

Cloud subtitling in research-led education

Synergizing audiovisual translator training and action research

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Empirical research has boomed in the last few years in translation studies (TS) scholarship in general and audiovisual translation (AVT) in particular (Orero et al. 2018; Díaz-Cintas and Szarkowska 2020). As a discipline heavily driven by new technologies, AVT poses additional problems for translator trainers as training institutions sometimes fail to keep abreast of the latest technological developments in the industry. The learning and teaching of said practices ought to bear empirical scrutiny and shed light on how new technologies can inform classroom practices and vice versa. This paper explores practice-based research on the use of cloud technologies in the subtitling classroom and encourages the establishment of closer links between training institutions and industry partners, as well as the use of user-generated feedback to improve existing AVT software.

Keywords: audiovisual translation, cloud subtitling, higher education, subtitler training

1. Introduction

Few would contest that audiovisual translation (AVT) has outgrown its status of being a burgeoning field of research and has arguably become a discipline of its own (Díaz-Cintas and Neves 2015). Against the backdrop of a translation industry that is ever-more audiovisual (Nikolić and Bywood 2021), the AVT market has greatly developed in recent years as a result of a growing demand for localized products and the rapid expansion of new technologies (Baños 2018; Díaz-Cintas and Anderman 2009; Georgakopoulou 2012). Most recent trends in the profession have led to a vast increase in the global workflow handled online in this ever-changing landscape (Baños and Díaz-Cintas 2015).



Following the “technological turn” in TS (Cronin 2010, 1), technology soon became a fruitful field of scholarly research, particularly in AVT (O’Hagan 2013; Chaume 2013), in which many have highlighted the importance of examining industry practices and new technologies in general (Díaz-Cintas and Massidda 2019). Cloud technologies, in particular, have featured prominently in the latest studies (see, for instance, Artegianni 2021; Bolaños-García-Escribano et al., 2021; Chaume and De los Reyes Lozano 2021). Yet, AVT education has received scarcer attention in academic circles, despite some pioneering works (e.g., Díaz-Cintas 2008). Learning- and teaching-focused research still offers room for exploration in AVT research even if specialist programs have existed for over three decades (Bréan and Cornu 2014). As scholars become more aware of the paramount importance of technology in AVT (e.g., Bywood 2020), a (timidly) growing number of specialist, technologically oriented training courses are appearing in higher education in the UK and beyond. Regarding the use of technologies, such as cloud subtitling systems, in the AVT classroom, additional hurdles may arise for educators. Indeed, the fact that some tools are being used in the industry does not necessarily mean that they are also pedagogically sound and hence fit for teaching. Therefore, it is paramount that AVT educators evaluate their efficiency by means of empirical research.

The key objective of this paper is to examine the uses and applications of cloud subtitling systems in AVT training settings. Trainee translators’ perceptions are gauged, and their feedback on the usability of the technologies is used ultimately to improve the tools and make them more appropriate for learning purposes. Testing new technologies in the classroom with would-be linguists constitutes a productive approach to research-led education, whereby AVT educators can identify areas of improvement and propose changes to make existing tools more pedagogically attuned. Besides, by striking collaborations and partnerships with industry stakeholders, particularly software developers, AVT educators can also contribute to the development of tools that cater to would-be subtitlers and can be used in learning and teaching environments.

This empirical study builds on user-generated feedback from continuous in-class observation and questionnaires. Continuous cycles of hands-on experimentation were used to inform classroom practice and stimulate trainer-trainee collaboration and reflection. The results yielded by this initiative led to software-specific changes, which subsequently assisted the development of an educational version of the tool (<https://edu.oonatools.tv>). Ultimately, this research approach allows for the establishment of closer synergies between educational centres and the industry for the sustainability of technology-oriented training programmes at university.

2. Audiovisual translator education

AVT scholarship is moving progressively away from descriptivism to further embrace empirical and experimental research (Díaz-Cintas and Szarkowska 2020). Until the turn of the century, a significant body of descriptive AVT research was conducted to interrogate the quality of translated products and ended up having little or no application beyond scholarly inquiry. However, authors such as Mayoral-Asensio (2001) and Chaume (2005) argued that audiences ought to be at the core of quality evaluation and assessment. Although some scholars were already using questionnaires and interviews to gauge the perceptions of some audiences (see, for instance, Fuentes-Luque 2003), the last decade has witnessed a boom of reception and cognition studies in AVT (Kruger and Liao 2022). Empirical methods have started to be more widely applied across our field (Orero et al. 2018), and more projects have expanded their remit beyond the purely linguistic aspects to consider parameters other than translation quality, such as conventions (Szarkowska and Gerber-Morón 2018; Szarkowska et al. 2020), the needs of sensory-impaired users (Matamala et al. 2020), the influence of non-professional practices (Orrego-Carmona 2015), and even our very understanding of AVT as a discipline (Di Giovanni and Gambier 2018).

