an electric kettle (see Appendix A).

Since the same students participated in studies I and II, we selected comparable but different texts for these two tasks so as not to ask students to translate the same content twice. We approached the text selection in a way that minimised human bias by

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5 We note that the second study was not pre-announced. The students were invited for the second session at relatively short notice while the teaching term had not yet started. Although we cannot eliminate the possibility that the students might have familiarised themselves with SDL Trados Studio of their own accord during the three-week interval, the data obtained and the conversation we had with the students in the debriefings suggested that this was very unlikely.
choosing two texts (henceforth ‘Text A’ and ‘Text B’) that were automatically clustered together according to several measures of text complexity and readability. We pre-selected 20 candidate text excerpts with similar size from the user manuals of seven electric kettle brands. We then analysed the excerpts with the Coh-Metrix 3.0 text analysis tool (Graesser, McNamara, Louwerse, and Cai 2004). First, we excluded Coh-Metrix indices that had a value of zero for all excerpts. A total of 101 indices remained after this exclusion. We then analysed these indices with the K-Means algorithm, available in the WEKA data mining tool (Hall et al. 2009), to group the 20 candidate texts into ten automatically generated clusters. We subsequently selected two excerpts of approximately equal size from the same cluster. Table 1 shows the word count and length of each text together with measures expected to influence students’ reading and translating performance, including lexical diversity (see Yu 2009) as well as word frequency and text readability (see Hvelplund 2011).

Table 1. Coh-Metrix measures for Text A and Text B. For more information on the VOCD lexical diversity measure, see McKee, Malvern, and Richards (2000). For the CELEX word frequency measure, see Baayen, Piepenbrock, and Guliker (1995).

<table>
<thead>
<tr>
<th></th>
<th>Text A</th>
<th>Text B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Words, count</td>
<td>116</td>
<td>118</td>
</tr>
<tr>
<td>Word length, number of syllables, mean</td>
<td>1.4</td>
<td>1.3</td>
</tr>
<tr>
<td>Lexical diversity, type-token ratio, all words</td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>Lexical diversity, VOCD, all words</td>
<td>40</td>
<td>38.3</td>
</tr>
<tr>
<td>CELEX word frequency for content words, mean</td>
<td>1.8</td>
<td>1.8</td>
</tr>
<tr>
<td>CELEX Log frequency for all words, mean</td>
<td>2.7</td>
<td>2.8</td>
</tr>
<tr>
<td>Flesch Reading Ease</td>
<td>76.5</td>
<td>83</td>
</tr>
</tbody>
</table>

Students used an empty translation memory in all tasks. We added three extra segments to the texts so that translation matches could be generated during the
translation. Specifically, we added the sentence ‘Turn the kettle on and off’ twice to each text to generate a repeated match. To generate a fuzzy match (i.e. where only a portion of the segment being translated matches the suggestion), we added a third similar but non-identical sentence, namely ‘Turn the kettle off and on’. We saved the source texts as Word documents with the opening sentence in bold.

In addition to the empty translation memory students used in every task, we also set up a term base containing Simplified Chinese translations of two terms per text. For Text A, the source terms were ‘spout’ and ‘360° base’, and for Text B they were ‘spout’ and ‘base unit’. Text A was used in studies I and III, and Text B was used in study II. The same term base was used in all tasks.

3.3. Procedure

In all studies, we considered exporting the translation from the tool as the indicator of successful task completion. We did not consider confirming each segment a requirement to declare the task successfully complete because translation memory matches were not the only source of assistance available. Students could also have benefitted from terminology matches, for instance, which would not have required confirming the segments, so exporting the translation seemed like a suitable baseline parameter. To define a cut-off point at which the task would be deemed unsuccessful if students did not export the translation, we conducted a pilot study with three Chinese native speakers who had no translation experience. The pilot participants took an average of 15.7 (SD = 2) minutes to complete the task. We therefore considered the cut-off point at which the task would be deemed unsuccessful if students did not export the translation.

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6 Confirming segments of text in a CAT tool is required for saving these segments in the translation memory. It is only by saving the content in the translation memory that the tool can offer any textual matches to be re-used later.
off point as approximately double that time at 30 minutes, which seemed like a conservative limit. We then conducted a second pilot study with a further four students to test the selected texts and refine the task guidelines. None of the pilot participants was involved in the main studies.

