The proper place of localization in translation curricula

An inclusive social, object-driven, semiotic-communicative approach

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The teaching of localization has traditionally been an uneasy fit in translation programs, with little consensus about contents, aims and orientation. In this chapter, localization is first analyzed in terms of disciplinary and professional scope, qualifications and definitional overlaps with translation, resulting in a number of criteria for the prototypical definition and the teaching of the localization activity: type of product, multimodality, transformational co-agency and new textual genres. Translation theories (like functionalist, user-centered and systemic-participatory approaches) and educational models (like constructivist, constructionist and other situated, embodied, emergent approaches) are then explored and complemented, in light of the previous discussion, with frameworks like Human-Computer Interaction and social semiotics, leading to the proposal of an inclusive approach combining a communicative and semiotic approach with a strong social and object-driven learning orientation.

Introduction

As recently as ten years ago, it was not common for general translation courses to include localization exercises or discussions in translation classes, let alone specialized localization modules. This trend has been reversed over the last decade: more and more students believe that localization offers promising marketable skills, and the proportion of technophobes in translation courses is steadily decreasing, while the number of users of complex, interactive cultural artefacts such as video games and social media is soaring. At the same time, translation teaching institutions realize that rather than being a threat and an oddity, localization can be a source of prestige and modernity for the discipline, and can help Translation Studies gain a firm grip on the changing realities of the 2010s and beyond.

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We believe that localization can only gain its proper place in the translation curriculum by adopting an inclusive approach that takes into account the varying views and models currently in place in its teaching, particularly those that are more translation-oriented. At the same time, we recommend embracing new concepts and practices coming from technological areas that are related to localization in their emphasis on communication, multimodal meaning (re)production and the transmission and transformation of ideas and cultural material.

However, before we devise a learning methodology or design the curriculum, it would be appropriate to decide on at least two aspects comprising what Kiraly (2000, p. 5) calls the *approach*, which is "the most fundamental level of a method," relating to our "view of the world and of learning, teaching and language use," and also, in our case, to our view of translation and localization: on the one hand, a *theory or model of teaching and learning* "that can transcend individual teaching and learning environments and the limits of individual institutions"; and, on the other, a *theory of domain competence*, i.e., what localization knowledge and expertise are, and how they can be achieved (*ibid.*).[1]

In this chapter, we present our own approach to the training of localizers (see section on "An inclusive approach to localization education" below), which has evolved out of our experience and continuous experimentation, but has also been informed by our own background in the study of educational theories and methodologies for the teaching and learning of technology for translation and localization (see section on "Educational models and approaches in translation and localization" below). While our sympathies lie with constructivist and post-structuralist models, we acknowledge that many other didactic methods and methodologies offer useful, complementary angles and insights into the complex pedagogies of translation and localization. Our approach does not presuppose any specific methodologies, and we hope that it will be perceived as an inclusive framework or, at the very least, as a proposal that can offer useful ideas, concepts and methodologies for those involved in training localizers.

Besides drawing on *pedagogical* theory and practice, our approach has also been built upon the observation, study and application of various *theoretical* frameworks, both related to Translation Studies and the localization field (Folaron, 2006, pp. 195–211), but also from other disciplines closer to the analysis of human interaction with computers, interfaces and formal languages, and also in connection with recent approaches to multimodality (Jewitt, Bezemer, & O'Halloran,

1. Kelly (2005, pp. 11–19) gives an excellent account of major methods in translator training, particularly as regards pedagogical procedures and syllabus design: task- and goal-oriented methodologies, problem-solving, project-based learning, etc. A complementary perspective is presented in Torres del Rey (2005a, pp. 153–160).

2016). Surprisingly, these other more technological areas of enquiry have been virtually absent from the localization debate. However, we believe that their cognitive, experiential, phenomenological, and semiotic principles and concerns can help localization teachers and students become better equipped, conceptually and methodologically, when presenting, and practicing with, the different objects of study, scenarios, processes and agents involved. Therefore, before reaching the pedagogical part of our paper, we will look into the theories of domain competence that provide the foundations for our approach in the sections on "Redefining the translation-localization relationship" and "The localization interdiscipline: theories and applications" below.

Redefining the translation-localization relationship

Ever since the establishment of localization and its industry as a major player in the multilingual content market in the early 1990s, there has been a heated debate as to whether translation is only a (subordinate) part of localization or whether localization is just a (special) type of translation. Those closer to the industry hold little doubt about the former while academics have always tried to find other equally sound perspectives which are philosophically and disciplinarily closer to the latter.

Translation Studies scholars, for instance, state that all that localization seems to offer as new was already there in the modern definition of translation (Pym, 2004, p. xv); that we should be talking about translation of "digital genres" (Montalt, 2004, pp. 325–326) instead, while restricting the use of "localization" – or "product localization" (Bernal-Merino, 2015, p. 87) – to the more industrial, business-related facets of the trade; or that "the concept of translation in its broadest sense affords to accommodate the concept of 'localization' if only on an abstract level" (O'Hagan & Mangiron, 2013, p. 107).

Be it as it may, there are three main reasons for these longstanding discrepancies in the relationship of localization vis-a-vis translation, which affect the teaching of the former in the context of the latter, as we will explore next.

Scope and locus

While it seems clear that the *scope* of localization goes beyond translating textual material – in a narrow sense (Melby, Fields, Hague, Koby, & Lommel, 2014), we tend to forget that no other single discipline encompasses the rest of non-translational tasks of the GILT (Globalization, Internationalization, Localization, Translation) compound: think of programming or architectural design, of course, but also of interaction and interface design, graphical design, authoring, branding,

SEO, internationalization, defining business strategies, project management, terminology management, testing, and so on. Similarly, at the very least, the technical aspect alone is not enough to account for localization as a process of making a product or service linguistically appropriate to the target locale, or of adapting that product to a specific international language or culture so that it seems natural to that particular region, in the traditional LISA and GALA definitions.

Granted, the product to be localized is mainly a technological one, but, above all, it is either a cultural product or it serves to spread or exchange culture, entertainment, science, knowledge or information in its broadest sense. This can only be achieved through (multimodal)[2] language and communication, even if only to design, name and document – and, consequently, to reach a common understanding of – its main objects, aims, rules and human-machine interfaces.

So, in an alternative sense, we could conceptualize localization neither as a kind of translation alone nor as superordinate to translation, but as an *area of encounter* for technology, language and communication, interaction design; and, above all, as a (re)construction site or *locus* – maybe more aptly, a *crossroads* – for digital expressions and operationalizations of general or particular human concerns and needs, where technology, language and other semiotic and instrumental discourses and practices compete for pre-eminence or, hopefully, cooperate to transform, rebuild and extend the life and the scope of the product or service for a wider, more diverse user base.