Yet, there has been a significantly lesser interest in how AVT practices are taught and whether current technologies are pedagogically sound. In one of the first scholarly publications that examined the learning of subtitling from an empirical angle, Pagano et al. (2011) conducted a small-scale experiment involving three professional subtitlers and three subtitling trainees. The authors remarked that, when subtitling, “professionals enact a pattern of shorter total time for task execution, longer revision phase, attention to spotting during the end-revision phase, and less concern about condensation” (Pagano et al. 2011, 153). A similar study was carried out by Orrego-Carmona et al. (2018), who used both keyloggers and eye trackers with ten professional translators and five trainees, concluding that “the trainees decided to have a thorough orientation phase watching the whole clip and did not structure their revision phase, while professionals applied more refined revision strategies” (Orrego-Carmona et al. 2018, 171). Perhaps one of the greatest findings of the latter study is the presumed existence of a link between software use and subtitlers’ agency, which inevitably calls for more detailed examination.

In translator training settings, empirical methods have been implemented to examine “the competence that underlies the work of translators/interpreters and enables them to carry out the cognitive operations necessary for the adequate unfolding of the translation process” (Hurtado-Albir and Alves 2008, 63). Translation competence integrates “various types of capabilities and skills (cognitive,

affective, psychomotor or social) and declarative knowledge” (Hurtado-Albir 2007, 167), and considerable efforts have been devoted to shedding light on its acquisition (see, for instance, PACTE 2003, 2005; Hurtado-Albir 2017; Quinci 2023).

As for the learning and teaching of AVT, one of the most notable differences with other practices, such as literary or legal translation, lies in its multimodal nature, which calls for transversal skills related to technology and audiovisual literacy (Díaz-Cintas 2008). However, as Bolaños-García-Escribano and Díaz-Cintas (2019) posited, many scholars have often ignored the importance that technology, instrumental, and occupational subcompetences have in AVT education. The translation competence framework developed by the EMT Board (2017), however, emphasizes technology and translation service provision as two main areas of competence, which, according to Chodkiewicz (2012), have gained more importance as the EMT has developed over the years. When it comes to competence building, Cerezo-Merchán (2012, 2018) assembles a comprehensive analysis of AVT training research and fleshes out the AVT-specific competences under four main axes: communicative and textual, cultural, thematic, and instrumental-professional competences (Cerezo-Merchán 2012, 128–129). Yet, the application of empirical methods and instruments to examine the acquisition of AVT competences remains barely unexplored.

Scholarly work on the perception of new technologies in AVT training environments remains an uncharted territory. In this paper, the focus is put on the use of specialist software, which is paramount for the learning and teaching of AVT, and more specifically cloud-based subtitling tools as they often feature among the latest technologies currently being used in training environments. These systems appeared in the translation and localization industry over a decade ago but have started to be more widely used in the AVT industry in the last few years. Some of the largest media distributors and broadcasters, such as Netflix, seem to have consolidated themselves as the new driving forces of a heavily internetized market (Bolaños-García-Escribano and Díaz-Cintas 2020). Smaller manufacturers and language service providers have also engineered their own web-based tools that can be used on a pay-as-you-go basis. However, their scholarly examination still has been virtually non-existent until fairly recently (Bolaños-García-Escribano 2020).

The next section discusses the uses and applications of empirical research to further examine the perception of new technologies by would-be subtitlers and how this type of research can foster academia-industry collaborations and software improvement through user-generated feedback.

3. Cyclical inquiry in the audiovisual translation classroom

Little research has been carried out on the advantages and drawbacks of utilizing cycles of inquiry in TS. Most existing studies utilize action research methodologies to pinpoint specific trends in translation theory (Cravo and Neves 2007), translator training (Kiraly 2000; Hubscher-Davidson 2008; Massey et al. 2015; Haro-Soler and Kiraly 2019; Zhong et al. 2021), interpreter training (Boéri and De Jerez 2014; Pavez 2021) and AVT (Bogucki 2010; Neves 2016). Action research is considered to be “an *enjoyable* way of helping us to reflect and act in order to improve our teaching and assessment activities” (Hubscher-Davidson 2008, 90; emphasis in original) as it can inform translator training practices by evaluating the teaching and learning of a particular practice as well as student performance. It can arguably be used to study the tools educators employ to train would-subtitlers.