The guidelines we provided to students (see Appendix B) stated the task goal, but not how to achieve it (i.e. they did not include direct instructions on how to use the software). Students had to export the translated document from the tool without copying and pasting the text into Word. They were also told not to use the internet. We deemed forbidding internet searches a desirable way of setting a more difficult benchmark for the task and of avoiding interference from any variation in quality and clarity in user manuals and CAT tool documentation that different students could come across online. While these core details were the same for all three studies, in studies II and III we provided students with brief conceptual introductions to CAT prior to the tasks. Specifically, before study II, students watched the first 6 minutes and 45 seconds of the video What is a CAT tool? – Translation 101 published online by SDL (SDL 2017). The video introduces key CAT features without demonstrating how to use them in a given tool. While this short video clip may provide a very introductory idea of what CAT tools are, the video was a way of ensuring that all students were exposed to the same information and in the same format, so for our exploratory purposes it was deemed suitable. The written guidelines for study II also purposefully used terms that students would come across in the tool itself, such as the ‘target’ document, ‘confirming’ segments and ‘saving’ or ‘exporting’ the text. These same guidelines were used in study III where, instead of using a video the researchers introduced key CAT concepts before the task in a group discussion involving all students at once. This allowed us to provide a more in-depth introduction to CAT concepts while still
preventing the use of direct instructions and ensuring that all students were exposed to
the same information. Like the video shown in study II, the group introduction did not
involve any information pertaining to the tool’s interface. The purpose of the video (in
study II) and our own introduction (in study III) was to check if information on basic
CAT concepts would be of help to the students.

In all studies, we asked students to read the task guidelines twice before
beginning the task. In between readings, we showed them an excerpt of a Simplified
Chinese user manual that was comparable, but different, to the ones they were about to
translate. We did this to activate similar vocabulary and further reduce the impact that
the texts themselves could have on students’ performance. Before all tasks, we asked
students to choose their preferred Chinese input method and then type a perfunctory text
in Word, namely a description of their breakfast, to get acclimatised to the study. After
the tasks, we debriefed students orally to gain insight into their impressions.

3.4. Data collection and processing
We used a Tobii Pro X2–60 remote eye tracker to record students’ eye movements and
the screen in studies I and II. We did not use eye tracking in study III because in this
study the task was carried out by all students independently at the same time, in a
classroom setting. This precluded eye tracking since it would have required multiple eye
trackers that would need to be set up at the same time.

The eye-tracking data was processed with Tobii Studio’s Tobii I–VT fixation
filter, with default settings. Fixation data was obtained by marking the entire area of the

We note, however, that two students ignored our initial instructions and opened the file for
translation before the start of the task. This is unlikely to have given these students an
advantage, but because of this early exposure we mark these students in the Results so that
they can be distinguished from the remainder of the group (see Table 4).
screen covered by the CAT tool as an area of interest. Different minimum values for average fixation duration have been used in previous research for data quality screening. Data is normally excluded when average fixation durations are below 200 milliseconds (e.g. O’Brien 2011) or below 175 milliseconds (e.g. Jensen 2011). As shown in the results (see below), average eye fixations for almost all our recordings were above the 200 milliseconds and none of them was below 175 milliseconds, so we retained all eye-tracking data.

We manually identified the exact beginning and end of each task to obtain task durations. In study III, we recorded the screen, mouse and keyboard activity with BB FlashBack Express. Mouse click counts were extracted automatically from Tobii Studio. To obtain mouse click data for study III, we manually counted the mouse click logs available as a default feature in the video editor of BB FlackBack Express.

### 3.5. Students

To ensure that the students had no previous experience of CAT, the tasks were conducted at the very beginning of the academic year and all students were asked to complete a pre-task questionnaire where they were asked to mention any potential previous experience with translation technology. Students who had used a CAT tool before were excluded. Seven students (P01–P07, 5 females and 2 males) from the 2017–2018 cohort were retained to take part in studies I and II. Study III was based on ten students (S01–S10) from the 2018–2019 cohort\(^8\). All students were native speakers of

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\(^8\) We note that ten recordings remained after a few exclusions. Due to errors, we had to exclude three incomplete recordings from the 2018–19 cohort. In addition, one student who took part in study III was not a native speaker of Chinese like the remainder of the group, so this recording too was excluded. We also excluded a recording pertaining to three students
Chinese who were about to start the same MA programme, so the students’ profile is largely comparable. Their IELTS (International English Language Testing System) (IELTS 2018) scores ranged between 6.0 and 8.0 (out of 9.0). Most of them were between 21 and 25 years of age, except for one student who was between 26 and 30.