Qualifications and entitlement

Second, localization can be considered a specialization of translation, just like medical or legal translation. However, we may argue that, since in web localization – and, to perhaps a lesser degree, video game, and software, localization – text types, genres, topics and knowledge areas are virtually infinite, then what characterizes localizers first and foremost is their technical expertise rather than subject matter specialization. However, this argument could be somehow contradicted if we adopt a more text- and discourse-oriented perspective, about "linguistic" (rather than "product") localization (Bernal-Merino, 2015, p. 87). This raises the questions of *qualifications* – i.e., must a translator, by nature or necessity, have certain programmatic or engineering knowledge and know-how – and of *entitlement* – to

2. A mode is "a socially organized set of semiotic resources for making meaning. Examples of modes include image, writing, layout and speech, among others. For something to count as a mode, it needs to have a set of semiotic resources and organizing principles that are recognized within a community as realizing meaning." In "actual instances of meaning making, these resources are used in conjunction to form multimodal wholes." (Jewitt, Bezemer, & O'Halloran, 2016, p. 157)

what extent should designers or project managers, particularly with video games, allow localizers into the entrails of their products?

There may be three main solutions to these dilemmas. In terms of qualifications, Jiménez-Crespo (2013, p. 180) suggests the existence of different profiles, where a "continuum in the acquisition of localization competence progresses from" more "technically complex types towards more textual-based but less technologically complex ones." Therefore, based on the PACTE translation competence framework, whether one accesses the field through the gateway of a localization engineer or manager, or of a localization expert, the same componential model could be applied and adapted, allocating more emphasis to one sub-competence or another (*idem*.).

For O'Hagan and Mangiron (2013, pp. 179–200), (game) localizers should be entitled to a much higher degree of *agency* and *involvement* in the re-creation and the transformation of the product, particularly considering localizers' expertise in the target culture and in the communicative functioning of the products. They also warn against "treating localized games as lesser derivative products," which should instead be seen "as new creations which can stand on their own with new added value."

From a broader perspective, Pym (2000, p. 224) stresses the idea that translators and localizers should try to position themselves in the context of the *professional intercultures* they work for/with, rather than as simple "intermediaries between pairs of territorial cultures." By doing so, localizers would avoid being seen as irrelevant in a globalized world where multilingual, hyper-technological "professional cultures are now in the intermediary positions where we were once used to seeing translators." Instead, localizers' "specialized knowledge would formally make them participative members" of the intercultures within which they would act as producer-consumers (*ibid*., pp. 234–235), adopting the pragmatic rules of those professional cultures but remaining loyal and responsible towards their own profession as translators, that is, as intercultural, inter-professional mediators and facilitators.

Conflicting definitions

Finally, the concepts and definitions of translation and localization (in individual or mutual terms) are often too simplistically taken for granted or misinterpreted, particularly from the point of view of outsiders and, more often than not, clients and consumers. It is widely believed that "localization" as a differential term comes both from the still-predominant notion by localization industry operators that translation is just a question of word-by-word or sentence-by-sentence substitution (irrespective of cultural and linguistic differences, or target user needs), as well as from their idea that the main (or only) concern in localization is to make

sure that the product or service is adapted to function in a different technical and cultural locale, following conventional and legal target systems for the input and output of data.

Translation is largely seen by society as a literal activity, aimed at securing the accuracy of the *message* and also, albeit to a lesser degree, the fluency of the target text, even though theories such as functionalism, not to mention the manipulation school, post-structuralism, and so on, have introduced a great deal of complexity, richness and, needless to say, useful practical and theoretical resources to deal with the many particular situations in which translations are undertaken.

The main issue, as regards localization at least, is not in the concept of accuracy and fluency – which are problematic but clear and useful-enough benchmarks for any kind of translation – but in the romantic, modernist conception of the "message" as a *stable* and *static* utterance directly referring to perfectly identifiable, pre-existing or perfectly fixed ideas and objects in the world, as well as in the notion of the invisible translator, who would therefore bear no external responsibility for his or her work of intermediation (Arrojo, 1998). The question is whether, in localization, translation is *just* the "simple" recoding into different language(s) of the messages that help describe and operate the localized product, regardless of context, interpreting or operating subjects, other co-occurring meaning-producing systems and, most importantly, potential (non-explicit, non-immediately present) action – i.e. affordances, as we will see.

Translation scholars have often pressed the point (e.g., Cronin, 2003, pp. 62–63; O'Hagan & Mangiron, 2013, pp. 107–110; Jiménez-Crespo, 2013, p. 198) that the literal conception of translation that some localization operators have is extremely simplistic and also detrimental to the quality of the localization product. This is obvious in highly narrative video games and in content-laden websites, where we may argue that the localization job is close in nature to the traditional translation brief, particularly in certain text types, genres or articles where no major interactive mechanisms apply to the content. Take, for instance, Wikipedia articles, blogs, but also descriptions of rules or settings in video games, online software manuals, and so on.

What we have just described could be characterized as a "low-tech" or "technology-insulated" area of localization. The technology behind it, in terms of programming, architectural design and runtime dynamics, may be extremely complex, but the actual contact of translators with that complexity and dynamism is very superficial or non-existent, a situation often motivated by project managers or engineers. It is the consequence of technology on the *medium-as-document* (e.g., hyperlinked documents and pages, variable outputs, interactivity) and particularly on *the way information is conveyed* linguistically (e.g., shorter information chunks, different text structures, non-linearity) and *complements the functioning*, usage

and experience of the product (e.g., alternative texts, menus, dialogs, help messages and feedback) that becomes the main focus of translation-as-localization.

The more salient the affective-expressive and the poetic functions (in Jakobson's classic terms) of the product, and the more explicit the interactive (rather than just one-way, instructive) communication with the user is, the more leeway and responsibility the localizer is likely (at least in theory) to be given. When the client is aware of this and understands the possibilities of the new media and the multidirectionality in the production of meaning, actions and responses, "the nature of the malleable medium is exploited" (O'Hagan & Mangiron, 2013, p. 190), rather than considering the technology as an end in and of itself, but as a participatory cultural product requiring different semiotic, material and logical-processual technologies and associated languages.

When it comes to more "high-tech" localization (usually linked, somewhat simplistically, to software), the widespread notion is that the messages (or strings) are just subsidiary and subordinate to the main component (software, functional logic), which is "already there," before language and culture (Pym, 2004, p. 62), thus making translation a secondary – almost irrelevant – derivative task. Localization is, in this way, a kind of highly "constrained" (or, rather, "subordinate," in the Spanish version of the term) translation – constrained by the medium, the form, the container; but, mainly, subordinate to the product's logic, its functions, its essence as a performative product – as it performs complex tasks, processes data, reproduces interactive environments.[3] If this is the prevailing idea, no wonder that translation is only seen as an after effect of core engineering, programmatic or usability design. The medium *is* the message, in McLuhan's terms.

Unity in diversity

So, is localization translation of digital genres? Are all kinds of translational activities performed on a digital product part of localization? Is all localization the same?

3. Translation is constrained and conditioned by extra-linguistic elements influencing how the translated document is produced, and imposing a series of restrictions on it (Toda, 2005, pp. 121–124): screen or advertising space, reading speed, lip sync, rhyme and rhythm, and so on. Approaches to constrained translation also rightly "stress the intersemiotic dimension and the interdependence of words and images" (Zanettin, 2009, p. 39), which, nonetheless, may be construed as subordination to the main, "strong" language of the medium, that is to say, moving or still images (in the case of film, comics and so on), or action and functionality in software and video games, or even multimodal hypertextuality in websites.