Methodologies that involve research cycles, such as action research, endeavor to trigger swift changes and improvements by undertaking practice-oriented experimentation in particular educational settings. Cyclical research involves a process of informed trial-and-error inquiry that utilizes evidence (i.e., analyzed data) to improve certain elements within a specific educational environment through a “constant confrontation of reflection and action, theory and method, theory and practice aimed at producing understanding and effective action” (Dick and Greenwood 2015, 195). Results are fed into practice as part of continuous research cycles, and outputs are therefore embedded in educational settings in a continuum. Critical reflection and action are not limited to identifying issues that are worthy of investigation; indeed, the results can also improve practice (e.g., sequencing, technologies, delivery) and impact students. What is more, results can lead to the evaluation of changes that would prompt further cycles of inquiry while prompting the modification of key institutional materials, such as syllabi, and the incorporation of new practices into lesson plans and sequences.

Cyclical research, particularly action research, has certain limitations, nonetheless. For instance, the research solely applies to a specific learning context since the inquiry derives from the needs of students, educators, and institutions in a specific setting (Noffke 2009). As a result, research is often limited to one-off pieces of localized outputs (Denscombe 2010), making it difficult for the outcomes to be generalizable and applicable to other contexts. Cycles of critical inquiry, however, can further our understanding of how students learn and what educators can do to finetune teaching practices and improve existing tools. Arguably, the pervasiveness of new technologies also makes it easier for research outcomes to be generalizable and influence learning contexts other than the one where the research is undertaken. Technology-related studies can be particularly

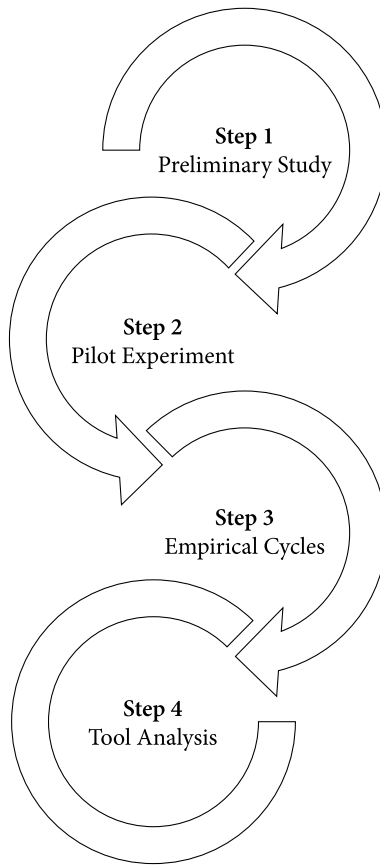
compelling inasmuch as they can take stock of industry changes while exposing trainees to the latest developments, ensuring that education remains impactful and global. In AVT education, not only does this mean that closer synergies can be established between the educator and the trainees (and industry partners if applicable), but it also means that stakeholders can take ownership and work towards the wealth of the discipline.

4. Methodology

In a translation industry where technology moves apace, competition can be extremely fierce, and confidentiality can hamper collaborations with academic partners. Yet cooperation with industry partners, such as software developers, is key to guarantee that applied research is up-to-date and industry-focused and to ensure that training programs do not become obsolete in the wake of new technologies. For this university-industry collaboration to bear fruit, a series of learning experiences (henceforth, *experimental sessions*) were designed to gauge end-users' perceptions of the cloud-based platform.

This research encompassed four main steps (see Figure 1), which involved a preliminary study, a pilot experiment, a series of empirical sessions, and a subsequent analysis of the tool. Each step led to the introduction of changes actioned by the software developers, who were able to integrate changes into the tool. Additionally, the contents and materials of the sessions were continuously adapted so as to reflect the aforementioned changes, thereby finetuning practice through reflection and observation.

The cloud-based tool used in this research was OONNA Tools, which is an ISO 27001:2013 certified web-based subtitling system offering a wide variety of functionalities, including text timing, template translation, reviewing, file conversion, and burning and encoding, among many others. Contrary to other cloud-based subtitling systems, such as Netflix's Subtitle Originator or ZOO Digital's ZOOsubs, this paid tool is not exclusively associated with a specific media distributor or agency, meaning any user can create an account and purchase a license. This end-to-end platform allows users to create and translate subtitles and offers wide application integration with other cloud- and desktop-based systems.