4. Results

4.1. Study I

Details of students’ performance in study I, carried out in memoQ, are presented in Table 2. Most students, except for P07, finished the task successfully within the 30-minute limit. While the sample is small and our intention here is not to provide an inferential analysis, these results show that students with no knowledge of CAT could translate a document in a desktop CAT tool without direct instructions on how to use the software.

Table 2. Average fixation duration, task duration, clicks per minute and task completion status for study I (memoQ)

<table>
<thead>
<tr>
<th></th>
<th>Avg. Fixation Duration</th>
<th>Time (min.)</th>
<th>Clicks/Minute</th>
<th>Task Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>P01</td>
<td>0.343</td>
<td>13.3</td>
<td>6.5</td>
<td>Yes</td>
</tr>
<tr>
<td>P02</td>
<td>0.334</td>
<td>21.7</td>
<td>5.2</td>
<td>Yes</td>
</tr>
<tr>
<td>P03</td>
<td>0.32</td>
<td>13.5</td>
<td>5.3</td>
<td>Yes</td>
</tr>
<tr>
<td>P04</td>
<td>0.33</td>
<td>22.8</td>
<td>8.3</td>
<td>Yes</td>
</tr>
<tr>
<td>P05</td>
<td>0.379</td>
<td>22.7</td>
<td>11</td>
<td>Yes</td>
</tr>
<tr>
<td>P06</td>
<td>0.262</td>
<td>14.3</td>
<td>9.2</td>
<td>Yes</td>
</tr>
<tr>
<td>P07</td>
<td>0.212</td>
<td>30</td>
<td>4.2</td>
<td>No</td>
</tr>
</tbody>
</table>

who undertook the task as a group and therefore under conditions that were different to those described above.
Table 2 also shows that there was considerable variation in how students coped with the lack of direct instructions. Average fixation duration is a well-established indicator of cognitive effort or processing in the translation and cognitive psychology literature (e.g. Rayner 1998, 398; O’Brien 2011, 208). Most of this previous work is based on tasks that involve just reading or translating, however, rather than reading, translating and interacting with an unfamiliar software interface. In any case, we regard average fixation duration an approximate measure of cognitive processing in these tasks since, in the process of using the software, students also read tooltips, the names of buttons and other written information on the tools’ interface. On this basis, this measure suggests that P07, who did not finish the task successfully, had the lowest level of cognitive processing in the activity. This participant also had the lowest rate of clicks per minute of the group.

P07 mentioned that she in fact ran out of time. This student ran into difficulties while trying to confirm the segments. She accidently locked segments during the task, which is likely to have influenced her overall task time. This student also had more than one pass through the text, with significant focus on the translation process itself. The student mentioned realising that highlighted words in the source text – the terms that had been matched with entries from the term base – were there to assist her. It was only during the second pass through the text that she looked at the terms’ translation suggestions. P07 managed to confirm the segments in the end, however, which shows some success in learning how to use the tool.

Concerning the operations students performed during the study, although we did not consider confirming segments a task completion criterion, six of the seven students in study I discovered how to confirm the segments. Three of these only did so towards
the end of the task, after the document had been translated. These students therefore did not benefit from the within-document matches proposed by the tool, since the translated segments were not saved in the memory as they worked through the text. This late discovery was nevertheless likely to come in handy in the future (see results from study II, below).

Regarding students’ speed, as we reported previously the pilot participants had no translation experience, which we assumed would slow them down compared to translation students. We observed the opposite effect, however. The translation students were generally more dedicated to the translation and took longer to complete the task even though they were told that the target texts would not be assessed. This means that the 30-minute limit set for the task was slightly harsher for the students compared to the pilot participants, thereby arguably representing a more conservative indicator of successful task completion.

P01 was the fastest student in study I. P01 was also the single student who did not confirm any segments. This did not give this student a significant time advantage as she did spend time attempting to find out how to carry out the confirmation. P01 mentioned expecting the segments to be confirmed automatically. When this did not happen, on various occasions she kept looking for buttons in the vicinity of the segment but could not find the ‘confirm’ button on the top menu. P01 then managed to export the translation with relative ease. She mentioned reading the names of buttons on memoQ’s interface as a strategy for finding out how to complete the task.