To start with, just as localization challenges the traditional notions of translation, so is localization under "territorial" pressure from concepts or activities such as *transcreation* (O'Hagan & Mangiron, 2013, pp. 107–110), which focuses on creative freedom of the translator, particularly in websites, marketing, advertising and video games, rather than on technical adaptation and technological conditions; or from certain *internationalization* perspectives aiming at making localization irrelevant or "reducing it" to "plain" or automatic (including machine) translation.[4]

Esselink (2000b) argued that localization can be distinguished from translation by comparing them in terms of the (higher for localization) number or degree of: *activities*; *complexity* of projects and products to be adapted; *adaptation* level; and *technology* and tools used. Although some of these factors may be indicative of localization and, certainly, are usually caused by localization needs, we believe that the key lies in considering localization as a special area of transformation and material transfer of digital interactive products, where localizers take part in a dialogue between technology, action, language, culture and users.

In our view, activities must meet a number of criteria to a certain degree to be considered – and be taught as – localization (which does not preclude the same activities, or part of them, from being treated – and taught – also as part of other sub-disciplines, like screen, literary, or technical translation, advertising, or in the context of a more general translation perspective):

1. Object of activity: localization deals with *digital interactive* products or services, allowing users to do things with them (and whose potential actions must be communicated). Translating a small text for a website outside its medium should not qualify as localization unless there are interactive, programmatic or medium-related elements that are potentially adaptable or meaning producing.
2. *Semiotic interdependence* between texts and the material product (*multimodality*, see note 2). This interdependence can be realized through interactivity or other semiotic modes (icons, forms, images, video, etc.). Failure to notice it would result in poor (or non-)localization.

4. Take the example of Facebook or certain web CMSs, which include in-context translation capabilities into their multilingual support, providing some visual context to their applications, but also, alas, looking at translation and localization again as simple string substitution, without much or any functional contextualization, which is also the case with undocumented, uncommented, isolated multilingual resource internationalization.

3. *Co-agency*: (active or passive) *participation in the process of re-creation*, by sharing formats, processes, tools, or joining the de-composition/re-composition cycle.
4. High degree of material, cultural or functional *adaptation* or *transformation*, to meet cultural and legal conventions, norms and laws.
5. Dealing with *textual genres* based on *performativity, interactivity* and new (and fast-changing) *information habits*.

The localization interdiscipline: theories and applications

Functionalist, user-centered, transformational and systemic approaches

There is widespread agreement that localization can mainly be described within Translation Studies by the functionalist approach (Jiménez-Crespo, 2013, p. 19; O'Hagan & Mangiron, 2013, p. 149). Purposes or functions cannot always be predetermined, or at least not absolutely (Cronin, 2003, p. 66; Pym, 2004, pp. 15–16, 157; O'Hagan & Mangiron, 2013, pp. 174, 184, 198), either through explicit, client-agreed-with specifications or by means of an implicit, "essential" translation brief (Melby et al., 2014, pp. 399–400). However, this and other newer user-centered and cultural usability approaches (Suojanen, Koskinen, & Tuominen, 2015, pp. 22–23, 40–41) probably have the strongest explanatory force for many translation situations, particularly localization and transcreation. They are no doubt most useful in helping explain and defend strategies leading to source-target "differences," non-literal solutions, or creative, pragmatic adaptations for target users to the intended message, experience or function.

Another useful theoretical construct is Pym's intercultural professional (see subsection on "Qualifications and entitlement" above). According to him (2004), translators and localizers should become and be seen as experts and *co-operators* within broader processes of transformation and distribution of knowledge, information and services. This emphasis on the *meaningful materiality* of texts and products that need to be transferred, disseminated, transformed or distributed is also the basis of Cronin's suggestion that, in the information age, translators should be seen as *transmitters* rather than just communicators (Cronin, 2003, p. 65).

To this effect, Tymoczko (2003, pp. 197–201) argues against the typical spatial and cultural metaphor of the translator as an agent *between*, which "grows out of a particular Western capitalist paradigm of the translator as an isolated individual worker who independently acts as mediator of languages," as this discourse is "incompatible with a view of languages as formal systems that actually construct meaning rather than as structures that merely reflect external, language-free meaning."

Social semiotics, de-sign and Human-Computer Interaction (HCI)

In order to look, both theoretically and pedagogically, towards those areas where localization can be regarded as part of larger social *systems* of cultural (re)production – not as an isolated externalized activity – where localizers are entitled to participate in the meaning-producing processes and media of software, websites and video games, we must move to what we may call the "semiotics of de-sign," i.e. not only the relationship of non-verbal *signs* with meaning, but particularly also the relationship of the *design* of the product, of interactivity, and of its process of communication and use, with meaning (check the definition of "design" by social semiotics, in Jewitt, Bezemer, & O'Halloran, 2016, p. 73).

Translation theories and approaches have traditionally focused on the analysis, transfer and negotiation of meaning and communication from linguistic, cultural, discourse analysis and functionalist perspectives. The more dynamic approaches consider how a text may impact recipients, a particular system or culture, or communication and interaction among agents in general. Translation and transcreation of conceptual art and advertising also show an enhanced awareness of the medium as a meaningful part of the message. However, with localization products, the message and the medium are all one, and a new most important semiotic regime is also in operation: *(inter)action* and *interactivity* (Jiménez-Crespo, 2013, p. 88), which are crucial in the mediation of human tasks and concernful activity (Winograd & Flores, 1985), where usage, experience and meaning, and the transmission of all three, are tightly intertwined.

If action, usage and experience are crucial, we believe that Translation Studies would greatly benefit from observing and exchanging concerns with the area of Human-Computer Interaction (HCI), and related user-centered approaches (Suojanen, Koskinen, & Tuominen, 2015) and disciplines such as Usability, Accessibility, User Experience and so on. In particular, we will briefly look at the seminal work of two major thinkers and practitioners in the field: Norman, who takes a social cognitivist approach to usability, human-centered design and user experience, and acknowledges that good "design requires the cooperative efforts of multiple disciplines" (Norman, 2013, p. 34), clear conceptual models and good communication of it; and Winograd, whose approach is ontological-phenomenological and heuristic, with a strong emphasis on language, embodied practice and "thrownness" (the fact that we always act conditioned by the contextual situation in which we are in the world). Both approach software design (so, by extension, localization) as a *conversation for action* and *with materials*, and HCI as a *dialogue* (Winograd, 1996, pp. 105–120, 171–184), thus highlighting the importance of language and communication in the successful marriage of human concerns, professional tasks, and electronic artefacts.

For HCI experts, applications are not just a conglomerate of *isolated functions*. "No matter how brilliant the product, if people cannot use it, it will receive poor reviews" (Norman, 2013, p. 32). In contrast, successful software products satisfy deeper, more comprehensive needs, embed and interweave themselves neatly in routine and professional activities without much disruption, and provide gratifying experiences to their users.