4.1 Preliminary study

In 2016, an online questionnaire comprising 24 questions was administered among subtitling trainers to shed light on the uses and applications of cloud-based subtitling tools in higher education and other learning/teaching settings. The questionnaire was completed by 20 trainers, although the non-response error – i.e., selected respondents from a given sample who failed to respond appropriately – reduced the final number of valid subjects to 19. This small sample may seem nugatory; however, to participate in this study, respondents had to be trainers involved in the teaching of subtitling exclusively in e-learning environments, which was considered a niche market back in 2016.

The results of the preliminary study (Bolaños-García-Escribano 2018) were essential to fully grasp the trainers' insights into subtitling and to conceptualize the subsequent sessions with learners. The latter was conducted to explore the pedagogical potential of cloud-based systems by means of testing real-life teaching

experiences. Among the most salient findings was that cloud-based platforms were extremely limited back in 2016 – only two out of twenty respondents were using an online platform to teach subtitling. Freeware, desktop-based programs were widely used, but some had heard of commercial solutions such as OOONA Tools (then known as *Online Captions and Subtitles Toolkit*). The results proved that, albeit still uncommon a decade ago, cloud-based systems were already making inroads into the teaching of AVT.

4.2 Pilot study

The experimental sessions were conceived as face-to-face sessions. Suitable study spaces (i.e., computer labs) and the right to use audiovisual materials were secured. A pilot study was designed to validate the research methodology and data collection in alignment with the research objectives.

The pilot study was a hands-on subtitling session run in 2017. This session, attended by over 70 undergraduate students of modern languages, was funded by the Association of Low Country Studies in partnership with four UK universities (Newcastle, Nottingham, Sheffield, and UCL) and the Embassy of the Netherlands in the UK. In light of the results yielded by this pilot session, amendments were made to the questionnaire, the subtitling exercises, and easy guides to run subsequent sessions.

Three main requirements were considered when devising the case studies with subtitling trainees. Firstly, granting access to the cloud subtitling tool for all participants; secondly, running the experimental sessions as hands-on subtitling sessions that could be easily adapted so as to reflect the latest changes prompted by this research; and, thirdly, creating and distributing an anonymous questionnaire in which the respondents could include their evaluations and comments on the usability of the tool.

4.3 Empirical cycles

The sessions that followed the pilot study took place in several European institutions from 2017 to 2019 and involved 347 participants. The participating institutions offered or were planning to offer, courses and programs of study on AVT and were therefore particularly interested in cloud subtitling. The sessions involved three main stakeholders:

- Students of modern languages or translation with ample, some, little, or no experience in AVT;

- alumni of modern languages or translation, some of them with some degree of professional translation experience;
- translator trainers and modern foreign language teachers with ample, some, little or no experience in AVT, who were teaching translation in higher or further education.

A better grasp of the students' perception of the session in general, and the cloud-based tools in particular, had already been sought in the preliminary and pilot studies. This helped to draw a list of action points to improve the sessions, especially in terms of overall duration, the balance of subtitling theory and practice, printed materials, reasonable adjustments of difficulty level, length, subtitle exercises, and teamwork, among other aspects. The reflections after each cycle (i.e., each session) were conducive to the reconfiguration and customization of each of the upcoming sessions in light of the bottlenecks and areas of improvement reported.

Since the main goal of this research was to perform an initial exploration of the uses and applications of cloud-based tools, it was advisable to keep questionnaires as similar as possible. Careful consideration was given to differences across sessions to ensure consistency and minimize any potential negative impacts on the collection of the results when grouped together. The different educational settings where the sessions took place determined their configuration, contents, and pedagogical methods. For instance, some sessions were shaped in the form of longer sessions – the longest being 12 contact hours across three teaching sessions – whereas others were conceived to be part of undergraduate or post-graduate modules or one-day conference sessions. Despite the various formats, the research objective always remained the same, and all sessions endeavored to gauge the end-users' perceptions of the use of cloud-based subtitling tools in training environments.

Given that the sessions took place over an extended period of time, certain compromises were made. On the one hand, variables were not controlled, and the questionnaire remained barely untouched so as to ensure consistency and to allow for the agglomeration and correlation of the bulk data for in-depth statistical analysis. On the other hand, following the principles of cyclical inquiry, improvements were introduced to the experimental sessions while the software developer actioned upgrades on the subtitling platform. Indeed, substantial changes were observed in the user interface, features, and usability of the tool (see Section 5). As changes were integrated steadily and continuously by the software developers, it would have been virtually impossible to adapt the variables. Besides, priority was given to obtaining responses that were representative, both quantitatively and qualitatively. The study sessions observed the changes made to the tool following

the pilot and were carefully adjusted, which led to conclusive results throughout the process.