P06 was the only student who described study I as easy. Based on our proxy eye-tracking measure, she had a relatively low level of cognitive processing during the task – the second lowest level of the group – and clicked on the interface relatively often, with 9.2 clicks per minute. P06 mentioned paying attention to icons on the tool’s
interface. Notably, this student reported that the tool could increase her speed and that it was useful for repetitive texts. This suggests some previous knowledge of CAT tools and their expected benefits. Although like the other students P06 had not used a CAT tool before, she was more familiar with CAT concepts, which may have facilitated her performance.

To further explore how students coped with the lack of direct instructions, we conducted a more detailed analysis of the data by identifying two distinct phases of the task. The first phase covers mostly the process of translating the source text – henceforth the ‘translation phase’. We deemed a second phase to start at the point students last used the keyboard while translating the text. In this second phase – henceforth the ‘export phase’ – students mostly dealt with the technical aspects of exporting the translation from the tool. It should be noted that the translation phase did not necessarily include only translation-related activities. This phase usually involved the process of finding out how to confirm the segments, for instance. Discriminating between these phases in any case serves to isolate a moment of the task containing just the technical operations required to export the document, which can shed further light on how students interacted with the tool. Table 3 presents results corresponding to these two phases for those who finished the task successfully. A separate final stage was not apparent for P07, who focused on attempting to confirm the segments and on translation editing rather than on exporting the document from the tool. We therefore do not present details of the two phases for this student as a distinction between them is not clear-cut in her case.
Table 3. Average fixation duration, clicks per minute and duration for the translation and technical phases in study I (memoQ)

<table>
<thead>
<tr>
<th></th>
<th>Translation</th>
<th></th>
<th></th>
<th>Export</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Avg. Fixation Duration</td>
<td>Clicks/minute</td>
<td>Time (min.)</td>
<td>Avg. Fixation Length</td>
<td>Clicks/minute</td>
</tr>
<tr>
<td>P01</td>
<td>0.381</td>
<td>5</td>
<td>8.8</td>
<td>0.284</td>
<td>9.6</td>
</tr>
<tr>
<td>P02</td>
<td>0.329</td>
<td>4.6</td>
<td>18</td>
<td>0.361</td>
<td>8.6</td>
</tr>
<tr>
<td>P03</td>
<td>0.33</td>
<td>5.7</td>
<td>12.1</td>
<td>0.256</td>
<td>1.4</td>
</tr>
<tr>
<td>P04</td>
<td>0.333</td>
<td>7.7</td>
<td>20.9</td>
<td>0.297</td>
<td>14.7</td>
</tr>
<tr>
<td>P05</td>
<td>0.408</td>
<td>5.9</td>
<td>8.3</td>
<td>0.365</td>
<td>13.9</td>
</tr>
<tr>
<td>P06</td>
<td>0.261</td>
<td>8.9</td>
<td>12.5</td>
<td>0.267</td>
<td>11.7</td>
</tr>
</tbody>
</table>

As can be seen, the export phase was shorter for most participants except for P05. This was the student with the longest average fixation of the group for both task phases, which suggests a high level of cognitive processing. P03 had the shortest export phase. After finishing the translation, P03 spent approximately a minute and a half visually exploring the tool’s interface to find out how to export the document. The export phase for this student included only two clicks, which were both required for the document export. This suggests that P03 refrained from clicking on buttons when he was unsure about their function. After scanning the ribbon a few times, he clicked on the Documents pane and then found the Export button. This was a different problem-solving approach compared to the remainder of the group, who were more inclined to experiment with different buttons.

Generally, the results reported above show that students adopted different strategies to tackle the challenge of translating a document in a previously unseen computer program. Some students had a more calculated approach that relied largely on reading the information on the tool’s interface. Others adopted more elimination-based
methods by clicking on different buttons and checking to see if the buttons produced the desired result. Importantly, theoretical familiarity with the concept of CAT was a factor. Students who were completely unfamiliar with CAT mentioned understanding from the context that the tool was there to assist them but said that they were confused by how this was supposed to happen. Some students expected translations to be suggested automatically – i.e. like in post-editing of machine translation – and many of them did not understand why segments had to be confirmed or why this did not happen automatically. Since contextual CAT knowledge influenced students’ perceptions of the task, as mentioned in the Methodology, in study II we asked them to watch an introductory video explaining key CAT concepts.