"Good design requires, among other things, good communication of the purpose, structure, and operation of the device to the people who use it," which, in turn, requires good conceptual models, which "are the key to understandable, enjoyable products" (*ibid*., p. 14). From this kind of analysis, and also from certain multimodal approaches like Kress and van Leeuwen's social semiotics (Jewitt, Bezemer, & O'Halloran, 2016, pp. 58–85), we can derive crucial concepts which can and must be applied to localization: *affordances* (the relationships between an interactive artefact and the agent; what the latter can do with the former, according to their nature and to internal and external *constraints*);[5] *signifiers*, which communicate the artefact's potential for action – its affordances – mainly through words, graphics, or other semiotic resources); or *feedback* (the way software assesses and communicates to users what they are actually doing and what the results are).

Both the activity of design and the task carried out by the intermediation of software, video games and websites take place in a space of conversation and negotiation with objects, metaphors, agreed-upon labels for actions, things, and so on. Both, then, are interwoven by *language games*, in Wittgenstein's terms, i.e., rule-based ways of interacting with each other and the world, and discovering them, by means of (conscious or subconscious) forms of language and communication, which are indispensable for any successful co-operative human concerns: "Language-games are performed both as speech acts and as other activities" (Ehn, 1992, p. 120), signs, tools, objects, mechanisms. Just as language is, to a great extent, action (*speech acts*, in Austin and Searle's terms), (inter)action (and technology) can only exist through (multimodal, including ergodic[6]) language, through re-cognizable interpretations or re-constructions of signs and conventions. Speech acts are a way to understand (inter)action in computer artefacts (Winograd & Flores, 1985, pp. 17–79, 174–176) that can bring localizers on the same wavelength as the rest of the re-production team.

5. "Affordance is a concept initially developed by [psychologist] Gibson (1979)" (O'Hagan & Mangiron, 2013, p. 77).

6. In Aarseth's (1997, p. 1) definition, digital products, and particularly video games, ergodic texts are those where intentional, "nontrivial effort is required to allow the reader to traverse the text," to interact and move with it.

HCI theorists and practitioners typically start their approach from the recognition and design of proper *tasks* and objectives for actual users in a particular domain of action (i.e., its *ontology*), and are most successful if designers and users co-operate in participatory design by reaching common, mutually resembling language games (with recognizable objects and rules). It is this space of mutual understanding (enhanced by their role as "special" users and reader-writers, as in translation) that localizers should occupy, as mediators between stakeholders but also as part of the interculture of designers, programmers, experts and users.

Educational models and approaches in translation and localization

Before deciding how to teach a particular subject or how to integrate it within the overall educational environment and activity, one must have a conscious or subconscious – often handed down by prior exposure – idea of how teaching and learning are (best) achieved and what the main objectives of education are, from a social, political, cultural and individual-developmental point of view (Torres del Rey, 2005a, pp. 17–56, 144–146, 172–173).

Technology modules are often seen by translation scholars as ex-centric in terms of teaching methodologies. Technology is frequently considered a "foreign body" in our discipline unless deeply integrated in translational action. Some of the misgivings may be that the use of technology disrupts creative cognitive activity, which is essential for translation processes; and that teaching technology is often carried out in a way that is too theoretical or too technical, thus introducing an extraneous domain into translation.

These "dehumanizing" fears, which have typically applied to computer-aided translation (see, for instance, Austermühl, 2013), may be allayed for localization as a practical field combining the understanding and application of translation and digital interaction. It is fundamental to approach technologies by analyzing how they are meaningful for humans, how their uses are conditioned socially and culturally, and how they integrate communication in their meaning and operations. By not getting fixated on the instrumental, starting the approach from translation (social, linguistic, cultural) needs, opportunities and implications, maximizing those cognitive areas where the technological and the translational meet – rather than just considering language or the mind as computer models to be unproblematically scrutinized and reproduced – we may be more in tune with a more satisfactory, comprehensive model of localization for translation students.

General educational models or teaching theories or approaches usually lead to certain general methodologies. The 20th century mainly saw behaviorist, cognitivist, and constructivist theories and methodologies. The Internet era has spawned

new (or renewed) approaches, such as online collaborative learning (Harasim, 2012, pp. 12–14) and connectivism (Siemens, 2005), seeking solutions for current phenomena like the massive decentralization and profusion of information and of sources of authority, and the possibilities of social networking and active participation in the co-construction of knowledge.

Even if we are philosophically closer to one model or another, we are most likely to be relying on a mixture of them, as they explain different yet not always incompatible ways of how we acquire and process knowledge, assimilate it and become educated, socially, individually and professionally empowered, or enculturated. Different learning and teaching styles may require different methodologies for specific content elements, objectives and so on. It depends on instructors' or learners' styles, or on environmental circumstances, but it is always crucial to make sure that not only the student, but also the teacher or facilitator is comfortable with the approach, which will always make the process more motivating for all participants.

For instance, when Espunha (2005) argues that typical methods in translator training have been *learning by doing* (by translating and being revised by the teacher or other students) and a *textual approach* (analyzing the text first, then trying to apply the textual structures and methodologies identified, top-bottom or bottom-up), we may be engaging on all three classic learning theories: analyzing typical behavior to be able to measure it and convey it (behaviorism), modelling mental processes (cognitivism) to move from novice to expert, or experiential learning (constructivism).

Focusing on achieving learning objectives by repetition can have a more behaviorist tone, while process orientations are usually closer to cognitivism when dealing with understanding and operating on mental states and changes, both conscious and unconscious. Constructivist cognitivism can be useful in bringing technology and translation together in the teaching of localization, by placing "a strong emphasis on learners developing personal meaning" (Bates, 2015, p. 54) about technical and technological objects, their workflow, the conceptual models they are built on, and how they are creative human responses to human needs (Folaron, 2006, pp. 204–206).

Constructivism also tends to focus on processes and, particularly, on allowing students to incorporate knowledge by actively constructing it, by providing for meaningful experiences, and reflecting on them; and, in the social branch of constructivism, setting up collaborative environments, authentic activities and interacting socially and linguistically with other learners and with experts.

Constructionism, Papert's particular brand of cognitive constructivism, suggests "that the most effective learning occurs when the learner constructs something that is meaningful to himself or herself," creating "their own ideas facilitated

by their own building of 'artefacts' that illustrate their learning and meaning and subsequent reflections, almost always in collaboration with their peers, on those artefacts. Students have taken ownership over their learning and their artefacts" (Flippen, 2014).

Social semiotics also stress how students can use various semiotic "resources to realize meaning and express identities in complex ways related to their interests and context" and become (technologically) "literate through engaging with and creating multimodal artefacts" (Jewitt, Bezemer, & O'Halloran, 2016, p. 80).