Generally speaking, and similarly to what was done in the pilot study, the sessions capitalized on practice rather than theory and contained four hands-on tasks: (1) an error-spotting exercise on the text-timing tool, (2) an origination exercise on the subtitle template translation tool, (3) a peer-reviewing exercise on the application of their choice, and (4) a subtitle file conversion exercise.

The clip and subtitle templates for the error-spotting exercise remained identical to the ones used in the pilot study; however, the template was adjusted to better cater for the needs of each cohort of participants depending on their background and subtitling experience. The template-translation exercise was restructured several times depending on each cohort's experience.

Participants attended the sessions and carried out all exercises without being monitored or closely observed. They were only asked to participate in the anonymous questionnaire after the sessions. The rationale behind this decision was as follows: should attendees have been made aware of this before the study, they might have made greater efforts to perform better at text timing and originating, which risked altering their rough perception of the tool's pedagogical potential. This procedure also discards the Hawthorne effect, according to which participants may "alter (usually improve) their normal behavior because they are aware that they are being studied" (Saldanha and O'Brien 2014, 31). The learning environment had to be both authentic and realistic, in which students were motivated to learn about cloud subtitling and not just to report on the results of their experience.

4.4 Analysis of the tool

A comprehensive analysis of the tool followed the improvements fed into it throughout the previous years, which drew on the previously discussed advantages and shortcomings of the tool. It focused on adapting the existing tool to fit the learning and teaching of professional subtitling, encompassing tasks such as project management, text timing, template translation, revision and proof-reading, and quality control checks. The inquiry took the form of a holistic analysis focused on the previous user-generated evaluations of tools provided by attendees in the questionnaires and through informal communication. Such areas of improvement were further examined and discussed in subsequent reports and communications with the industry partner.

A report was produced to summarize the main areas of improvement and suggest ways the research had informed the existing tool. It also discussed issues, glitches, bugs, and any other aspects that detracted from the appropriate use of

the tool. The feedback provided during the experimental sessions and in-class observations was particularly useful to better understand how subtitling could be taught using cloud-based subtitling ecosystems. It also provided the industry partner with the means necessary to implement changes to the professional tool after each cycle and ensure that it could be adapted to end-users (i.e., subtitlers-to-be). According to Cravo and Neves (2007, 99), “the models that students experience at higher education institutions will be replicated in their professional lives in the future.” This means that those participating in empirical research are also (in)directly benefitting from the research outputs during each cycle. A future research avenue would be to ascertain how many experiment subjects continued using cloud-based subtitling solutions after the experimental sessions.

5. Findings

The data collected in this research was substantial, and the responses to the open-ended questions led to the creation of a corpus, which was processed using Nvivo.

The analysis of the open-ended questions from the questionnaire shed light on the respondents’ perception of the tool as well as the areas of improvement they had been identified both in pedagogical and technological terms. Node categories were created in the corpus of responses to tag the most frequent responses and obtain quantitative results (see Table 1).

Despite a lesser interest in the *didactic applications* of the platform (49 references), its *usability*, *performance*, and *professional use* were thoroughly discussed by the respondents (288 references). The word frequency analysis pointed to a visible abundance of terms related to “use” and “useful” (including “practical,” “functional,” etc.) to discuss both the tool and its professional and pedagogical applications (236 cases). Terms such as “ease” or “easy” also show up rather frequently (103 cases), as does “good” (90 cases). Other respondents also wrote terms such as “interesting” (17 cases) and “helpful” (44 cases) to refer to the “training” (67 cases) of subtitling in the “cloud” (58 cases).

The first category refers to the respondents’ level of satisfaction (129 reference cases) with the overall performance and usefulness of the tool. Out of the 129 references, 127 were patently positive, indicating that the respondents were overall satisfied with the tool’s look, performance, efficiency, and usefulness, while 6 references were negative. Among the tool’s detractors, some reported that it implied too much extra work, it was slow, or there were technical features missing. Contrarily, positive responses pointed to the efficiency, convenience, comprehensiveness, practicality, and usefulness of the tool.