### 4.2. Study II

In study II, all seven students finished the task successfully. Table 4 presents details of students’ performance in this task. Five students (P01–02, P04 and P06–07) improved their overall task time. The average task time in this study was 15.3 minutes, while in study I, it was 19.7 minutes. P07 clearly influenced this average difference. Although this student failed to complete study I successfully, her task time was nearly halved in the second study. Despite our efforts to select comparable yet different texts, a learning effect tied to the text itself cannot be excluded as a factor in students’ time improvements. Nevertheless, there were clear signs of how study I is likely to have influenced students’ subsequent interaction with a different CAT tool. In study II, all students except for P01 confirmed the segments during translation as per the expected way of interacting with the tool. Given that in this second study students were again asked to use an unseen CAT tool with no direct instructions, this improvement is noteworthy.
Table 4. Average fixation duration, task duration, clicks per minute and task completion status for study II (Trados Studio)

<table>
<thead>
<tr>
<th></th>
<th>Avg. Fixation Duration</th>
<th>Time (min.)</th>
<th>Clicks/minute</th>
<th>Task Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>P01</td>
<td>0.196</td>
<td>7.2</td>
<td>4.9</td>
<td>Yes</td>
</tr>
<tr>
<td>P02</td>
<td>0.382</td>
<td>15.6</td>
<td>7.6</td>
<td>Yes</td>
</tr>
<tr>
<td>P03</td>
<td>0.297</td>
<td>13.9</td>
<td>4.9</td>
<td>Yes</td>
</tr>
<tr>
<td>P04</td>
<td>0.285</td>
<td>16.7</td>
<td>9</td>
<td>Yes</td>
</tr>
<tr>
<td>P05</td>
<td>0.357</td>
<td>25.7</td>
<td>8.9</td>
<td>Yes</td>
</tr>
<tr>
<td>P06</td>
<td>0.285</td>
<td>11.8</td>
<td>4.7</td>
<td>Yes</td>
</tr>
<tr>
<td>P07</td>
<td>0.308</td>
<td>16</td>
<td>4.7</td>
<td>Yes</td>
</tr>
</tbody>
</table>

There were nevertheless two students, P03 and P05, who in fact took longer to complete study II. In P03’s case, the difference was a matter of seconds. In P05’s case, on the other hand, there was a difference of three minutes. Like in the first study, P01 was again the fastest student. This is a clear sign that individual styles are a factor in these results. We note, however, that unlike in study I, where P01 attempted to confirm the segments, in study II, this student showed no signs of trying to do that. She simply translated the document and exported the translation, which explains the fast task time of just over seven minutes.

We again divide the task into a translation and an export phase in study II. Results of these two phases are presented in Table 5.
Table 5. Average fixation duration, clicks per minute and duration for the translation and export phases in study II (Trados Studio)

<table>
<thead>
<tr>
<th></th>
<th>Avg. Fixation Duration</th>
<th>Clicks/minute</th>
<th>Time (min.)</th>
<th>Avg. Fixation Length</th>
<th>Clicks/minute</th>
<th>Time (min.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P01</td>
<td>0.195</td>
<td>4.4</td>
<td>6.6</td>
<td>0.208</td>
<td>9.5</td>
<td>0.6</td>
</tr>
<tr>
<td>P02</td>
<td>0.391</td>
<td>6.2</td>
<td>12.4</td>
<td>0.353</td>
<td>12.8</td>
<td>3.2</td>
</tr>
<tr>
<td>P03</td>
<td>0.291</td>
<td>3.8</td>
<td>11.2</td>
<td>0.321</td>
<td>9.8</td>
<td>2.6</td>
</tr>
<tr>
<td>P04</td>
<td>0.283</td>
<td>8.5</td>
<td>10.6</td>
<td>0.289</td>
<td>10</td>
<td>6.1</td>
</tr>
<tr>
<td>P05</td>
<td>0.338</td>
<td>4.1</td>
<td>9.8</td>
<td>0.37</td>
<td>11.8</td>
<td>15.9</td>
</tr>
<tr>
<td>P06</td>
<td>0.316</td>
<td>4</td>
<td>8.1</td>
<td>0.225</td>
<td>6.4</td>
<td>3.6</td>
</tr>
<tr>
<td>P07</td>
<td>0.31</td>
<td>4.7</td>
<td>14.4</td>
<td>0.292</td>
<td>5.2</td>
<td>1.5</td>
</tr>
</tbody>
</table>

By comparing the phase-specific results of studies I and II, it is clear that exporting the document from the tool was not easier in study II. In fact, four students (P03–P06) took longer to export the document from Trados Studio. This is most likely due to differences in memoQ’s and Trados Studio’s export methods as well as the slightly different terms used by the two tools to describe this operation: memoQ has a designated ‘export’ button while in Trados Studio this is largely done via a ‘Save target as’ operation or via the ‘exporting for bilingual review’ button. Both tools have clear ‘confirm’ buttons on the top menu, however. It is plausible, therefore, that students’ ability to discover how to confirm all segments in study II was a cross-task learning effect carried over from the first study.