For Papert (1980), the constructionist approach pivots around objects to think and act upon, and takes advantage of computers, programming, simulation and objects to help students come to terms with varied, complementary styles of learning. Thus, ideas would form and evolve in more richness and would become more deeply ingrained in their mind and their affect. Objects allow students to have a reference, something more tangible to relate with. With objects students can wonder what they are and what for, how they would react and interact with other objects. They have properties and states, are manipulable and can be categorized in different ways (Torres del Rey, 2005b, pp. 535–536).

No student can get to know what a subject is about without understanding to a certain point the metaphors in its foundations (Postman, 1999, p. 195). Metaphors and language are also the basis for technology and, crucially, for the products that need to be localized. The essential metaphoricity of our culture and of our ability to develop ideas and negotiate them through language (Lakoff & Johnson, 1999), lies at the foundations of localizable user interfaces (both graphical and apprehensible through alternative senses and the intellect), but also explains how we come to a common understanding of tools and processes.

In line with constructivism and also with social semiotics and post-structuralism, we like to approach technology from the point of view of its languages, its objects, tools and processes, and its impact on society and knowledge. To learn something, in phenomenological and social constructivist terms, is to be able to use it (Ehn, 1992, p. 119). Technology for us is not (only) an object to be apprehended objectively or even just conceptually, but a mode of living and communicating which must be appropriated.

Our approach aims to be holistic, comprehensive, accepting the complexity of the real, conceptualizing localization and translation as a fundamentally ethical activity which must start from the recognition of the existence of a need for exchange, communication, transmission, and symbolic and semantic negotiation (Torres del Rey, 2005a, p. 155; Folaron, 2006, pp. 206–211). It is based on a number of principles similar to Kiraly's social constructivist (2000) as well as his more recent post-modern "emergent" model (2015), to Arrojo's deconstructionist manifesto (Arrojo 2012; see also Hague 2008) and to Risku's situated learning

approach (Risku 2016): trying to start from the social activity of translation and from translators as professional actors engaged in bigger social activity; using and engaging in authentic materials and processes, and not reducing complexity; making students participate and collaborate to construct individual, as well as social, declarative and procedural knowledge and competence; using continuous, self and peer assessment more as a method of formative evaluation rather than just as a summative end; making students want to learn by providing meaningful experiences; fostering in them self-reflection and reflection on their own learning; seeking the appropriation of viable explanations and conceptual models of the technical objects and processes they are engaged in, rather than looking for general or ultimate truths, and so on.

An inclusive approach to localization education

Current approaches to localization education are, to a certain extent, based on the previously-mentioned dichotomies between translation or localization as hyperonyms, as well as on the underlying theoretical framework from Translation Studies or other disciplines. Depending on whether translation (with a more or less linguistic, cultural and/or communicative orientation) is regarded as the main discipline, or whether the importance is placed in the manipulation and transformation of technology, or in business or professional processes, the approach can be very different.

We can find translation-centered approaches such as those based on the analysis of text types and genres; more target-oriented modules influenced by functionalism, discourse analysis, or derived from a broader study of media forms and cultural phenomena; project-management approaches, focusing on the organization of projects, human, language and technological resources; componential modules dealing with products, processes, tools and theory; and more techno-centric approaches, where the main emphasis is on technical competence and being able to dissect products and use complex tools and processes.[7]

In the following pages, we will present our approach, which is based on our above analysis of the localization domain and its theoretical foundations and of pedagogical models. We will not deal with curricular design *per se*, which covers needs analysis, setting objectives and outcomes, participants, content, resources,

7. See some of the few explicit academic approaches to localization education in the literature: Austermühl (2006); Folaron (2006); Schäler (2007); Jiménez-Crespo (2013, Chapter 7); O'Hagan and Mangiron (2013, Chapter 6); Bernal-Merino (2015, Chapter 6); Morado Vázquez and Torres del Rey (2015).

methods, sequencing, and assessment (Kelly, 2005). Instead, we will focus on those questions (*ibid*.) of the didactic act (why, what, how, with what, when and for how long, how to know about results) which have more to do with Kiraly's approach perspective: the *what* (the nature of the localization objects of learning, competences, integration into Translation Studies) and the *why* (social, professional, teaching, strategic motivations).[8]

Over the last ten years, we have developed it and experimented with it within the Cod.eX Research Group.[9] Only recently have we labelled it "ECOS" in Spanish (Communicative, Object-driven, Social Approach), as we try to strike a balance between those three aspects of localization education.

Semiotic/Communicative approach

Scholars and practitioners within what we have called Translation-Oriented Localization Studies (TOLS) (Torres del Rey & Rodríguez Vázquez, 2016, p. 972), like Jiménez-Crespo (2013), O'Hagan and Mangiron (2013), and Bernal-Merino (2015), whether from text or discourse approaches, functionalism, processes of transcreation, or the analysis of creativity and other conditions of cultural and technological reproduction, would no doubt consider the communication aspect paramount. They also share with us a concern with the technological and professional processes of globalization and how these may impact our profession.

In contrast, other recent (software) localization handbooks, such as Roturier (2015), like Esselink (2000a), touch only fleetingly upon translation-proper (communication, negotiation, mediation, language creativity) aspects, except to mention typical localization-, language- and culture-related constraints. This is not to say that the rest of aspects that these handbooks deal with are not important in localization, or in TOLS. Actually, they would correspond to some of our own "object-driven approach" and are important in the social configuration of localization professionals.

As advocated above and elsewhere (Torres del Rey & Rodríguez V. de Aldana, 2013, pp. 10–13; Rodríguez Vázquez & Torres del Rey, 2012), the localizer/

8. These, of course, are also influenced by the *when* (at what point of the studies, after and before what other modules) and by the *results* (evaluation, feedback), among other aspects. For instance, in our teaching context, basic concepts related to cultural adaptation, functionalism, and translation strategies had been assimilated by students in previous modules and years of study.

9. The approach would not have been possible without the participation of fellow Cod.eX members Lucía Morado Vázquez and Silvia Rodríguez Vázquez (University of Geneva), and Emilio Rodríguez V. de Aldana (University of Salamanca).

translator is, above all, a mediator in the process of communication and transmission of material culture. In this regard, analyzing and practicing with students the way verbal and non-verbal language is arranged and communicate linguistically and textually is an important part of our approach, but it is not enough. From a pragmatic and multimodal, intersemiotic point of view, it is also our mission to focus on the product's *affordances*; that is, how it communicates what the user can or cannot do with it, through signifiers, constraints, feedback, and so on (see subsection on "Social semiotics, de-sign and Human-Computer Interaction" above); how users can communicate with the product to accomplish their goals or experiences; or how, in the intermediation of the product, they can reach other users, communities, and the social, cultural or professional sphere they engage in. In brief, how the product is meaningful in the hands, minds and the language of its users (and designers, cultures and societies).