Table 1. Nodes and references in open-ended questions (NVivo)

Categories	Sub-categories	References
Didactic applications	Fun exercise or useful practice	12
	Should be taught in translation-subtitling courses	17
	Useful for beginners or inexperienced users	20
Ease of use	Difficult to understand or use	18
	Easy to understand or use (quick to learn)	103
	Needs to be explained clearly to understand	3
Performance satisfaction	Dissatisfied (bad performance or useless)	6
	Satisfied (good performance or useful)	127
Professional applications and use	Affordable purchase	2
	Unaffordable purchase	7
	Industry standards (suitable)	9
	Potential and future use	9
	Insufficient free trial	4
Configuration and cloud resources	Applications should be staggered in one interface only	2
	Cloud environment is convenient	20
	Cloud environment is inconvenient	4
	Complete tool (includes many features, is well developed)	14
	Convert tool is useful	1
	Faults, glitches or bugs (tool- or web-related)	25
	Features are missing and could be incorporated	2
	Incomplete tool compared to other tools	1
	User-friendly, intuitive or appealing interface	26

The second category focuses on the tool's ease of use and user-friendliness (124 reference cases) and reports on whether respondents found the web-based tool to be easy or difficult to understand and use. The vast majority of respondents' answers (103) included references to the easiness and quickness that characterize the use of the tool, and some of them also highlighted the intuitiveness, user-friendliness, and step-by-step guidance offered by the tool. The remaining 21 references were more critical and suggested that, due to the tool's complexity,

previous and exhaustive training is necessary to understand the tool, but also that navigation is far from ideal and the interface could lead to confusion at times.

The third category is the tool's configuration and resources (95 reference cases), which includes aspects like the convenience or inconvenience of cloud resources, the existence or absence of certain features, and the comprehensiveness (or lack thereof) of the tool as opposed to desktop-based software. There were 20 references to the benefits supplied by cloud systems, such as their portability and flexibility on account of their leaner and remote access, as well as the fact that lack of local storage is no longer an issue and the possibility of working across compatible devices with instant access to automatically saved work. Detractors of cloud systems pointed to the potential problems caused by weak broadband and loss of network. There were two different references to the fact that the applications could be more easily managed if they were staggered within the same interface; that is, if the spotting and originating applications could be merged into the same application. For one respondent, such separation meant that "the process is more fragmented, but this is inconvenient for a person who wants control of the whole project." Yet, several respondents went in the opposite direction as they preferred to access applications separately to be able to clearly distinguish between different subtitling tasks.

There were over 14 references stating the tool was deemed handy, well-developed, detailed, and complete on account of its features, such as error warnings and reading speed displays, along with a very powerful conversion tool. In addition, 26 references mentioned that the interface is user-friendly, intuitive, and appealing, with most features displayed in a visually attractive way. As reported by a respondent, "Convenient functions are there as icons on the screen. Also being able to drag the box to fix the duration of a title is very welcome." On the downside, a respondent advised that auto-suggest features, including MT and TM engines, would be useful add-ons, and 25 references focused on faults, glitches, and bugs: slower performance of the machine (4), disparity of shortcuts between Macintosh and Windows machines (4), lack of audio wave (3), browser's incompatibilities and poor performance (2), and unstable movement between subtitles (2). Some respondents expressed a reluctance to use a specific browser only (i.e., Google Chrome), and others reported having spotted glitches and experienced malfunction repeatedly.

The fourth category is the tool's professional applications and uses (31 reference cases), which includes comments related to subscription prices, industry conventions, and potential and future use of the tool. Subscriptions were considered affordable only by 2 respondents, whereas 7 considered it to be expensive and far from ideal from a financial point of view. One of them also highlighted that

some users, including higher-education institutions offering AVT courses, prefer licenses that do not expire after a one-off purchase. Another 4 references regarded the limitations of the free trial, one of which highlighted that the duration was scarce, whereas another suggested that such a tool should be free for learning purposes. There were 9 references foregrounding that cloud subtitling is widely used in the industry nowadays, thus acknowledging that tools like OONA Tools reflect the professional reality rather closely. In this respect, several respondents opined that cloud applications are “the future of the industry,” “a trend in the future,” and, therefore, a necessary skill to have. Another 9 references were retrieved in which the respondents explicitly said that they would consider using cloud-subtitling tools in the future.

Finally, the fifth category refers to the tool’s didactic applications and uses (49 reference cases), which includes the adoption of cloud subtitling in translator training programmes, the usefulness of the tool for translators-to-be and students, and the ludic aspects of cloud subtitling tasks. There were 17 references to the urgent need of integrating cloud subtitling specifically and cloud-based translation tools in general into existing translation courses. Some respondents mentioned that such tools help to hone specific skills, whereas some others believed that having a solid command of them would increase their employability as their potential use in the industry is, apparently, immeasurable. Many respondents commented that the ease of use and intuitiveness of the tool made it a helpful resource for trainee translators, non-experts, amateurs, and beginners altogether.