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9 The ‘exporting for bilingual review’ button exports a bilingual version of the document for review outside of Trados Studio. We regarded this as a successful method of exporting the document.
Surprisingly, most students did not find the video with introductory information on CAT concepts to have been useful for completing the task in study II, which may have been due to the clip’s short length. In the third and last study, we attempted to improve on the video and instead introduce students to key CAT concepts ourselves. In addition to CAT concepts (e.g. translation memory) this introduction also mentioned non-tool-specific operations and their associated terminology (e.g. ‘export’ as well as ‘source’ and ‘target’ documents). Like in studies I and II, no direct instructions on how to use the software were provided. Details of study III are presented below.

4.3. Study III

Results pertaining to the subsequent cohort of students who participated in study III are provided in Table 6 and Table 7. Eye tracking was not used in this study (see Methodology), so we cannot report students’ average eye fixation durations. The average task time for study III was 21 minutes. Eight of the ten students completed the task successfully, and seven found out how to confirm the segments. A single student, S07, confirmed the segments during the translation in study III. Surprisingly, despite discovering how to confirm the segments, S07 was also among the two students who did not complete the task successfully. Regarding the two students who did not complete the task, it should be noted that, unlike in study I, where the only student who did not complete the task ran out of time, in study III S07 and S10 gave up trying. They aborted the task at 27.1 and 25.3 minutes, respectively. This suggests that, as the first point of contact, Trados Studio posed a more significant challenge to these students compared to the impact of memoQ on the previous cohort.
Table 6. Clicks per minute, duration and task completion status for study III (Trados Studio). * = students who looked at the Trados Studio interface before task time started being recorded

<table>
<thead>
<tr>
<th></th>
<th>Clicks/minute</th>
<th>Time (min.)</th>
<th>Task Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>S01</td>
<td>10.2</td>
<td>20.6</td>
<td>Yes</td>
</tr>
<tr>
<td>S02*</td>
<td>3.9</td>
<td>17</td>
<td>Yes</td>
</tr>
<tr>
<td>S03</td>
<td>8.9</td>
<td>17.8</td>
<td>Yes</td>
</tr>
<tr>
<td>S04</td>
<td>5.2</td>
<td>20</td>
<td>Yes</td>
</tr>
<tr>
<td>S05</td>
<td>5.1</td>
<td>22.5</td>
<td>Yes</td>
</tr>
<tr>
<td>S06</td>
<td>8.8</td>
<td>22.1</td>
<td>Yes</td>
</tr>
<tr>
<td>S07</td>
<td>3.8</td>
<td>27.1</td>
<td>No</td>
</tr>
<tr>
<td>S08</td>
<td>11.3</td>
<td>19.5</td>
<td>Yes</td>
</tr>
<tr>
<td>S09</td>
<td>8.8</td>
<td>18.2</td>
<td>Yes</td>
</tr>
<tr>
<td>S10*</td>
<td>5.9</td>
<td>25.3</td>
<td>No</td>
</tr>
</tbody>
</table>

Table 7. Clicks per minute and duration for the translation and export phases in study III (Trados Studio).

<table>
<thead>
<tr>
<th></th>
<th>Translation</th>
<th>Export</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Clicks/minute</td>
<td>Time (min.)</td>
</tr>
<tr>
<td>S01</td>
<td>9.7</td>
<td>17.7</td>
</tr>
<tr>
<td>S02</td>
<td>3.8</td>
<td>16.2</td>
</tr>
<tr>
<td>S03</td>
<td>8.2</td>
<td>16.7</td>
</tr>
<tr>
<td>S04</td>
<td>2.3</td>
<td>14.8</td>
</tr>
<tr>
<td>S05</td>
<td>4.2</td>
<td>21</td>
</tr>
<tr>
<td>S06</td>
<td>8.5</td>
<td>23.2</td>
</tr>
<tr>
<td>S08</td>
<td>3.6</td>
<td>11.5</td>
</tr>
<tr>
<td>S09</td>
<td>7.8</td>
<td>15.7</td>
</tr>
</tbody>
</table>