Localizers' main role, then, is to interculturally mediate the communicative and semiotic value and potential of the product, or, maybe more precisely, of the *interaction*. This involves, at least, being able to deal with:

1. *Verbal and non-verbal language*: descriptive/representative language; language as action (options, functions, interfaces); language as result (status, feedback, errors, warnings, notices); cultural aspects of language.
2. *Interaction workflows*: identification of possible paths and narrative plots; bi- or multi-directional dialogue (who or what communicates action, result, intention, requests, promises, etc. – speech acts – to whom or what?); variable references to key objects and actions.
3. *The interrelated confluence of*: different genres and discourses; intertextuality; (visual, functional, textual, graphical) codes; culturally recognizable objects and functions; corporate and ideological signs.
4. *Accessibility* of the above: how they can be widely perceptible, operable, understandable and robust (Rodríguez Vázquez & Torres del Rey, 2014).

Focusing on all these aspects in relation to the semiotic value and potential of localization and its products and processes can make the localization experience of students more meaningful and comprehensive, and it can help them communicate that powerful and meaningful experience from the product to other social agents involved, who, in turn, might be more inclined to listen to the localizer as a real expert in this area.

Students would understand that they are *re/trans-creating* or *co-producing* something that they can feel *identified* with though a comprehensive experience. They would thus feel *empowered* and part of the team and the system aiming at realizing that potential of a product or service, as we will see in the discussion of a "Social approach" below.

In order for this learning experience to be part of localizers' education, special emphasis should be put on *contextualization*; acquiring clear orientations about the meaning, purpose, use of spaces and directions of the product or service; and fully *experimenting* and *experiencing* the process and the product by acting as *co-producers*, which is also part of our object-driven and social approaches.

Functional, visual and, in general, *contextual* information is essential for the correct interpretation of the product in general and of specific textual strings which depend on knowing what they are caused by, what their associated operation may cause, what other objects and structures they are related with, or even whether they refer to imperative action and orders, to blocks of conceptual information, results of action and so on – making, for instance, the identification of the part of speech of English (noun and verb) homographs critical. In this sense, it is crucial to make students realize that, in contrast with a traditional linear document, in a digital interactive object, text and product are disseminated and scattered in multiple files and intermingled in a reticular, non-linear way. Thus, localizers are often provided fragmented, un-cohesive, un-coherent strings or parts of the product, where the interaction workflow is not properly documented for them either.

In order to apply this for localization education (and eventually, for anyone involved in localization) we can introduce exercises where the product is analyzed in terms of sensory (visual, tactile), functional, semiotic and pragmatic components and relations, and then re-constructed by each student in individual assignments, or dialogically through debate or peer assessment. As part of a localization kit, Muzii (2011, p. 7) recommends providing a *UI (User Interface) flow chart*, including the flow of interactions, causal elements, possible output messages, intended outcomes, and so on, "describing how the overall UI fits together, and defining the context of terms; UML use case, activity and sequence diagrams could often be sufficient."[10]

For maximum authenticity (and as part of the object and social orientations of our approach), we may try to (have students) describe and build all the elements from a potential localization kit for a specific product. For instance, we are currently developing a framework for students to analyze action-language interactions, workflows and visual and functional contextualization in software (which may be adapted, at least partially, to other products), including:

1. Main purposes of the software;
2. Areas and aspects of interaction:

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10. For more information about UML (Universal Modelling Language), see http://www.uml.org. Some ideas for drawing UI flow charts may be found in Ambler (2004, pp. 197–198) and Singer (2009).

   a. fixed areas, like button bars or editing windows;
   b. interaction elements, like menus or dialogs;
   c. main objects of main actions;
   d. subjects performing or communicating actions and results (users, operating system, objects, etc.);
3. Speech acts:
   a. locutionary act – the actual message, and where it is displayed;
   b. illocutionary act, i.e. the type of action – request, order, promise, declaration of status or of change of state, feedback – and its intention;
   c. perlocutionary act – the output of the message-as-action, its effect;
   d. "pre-locutionary" act – previous action or cause;
4. Integration of the above in a UI flow chart, showing types and directions of interaction.

This framework somehow resembles systemic-functional approaches to multimodal discourse analysis in their (more micro-structural) exploration of the semiotic metafunctions of artefacts: ideational (experiential and logical), interpersonal and textual meaning (Jewitt, Bezemer, & O'Halloran, 2016, pp. 30–57).

Other communication-oriented methodologies that we have used (besides the actual practice of translation) include: group discussions and presentations on specific elements and topics regarding the communication strategies, the language and its interrelationship with the material and functionality of each type of localization product; and the accessibility analysis of a product considering not only perceptible and operable elements, but also the multimodal organization of information and how it should make sense and cohere in global terms, from a design perspective, which may be crucial for the localization act itself (Torres del Rey & Rodríguez Vázquez, 2016).

Object-driven approach

As seen in previous sections, focusing on objects can be highly motivating for students, allowing them to visualize, sense (through direct contact or evocation), assimilate, gain some control over, and internalize concepts and techniques. This can be done by using and manipulating objects-as-metaphors, objects-as-concepts, or objects-as-components, and experimenting with their nature, mechanics and aesthetics (Torres del Rey, 2005a, pp. 178–183). In a way, objects may serve, in the teaching of localization to translation students, as the bridge between the technical and the artistic or humanistic.

The origin of our *object* emphasis can be found in our practice and observation of general translation technology modules, where it was clear that, for most

of the aspects of the syllabus, it helped students to focus on, and *always* think in terms of, (visible, tangible) objects, such as files, folders, documents, images, unitary web pages, and other "physical objects" in their computers, which were usually metaphors from the real world. It was also helpful, of course, to use objects as representation of abstract ideas, relations, workflows and processes. This approach quickly found its way into localization education.

The idea was to make students think not only in terms of the tasks and steps they were asked to perform, or of the technological or cultural products they needed to use or translate, but to view and feel those products (and their component objects) as something whose (de)composable and (re)combinatory nature they could understand, internalize and appropriate even better by touching, using and experiencing them, in intellectual, physical, motor and aesthetic terms. Metaphors, dynamic visual presentations, but also "real" teaching and learning props, come in very handy for this purpose.

In general, the object orientation also means for us advocating an openly *technical* – yet intellectually and sensorially graspable – approach. Of course, this has the danger of trespassing the limits of entitlement or qualifications (or of translational relevance), as discussed above, but that can be prevented by striking a balance with the semiotic aspect, or by going as far as the communicative or the social would allow – considering learners' motivations and instructors' ability.

Our approach has obvious similarities with the term *object-oriented* in programming or design. In fact, we have experimented with that same notion when introducing programming to localization students. Our aim was to encourage students to experience and reflect on the way programmers and designers think – and are constrained by the combinatorial nature of the syntax, vocabulary, the assumptions and prior experiences of the language, and the structure of authoring tools – when constructing their universe of objects and actions, according to certain specifications or to the observation of a certain domain of activity, with more or less participation of potential users. A little knowledge about objects in programming (and in other computer languages like HTML or CSS), properties, methods, events and so on can go a long way towards making students, both the most and the least technophile, appreciate the context where their words, sentences and communication ideas interact with programming conditions, formal instructions, states and actions.[11]

11. One of the modules we use to introduce programming to localization students, in a somewhat ludic fashion, uses the MS Small Basic programming language to document typical issues, problems and opportunities encountered by localizers. This also builds on Papert's (1980) ideas about programming languages as culturally and materially rich aids to acquire

Re-composing objects provides students with a sense of accomplishment, of being able to build real, usable things. It also helps students acquire meaning from direct, concrete experience with technology (Pacey, 1999, p. 33). Learning about website localization, for instance, can be approached complementarily from basic knowledge and manipulation of HTML, but also of visual web editors, in order to compose, de-compose and re-compose the localized version, independently or together with CAT tools, as will be seen later.