Several respondents were openly critical and listed several drawbacks and areas of improvement, such as the following:

I can see the potential but there are flaws which need to be dealt with before it is fully functional.

Audio wave is missing. The export to rtf, doc and docx are not working.

There are some things that need to be improved: shortcuts, for example.

I think it is a good start and if improved, it will be useful.

Good, but should be improved. The tool has some issues, such as shortcuts, no audio wave.

During the classroom observations, it was noticed that students who enjoyed using the online subtitling ecosystem often reported an eagerness to use it professionally in the future. There might then be a direct link between the use of a tool in the classroom and its subsequent use out of the classroom. Most students remained positive about the pedagogical application of the cloud subtitling too as well as its future use out of the classroom, thus pointing to the following assumption: when used effectively in the classroom, a tool that meets a minimum degree

of satisfaction among students may also become the students' preferred professional tool once their training has been completed.

The ways in which the participants' responses informed both cloud subtitling tools and AVT education were manifold. The below list takes stock of some of the changes observed during the time this project took place:

- New so-called *Pro* versions of the text-timing, template translation, and template revision applications, which required a separate plugin to work, were introduced. (This plugin is no longer necessary at the time of writing this article.)
- The tools' interface and layout can be easily customized to suit the user's needs.
- Display rates (measured in either characters per second or words per minute), as well as the number of characters in each subtitle line (i.e., characters per line), are now indicated in the text editor.
- The conversion tool allows the user to select subtitle-specific features such as format, layout, language, and the like and is able to recognize languages automatically.
- The pre-set hotkeys menu was reconfigured so as to reflect long-standing conventions from legacy desktop-based software programs, which have traditionally used the numeric keypad. Customizable laptop shortcuts (e.g., Macintosh) were introduced, too.
- The tools included a waveform as well as shot changes indicators alongside the subtitles' in and out timecodes, which can be zoomed in and out for visibility purposes.
- The newly introduced applications allowed the user to semi-automate the process of locating and fixing errors. The subtitle review tool incorporated new features for users to introduce comments and track changes made to files.
- The most recent version of the cloud subtitling tool has an automatic application switcher with which the user can move between different subtitling phases.

Although originally developed for professional subtitlers, the tool's pedagogical potential was confirmed with the results from the preliminary study (Bolaños-García-Escribano 2018) and the subsequent pilot study and experimental sessions. The sessions with would-be subtitlers led to the exchange of feedback with the software developers, who updated and finetuned the tool to satisfy the usability requirements as per international standards (BSI 2008). The new features and developments introduced in the cloud subtitling tool are exemplary of the encouraging results that close collaboration between software developers, academics, and users can yield. Following this experience, it can be argued that

cloud solutions constitute immersive ecosystems that can potentially integrate customizable professional tools for the teaching of AVT practices in the age of cloud technologies.

An added value of the feedback volunteered by both trainers and would-be subtitlers is that it confirmed that cloud-based ecosystems constitute a legitimate alternative to learning in subtitler training environments. The aforementioned updates also showcase the eagerness expressed by software developers to continuously improve cloud tools in the age of agile software. It goes without saying that this research comes with limitations. For instance, as tempting as it is to establish that would-be subtitlers' feedback was always conducive to the changes introduced by the industry partner, the fast-paced, business-oriented nature of the AVT industry indicates that such transformations need to be considered holistically. It remains to be ascertained whether developers were truly eager to incorporate pedagogically oriented changes or whether improvements followed a purely business-oriented ethos. Software developments arguably result from a number of synergies, though this does not contest the fact that the user-generated feedback yielded tangible results during each cycle, thereby legitimizing the pedagogical foundations of this research.

Finally, fast-forwarding to the time of writing, the reality is that cloud-based subtitling systems have definitely found their place in the market. According to the latest report drafted by Nimdzi, "the majority of the tools are now on the cloud" (2022, online), and a sizable number of subtitling software developers now offer online or hybrid solutions. Cloud ecosystems are also starting to be more widely used by several institutions that offer AVT courses (over a dozen institutions, according to OONA's website at the time of writing), and one can only expect that they will likely replace many desktop-based software programs soon.