By comparing all tasks, we note that results from study III were closer to study I’s than to study II’s. This was observed in terms of overall average task time (19.8 and 21 minutes for studies I and III, respectively, whereas 15.3 minutes for study II) and in
terms of overall average clicks per minute (7.1 and 7.2 for studies I and III, whereas 6.4 for study II). Notably, the export phase in study III was the shortest of all studies at 3 minutes on average (as opposed to 4.6 minutes for study I and 4.8 for study II). This may suggest a small effect of the general explanations provided to students as a group ahead of study III, though the difference and the sample are not large enough for conclusive findings in this respect.

It is worth remembering that in study I students were not introduced to CAT concepts such as translation memories and term bases, whereas in studies II and III they had these introductions. In addition, in studies I and III students were using a CAT tool for the first time, whereas in study II it was the first time they were using Trados Studio, but not the first time they were using a CAT tool since those same students had participated in study I three weeks before. Given these task-specific conditions, we make two tentative deductions by comparing all studies. First, in addition to any practice effects resulting from the fact that students were translating similar texts, the improvement in students’ performance from study I to study II is to some degree the result of a cross-tool learning effect whereby students’ prior experience with memoQ helped them to navigate the process of using Trados Studio. The results suggested this particularly with respect to segment confirmation, since the study III cohort, who had not been exposed to memoQ, did not perform as well in this respect when carrying out the task in Trados Studio. Second, the short introduction to CAT concepts provided prior to study II is unlikely to have influenced students’ performance, which was suggested by students’ own views. In study III, preliminary teacher-provided explanations were possibly more effective, but this is subject to a future investigation because the difference observed is small. Finally, the studies showed, based on different cohorts, that students with no CAT experience were able to complete a simple
document translation task in desktop CAT tools without direct instructions on where to click or how to use the tool. This was especially noteworthy in relation to study II, where most students were able to confirm segments as required to make efficient use of the translation memory. We discuss these findings in more detail below.

5. Discussion and conclusion
CAT tools are known to require specialised knowledge (see e.g. Bass 2006, 75) and are a source of dissatisfaction for many translators (O’Brien et al. 2017). Unlike newer cloud-based tools,¹⁰ which often have simpler interfaces, the tools we selected for this investigation are arguably among those that would pose the biggest challenges for students who are unfamiliar with this type of software. When we designed the studies, therefore, we expected most students to fail to complete the tasks. However, the results above suggest that explicitly directing students on how to operate a given CAT tool may underestimate their ability to learn the technical aspects of these tools more autonomously. While the studies we present here are based on a small sample of 17 students altogether and while our intention is not to provide an inferential analysis, of 24 tasks overall, students were able to finish the task successfully as per our criteria 21 times, which was an 87.5% success rate.

Although not all students were able to complete the tasks within the set time limit, several factors should be considered in interpreting the results of the studies. For one thing, it is important to note that these results pertain to just three exploratory tasks which, for experimental purposes, reflected an extreme reduction in the use of direct instructions. Furthermore, in the studies reported here students were not allowed to consult external sources. This made the tasks more difficult than they would have to be

¹⁰ See, for example, https://lilt.com/ or https://www.memsoure.com/.
in real teaching contexts where students can access training materials and online tutorials.

An important question, however, is whether students had a critical understanding of the operations they performed. Our interactions with the students after the tasks as well as our experience of teaching them afterwards suggest that they did not. While most students were able to complete the tasks successfully, it was difficult for them to understand why they had to confirm the segments in the tools’ interface, for instance. Similarly, students often failed to grasp how exactly the tool was supposed to assist them. Students’ feeling of not knowing ‘why’ they needed to carry out specific tasks is not uncommon for this subject (Doherty and Moorkens 2013), so this does not occur exclusively with activities geared towards autonomous learning. In any case, we note that the purpose of the studies presented above is not to support eliminating class discussions or instructor-provided explanations. In fact, when adopted in the context of a teaching programme, any autonomous learning activities would ideally be contextualised in the classroom, so we do not propose that CAT teaching should be based exclusively on student discovery. Our objective was, rather, to test the limits of such an approach.