As with the communicative aspect, the object orientation can have a very practical side related to manipulating and building localizable things. However, attention is also paid to the analysis of the structures of signification and socio-ontological processes. That is, how the objects communicate at different structural levels, but also how they are assembled in the globalization cycle (including localization) and how they exist and behave as functioning (and localizable) objects, which can also help the localizer interact and communicate fluently enough with other agents in socio-professional terms.

For instance, as a means of giving students some unifying system of analysis about what to look at in any digital interactive products – from a semiotic and object-driven point of view, we have devised a framework comprising three structural levels in all localization products, and various action steps, according to profile (as suggested by Jiménez-Crespo), specifications or team organization. In terms of structures, our model mainly draws on Mata Pastor (2005, pp. 200ff):

1. *Superstructure*: the realm of user interaction; visible, surface manifestation of the product, coherently and cohesively organized at the level of the whole product or at the level of its units (webpages, interactive elements or spaces, screens…).
2. *Infrastructure*: the structure underneath, consisting of (development or deployment) *platforms* and groups of computer organization *objects*.
    a. *Platforms* can be a web editor, a Content Management System (CMS) and underlying technologies, a web server, a web browser, an Integrated Development Environment (IDE), game engines, and so on.
    b. In terms of *objects*, the infrastructure can be subdivided into:

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new possibilities for learning, thinking and growing emotionally; acquiring heuristic habits; and reflecting on real-world ideas and objects consisting of properties, having potential for action, and responding to events. Also see Roturier (2015, Chapter 2) on programming with Python.

   i. *Macrostructure:* file and folder structures, which often reflect the superstructure meaningfully.
   ii. *Hyperstructure:* the way files are interlinked.
3. *Microstructure*: the deeper level of code and programming languages: syntax, vocabulary, but also translatable text.

This analytical framework has proven very useful for students to understand, for instance, the infrastructural and microstructural differences between dynamic and static websites, and how this affects localizers' tasks, their choice of tools and processes, and the way they must communicate and relate to clients and developers (Torres del Rey & Rodríguez V. de Aldana, 2014). On the other hand, the correspondence between the superstructure and the object macrostructure, hyperstructure and microstructure is also very illuminating for CHM (compiled) and HTML (Webhelp) online help systems for software applications, which allows students to go through the whole process of localization, filtering translatable files in suitable CAT tools, and realizing the conceptual and communicative relations between the interface of the documented application, the functioning of both products (software application and online help), the textual structure of a documentation file, and their contextual relationships.[12]

Another example of a successful application of this analytical tool can be found in the way JavaScript inserts, on the client side, significant text and functions in the resulting HTML file served to a user. In the light of this kind of analysis, localizers can move from the microstructure to the macrostructure (through the available platform infrastructure, see note 12) to find the necessary JavaScript libraries producing the localizable texts (or other semiotic – including culture-dependent functional[13] – resources) that will be accessed in the superstructure. Finally, the way localizable text and other semiotic resources are hard-coded or externalized in resource files for multilingual software applications can be easily explored by looking at the microstructure and object infrastructure at the same time: their interconnections reflect how the logical functions embedded in software are communicated by different modes (symbols or icons, interactivity, verbal

12. Useful platforms that create and recreate web-based (re)production, development or deployment environments, as well as visually show structural relationships, and are easy to install, are: XAMPP (for CMS-based websites), MS Expression Web (visual web editor and manager), MS HTML Help Workshop (for CHM online help) and HelpNDoc (for single-source online help publishing).

13. As is the case with international variables and other interactive objects that depend on cultural or legal conventions and norms. See, for instance, Yunker (2017, pp. 79–80), García Nevares (2016, pp. 176–184).

language); and the microstructure of the externalized text resources may also be analyzed so that localizers can process and filter translatable text in conjunction with its explanatory or structural context.[14]

Depending on their role and qualifications, as will be seen in the next section, localizers' need to analyze the above structures would vary greatly, as would the degree at which they could process, prepare, or act upon those superstructural, infrastructural or microstructural objects. What is important, at any rate, is to let students know that those levels exist, in what ways semiotic text and resources are interwoven with the various objects, and that their manipulation and transformation (in an educational environment, at least) can offer useful insights into the nature and value of the localizable product.

Needless to say, strategies must be found to make the most technical information appealing and understandable to less technophile (or technologically-minded) students. Presentations, diagrams, videos and other varied resources and activities (like webquests or semi-scripted interviews by the students with actual localizers) are used to make them understand the nature of products, but also the dynamics of the process. It is also a question of carefully trying to present knowledge and know-how that is viable enough (Torres del Rey, 2005b) without going so far into the depths of the technology that students may feel alienated, confused or unmotivated by a "foreign domain" (Winograd and Flores, 1985, pp. 52–53, 165).

Social approach

Approaching localization education socially does not *only* involve learning how to provide a service to society at large, and particularly to those more in need – through accessibility, the promotion of open source ventures, but also by serving as ethical intermediaries who bring the social values of technology (Folaron, 2006; Schäler, 2007) to the fore. Our view of the social mission of education also means encouraging localizers to gain, and maintain, a strong social position in the complex, multidisciplinary (re)production effort that they will take part in, including other translators and localizers. In other words, empowering localizers to improve work, motivation and satisfaction for all involved, including users (Suojanen, Koskinen, & Tuominen, 2015). Using authentic or semi-authentic team project

14. Notepad++ (also Sublime Text or BBEdit) is an indispensable tool to identify different elements in the microstructure of a code file, as is WinMerge to compare differences in text/code files and folders. Downloading full software development projects from open-source repositories (like Sourceforge or GitHub), or official samples from Microsoft and other publishers can help analyze software macrostructures, before and after compilation.

work with students (and actual external localization players) is one of the main strategies that can be applied for this social purpose.

The social aspect has already been very present throughout the previous pages. By combining the semiotic and object orientations, localizers can maximize the successful transformation of the communicative characteristics of the product in tune with its nature as an interactive digital cultural object, thus improving acceptance and identification with it by potential users and consumers – which is one of the main objectives of localization – as well as promoting recognition of localizers' expertise by other co-operating agents in the globalization and localization cycle. In this sense, by actively joining the interprofessional communities that are involved in the process, localizers could also partake, to a certain extent, in the technical (re)production cycle, inscribing themselves as well as their own (translators' and localizers') values and meanings (Torres del Rey, 2005a, pp. 121–14) in it.