6. Conclusions

This paper has reported on the benefits and challenges that cyclical research can bring to the study of AVT education, particularly the use of new technologies for educational purposes and their finetuning through industry partnerships. This research involved long-term cycles of inquiry that followed an empirical approach and encompassed preliminary and pilot studies, followed by continuous experimentation cycles. These cycles aimed to identify areas of improvement upon which the industry partner could act to ultimately improve the existing subtitling tool and customize it for the benefit of subtitlers-to-be.

In the context of professional translation, many scholars have called for "the integration of existing technologies in a single platform in order to consider the

specificities of audiovisual texts and audiovisual translation” (Baños 2018, 25), whereas others have argued that AVT training ought to always remain practice-oriented and industry-led (Bolaños-García-Escribano and Díaz-Cintas 2019). A perceived *talent crunch* that started to affect the media localization industry a few years ago (Estopace 2017) has remained a topical question in scholarly forums ever since, but international translation associations have also expressed their concerns about its repercussions (see, for instance, AVTE 2021). Be it as it may, AVT demand does not cease to increase, and new initiatives are being orchestrated, in particular new cloud technologies. Arguably, research efforts should be devoted to evaluating the pedagogical adequacy of the AVT tools currently used in the classroom and whether their pedagogical applications meet the demands of a mercurial industry that is heavily driven by technological changes (Díaz-Cintas 2019). Strengthening partnerships with stakeholders and software developers is instrumental in equipping universities with up-to-date workstations (including dedicated software and access to the latest cloud-based tools and portals) and ultimately ensuring that would-be translators are exposed to authentic work environments. To hone the instrumental skills that the market requires, AVT educators can use the latest technologies available, and these inevitably include cloud subtitling systems in today’s industry landscape.

Cloud solutions in AVT courses are a widespread reality today. This paper has reported on the results of cyclical inquiry that aimed to shed more light on the gains and pitfalls of said technologies. Observations and user-generated feedback can help educators further customize the use of new technologies while advancing teaching methods and strengthening links between training institutions, software developers, and other industry stakeholders. In this study, the feedback provided by the participants, both inside and outside the classroom, allowed cloud subtitling software developers to further customize the tool in their attempt to offer an educational version to training institutions (i.e., <https://edu.oonatools.tv>). Some of the changes that were discussed include additions to the existing interface (e.g., display rate calculations and customizable layouts), error recognition tools, and improved waveforms, among other developments that are discussed in further detail in Bolaños-García-Escribano (2020). A few years after the completion of this research, the industry partner launched an educational version of the tool, which is currently being used by many translator training institutions offering specialized AVT courses, some of which continue to provide user-generated feedback for fine-tuning the tool.

Nurtured by the creation of stronger relationships with industry partners, educators can involve would-be subtitlers in academia-industry collaborations, thus contributing to the provision of research-led teaching. The latter is essential for AVT education to remain competitive and purposeful, and this paper has

attempted to offer a research methodology that can be replicated by other AVT scholars wishing to conduct similar collaborations. Indeed, further research is needed on cloud technologies and the latest (and much-needed) industry efforts to develop dedicated educational tools for learning and teaching AVT practices.

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Conflict of interest

There is no conflict of interest with industry partner OOONA or any other software development companies. A partnership was struck between OOONA and the UCL Centre for Translation Studies for research purposes only. The author of this article has not received any monetary retributions for this research, the results of which were obtained by means of unbiased research methods, including experimentation and anonymous questionnaires. When user reports were shared with industry partner OOONA for the development of an educational version of the tool, these were produced by the researcher having the end-users’ interests in mind. Any financial profit obtained by industry partners remains outside of the scope of this research.

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Resumen

La investigación empírica ha experimentado un auge en los últimos años en el ámbito de los estudios de traducción en general y de la traducción audiovisual (TAV) en particular (véanse Orero et al. 2018; Díaz-Cintas y Szarkowska 2020). La TAV, como disciplina estrechamente vinculada a las nuevas tecnologías, plantea problemas adicionales en la formación de traductores ya que las instituciones educativas carecen, en ocasiones, de los últimos avances tecnológicos que ofrece el mercado. El aprendizaje y la enseñanza de estas prácticas exigen un escrutinio empírico, así como que se esclarezca cómo las nuevas tecnologías pueden conllevar cambios en el aula y viceversa. Este artículo muestra una investigación práctica sobre el uso de tecnologías en la nube en el aula de subtitulación que pretende fomentar la creación de vínculos más sólidos entre las instituciones educativas y el mercado, así como proponer mejoras de *software* específico de TAV mediante el uso de evaluaciones de usuarios finales.

Palabras clave: traducción audiovisual, subtitulación en la nube, enseñanza superior, formación en subtitulación

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