Recommending a strict set of activities is outside the scope of this paper, but we make a few suggestions based on these results. First, the bulk of direct instructions on how to use a specific CAT tool should ideally be reserved for self-study. As shown above, even under harsh conditions with a time limit and no online research, students could carry out simple tasks with reasonable success and with some cross-tool learning effects. This approach may free up time for more collaborative or discussion-based class activities while also helping students to develop research skills by engaging with the tools’ documentation and other online information. Second, any feature students may be
expected to learn independently should ideally first be introduced in depth in a way that makes clear the rationale for the feature rather than how it works in a specific tool. Finally, our experience suggests that contingency plans should be in place for students who experience extra difficulty, for example due to lower levels of computer literacy. This can take the shape of offering follow-up sessions or extra support for students who require it. Directions for future research on this subject may include examining specific formats for integrating autonomous activities into the CAT syllabus as well as long-term longitudinal appraisals of how different CAT teaching methods influence students’ performance.

While proposals to increase student autonomy in translation are not new (see Literature review), the results we present here provide empirical evidence of the feasibility of reducing the use of direct instructions in the early stages of CAT teaching. We would argue that CAT’s central role in the curriculum should not need to involve increased use of procedural instructions where students are simply told where to click or how to use a given tool. It is precisely the increased importance of technology that calls for more in-depth conceptual discussions of what this means for translators’ practice, for how translators should structure and advertise their services and for how translation as a profession and field of study should be conceptualised. Higher student autonomy in CAT teaching may allow more emphasis to be placed on this type of discussion.

References


https://catalog.ldc.upenn.edu/LDC96L14


doi:10.17771/PUCRio.TradRev.30595


Appendix A

Text 1

**BOILING WATER**
1. Turn the kettle on and off.
2. Ensure the kettle is switched off. Open the lid by gently pressing the release button.
3. Fill with fresh, cold water, paying attention to the MIN and MAX marks on the water level indicator. Boiling water may escape from the spout if the kettle is too full.
4. Press down the lid, and place the kettle onto the 360° base, with the spout facing away from you. Plug the power cord into a socket and switch on. Press down the kettle on/off switch. The indicator light will show the kettle is working.
5. Turn the kettle off and on.
6. The kettle will switch off automatically when the water has boiled, and the power indicator light will turn off.
7. Turn the kettle on and off.

Text 2

**Using your appliance:**
1. Turn the kettle on and off.
2. Fill the kettle using either the spout or lid. Open the lid by pulling on the handle.
3. The water level must be between the MAX and MIN fill lines.
4. Check that the lid is closed correctly.
5. Ensure that the base unit and the base of your kettle are not wet.
6. Place the kettle onto the base unit and plug in.
7. Switch the kettle on by pushing the On/Off switch at the bottom of the kettle down.
8. Turn the kettle off and on.
9. Your kettle will begin to boil and will switch off automatically when it is done. Whilst the kettle is boiling the blue LED light on the ON/OFF switch will illuminate.
10. Turn the kettle on and off.
Appendix B

Task guidelines – study I (memoQ)

A client commissioned you with a translation task.

The translation must be done by using a Computer-assisted Translation (CAT) tool.

You are to translate the text as fast as possible and deliver your translation in a Word document generated from within the CAT tool.

Please ensure that you make the symbol below appear next to the text before moving on to the next segment.

Please note that you cannot copy and paste your translation from the software into a Word document.

You are not allowed to use the Internet or any form of references.

This test is for research and teaching purposes only, the results of which will be kept anonymous and will not affect your degree in any form.

Figure 2. study I guidelines.
**Task guidelines – Studies II and III (Trados Studio)**

A client commissioned you with a translation task.

The translation must be done by using a Computer-Assisted Translation (CAT) tool.

You should translate the text as fast as possible and deliver your translation in a Word document generated from within the CAT tool.

To save your work in the translation memory, you need to **confirm** each segment as you translate. When segments are confirmed, symbols like the ones below should appear next to the text.

![Symbols](image)

When you finish translating the text, please note that you **cannot** copy and paste your translation from the software into a Word document. To generate the document within the CAT tool, you need to look for the option that allows you to **save** or **export** the translated document. In some CAT tools, the translated document is also called the “Target” – i.e. the document containing the target text.

You are not allowed to use the Internet or any form of references outside of the CAT tool.

This task is for research and teaching purposes only, the results of which will be kept anonymous and will not affect your degree in any form.

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**Figure 3. Guidelines for studies II and III.**