To this end, we like our students to experience the process of fully re-creating the context of production and the localized end product.[15] Reproducing the whole development environment and reusing it to localize a product is not the most typical situation localizers would find. However, if a copy of the development project files or if access to the macrostructure or infrastructure of web content is provided for the localizer, either downloaded or reconstructed by him or her, there could be two very beneficial consequences: first, localizers would have the necessary visual, functional and textual context of the fragmentary or context-less text they would otherwise receive, thus maximizing quality and anticipating errors or the need for adaptations; second, they would be able to show or simulate the final look and feel for the client or the development team, which would certainly increase trust and confidence.

Besides, this methodology also allows students and teachers to find and practice with (often non-internationalized, hard-coded) open source repositories of software and games (ideally also with the project files and rest of the code and resources, see note 14), de-compilation and re-compilation tools (see note 15); or with offline browsers – in order to download whole static websites or mimicking

15. See examples in the previous section, and particularly in note 14, about development project files, and note 12 about development environments for dynamic and static websites and online HTML help. Integrated Development Environments (IDEs) that can be used for software (together with software project files for such IDEs) include Bluej and Netbeans (Java), Dev C++, MS Visual Studio and Android Studio. APK Tools is a reverse engineering application often used to delve into the file macrostructure of an Android application. JPEXS is very useful for SWF (Flash) animations. Rainbow and other tools in the Okapi Framework are excellent pre-processing and post-processing localization tools than can be used didactically, including XLIFF roundtrips.

the browsing structure of dynamic ones.[16] The didactic potential of these resources is huge, in our opinion.

Ensuring the social orientation of localization education would also help localizers communicate with designers, programmers and globalizers, using their professional language (games). They could then understand, to a certain extent, the main concepts and codes of programming and (re)presentation of the information, particularly in what concerns the intercultural and interlinguistic transformations of localization. That would put them in a good position to try to influence the way products are created, by convincing designers, developers and localization project managers both to include more contextual information in the form of comments, UI flow charts, or other data in standard formats like XLIFF (Torres del Rey & Morado Vázquez, 2015), and to rely on localizers' role as special or expert intercultural users, who can suggest internationalization and accessibility improvements that may prove beneficial for the product as a whole, in the "original" and the target locales.

Actually, performing internationalization (García Nevares, 2016) and, particularly, accessibility analyses and evaluations (Rodríguez Vázquez & Torres del Rey, 2014, pp. 34–37) might offer an excellent approach to localization education by bringing the social, the communicative and the object orientations together. Digital accessibility is an increasing ethical concern in advanced societies and may end up being enforced in many national or transnational legislations and initiatives. Its main potential lies in the way that, to ensure accessibility, it needs to de-compose and re-compose the product into objects, actions, intentions, information and knowledge structures; analyze it in terms of alternative interpretations, representations and functionalities, anticipations of breakdown, and sensory and intellectual engagements with the digital interactive product; and take into account users coming from diverse (functional and linguistic) cultures.[17]

Finally, a particular added-value opportunity we have met regarding the social and object-driven aspect of our approach is achieving cooperation between translation and computer science instructors in localization education. While the former can identify intercultural communication issues and opportunities in localization

16. Commonly used website copiers or offline browsers are WinHTTrack, the Scrapbook extension for Mozilla Firefox, and Cyotek WebCopy.

17. This is the basis for our incipient ALMA (Spanish acronym for Accessibility-Mediated Localization Learning and Acquisition) research project, which looks at accessibility both as an integral content for localization practice and teaching/learning, and as a methodological opportunity or affordance for localization education (Torres del Rey & Rodríguez Vázquez, 2016).

processes much better, the latter can offer a different perspective and new insights into computers, formal languages, development processes, and can also be very helpful in making sure translation and localization teachers present and develop concepts in correct terms. Besides, they are able to deal with certain specialized localization interests that non-computer scientists would find hard or too time-consuming to reach or dissect. Collaboration between open-minded translation and computer-science teachers can be a highly enriching and rewarding experience.

Concluding remarks

In the above pages we have presented an approach that can help teachers and students come to terms with localization both from a translation-oriented point of view and by getting immersed in the signification and functional processes, objects and concerns involved in the development and globalization of a digital interactive product for human use.

Our journey has started by revisiting the translation-localization disciplinary debate, with the hope of providing new conceptual and practical solutions that may be useful for all sides and agents coming together in the localization endeavor. We have then looked into some of the theories that can serve as the foundation for localization as an interdiscipline (whether within Translation Studies or as a more "autonomous," yet intersecting, Translation-Oriented Localization Studies).

There is no doubt that translation theories in general are applicable to localization, as witnessed day after day in different papers, monographs, student dissertations, and general localization practice. Yet, we believe that a broader perspective considering localization as part of larger systems of meaning and culture (re)production and transmission would be more than useful. Human-Computer Interaction and related disciplines like multimodality may be a solution to this.

With this theoretical and conceptual framework in mind, we have explored general educational approaches. Special attention has been paid to those that have been applied to translator training and which might be particularly useful for teaching students what localization is and how they can contribute to the trade and the discipline, and to their own advancement as professionals and intercultural mediators.

Finally, we have presented our own approach, built upon three main aspects (semiotics and communication, object-driven learning, and social interaction), which reflect, to a certain extent, Holmes's process, product, and function perspectives in the analysis of translational action. However, our orientation towards the *what* and the *why* in our pedagogical proposal, redefining the digital interactive product – as both a communication-rich artefact and as a collection of technical, semiotic and linguistic objects, which would help enhance the socio-professional

status of localizers, empower them, and improve the process of mediation – makes our approach seem skewed towards the product and the function sides. Yet, the *process* of translation and localization has always been present in our mind: as communication, as procedures of technological manipulation and transformation of objects, and as social interaction and negotiation among agents.[18]

On a complementary final note, localization can also be used as a pedagogical tool in early or intermediate stages in the acquisition of translation competence and skills. Rather than considering it as a specialized, even "elitist," form of translation, or as an intersection of disciplines, generalizing localization in translator training can provide students with insights into many important concepts and techniques that are useful for all kinds of translation.

By presenting examples and theoretical and practical issues typical of localization, students can broaden and enrich their views about translation in general, and of their possibilities as translators. With its emphasis on current media, devices and communication forms, different textual genres, team work, the paramount importance of (often badly needed) context, end users and co-construction of meaning, localization can be an important source of "modernization," motivation, but also of examples of critical issues concerning all types of translation and intercultural, interprofessional mediation. Different localization products can be used partially, with limited degrees of technical intervention, to make the most of notions like transcreation and creativity in translation, textual cohesion and coherence in websites, semiotic and technological constraints, the importance of terminology, language as performance, cultural and technical conventions, or the importance of quality assurance, and of putting oneself in the shoes of receivers and users (Suojanen, Koskinen, & Tuominen, 2015).

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18. Useful analyses and/or pedagogical proposals regarding localization processes can be found in Bernal-Merino (2015), Roturier (2015), O'Hagan and Mangiron (2013), Jiménez-Crespo (2013), Chandler and Deming (2011), Dunne and Dunne (2011), Mata Pastor (2005), Esselink (2000a), and Sprung (2000), among others.

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