

New insights into translation-oriented, technology-intensive localiser education: accessibility as an opportunity

Jesús Torres del Rey
Universidad de Salamanca
Facultad de Traducción y Documentación
37008 Salamanca, Spain
jtorres@usal.es

Silvia Rodríguez Vázquez
Dublin City University
Centre for Translation and Textual Studies (CTTS)
Glasnevin - Dublin 9, Ireland
silvia.rodriguezvazquez@dcu.ie

ABSTRACT

In this article we look for new insights into the teaching of localisation by defining the academic field as a translation-oriented and, at the same time, technology-intensive discipline. This definition encourages us to reconcile the main objectives of both areas by integrating a user-centred, human-computer interaction approach, where verbal and non-verbal communication of meaning and affordances is central. Disciplinary and technological challenges are reviewed and confronted with some of our strategies to cope with them. By embracing the above holistic definition, and incorporating accessibility as a key factor both for the practice and the teaching of localisation, we try to make the most of the linkages between technology, communication, social and user needs, as well as professional and research-driven translatorial action.

CCS Concepts

• **Human-centered computing** → **Accessibility** - *Accessibility theory, concepts and paradigms* • **Social and professional topics** → **Professional topics** - *Information technology education*
Applied computing → **Language translation**.

Keywords

Localisation; localization; translation; technology; education; training; learning; accessibility; user-centred approach; usability; HCI; competences

1. INTRODUCTION: THE ACADEMIC DISCIPLINE OF LOCALISATION

Localisation, a rapidly evolving discipline issuing from or pertaining to Translation Studies, is far from being acknowledged across disciplines or sectors in academia or the industry. A quick look at the English Wikipedia entry for “Localization” (the American spelling) in mid-2016 returns most references in relation to *finding* or identifying the *location* of the main object of various disciplines in Biology, Engineering or Technology.

In that entry, our area of study is labelled as “Language

localization” and defined as “the process of translating a product into different languages or adapting a product for a specific country or region”. The term “Internationalization and localization” is presented, rather confusingly, as its child, meaning “the adaptation of computer software for non-native environments, especially other nations and cultures”. In the Spanish version of Wikipedia, the emphasis is on the “adaptation of products to the needs of a target market”, considering it merely as a business-driven activity, as was the case when it emerged in the 1980s [5].

The industry and academia also hold differing views on the activity of *localisation*, which is part of a broader process known as GILT, including *globalisation* —mainly a business concern involving a “broad range of processes necessary to prepare and launch products and activities internationally” [8], *internationalisation* —the process of preparing a product technically, culturally and linguistically to enable and facilitate localisation, and *translation*. At the risk of oversimplifying, for the industry translation is ‘just’ a linguistic part of the process, whereas localisation goes beyond textual content and involves technical and cultural adaptation.

Within the academic milieu, in contrast, localisation is just a special kind (or genre) of translation where additional specialised technological knowledge and skills are needed. It is often argued that, while translation does not necessarily deal with digital material, localisation always takes place digitally, hence the need for higher digital literacy [24].

Currently, localisation is a thriving industry in the video game, software and website sectors, as heralded by Esselink in his seminal *A Practical Guide to Localization* in 2000 [6], and in 2004 by Chandler in her first (solo) edition of the *Game Localization Handbook* [4]. Since 2013 major monographs dealing with the three localisation sectors above have been published by recognised scholars in prestigious houses [1,11,16,23], culminating a very productive decade-and-a-half of research, initially driven and given momentum by the Localisation Research Centre (LRC), championed by Reinhard Schäler.

The University of Limerick, Ireland, home to the LRC, has offered one of the longest-standing Master’s degrees in localisation (since 1997). While this MSc has been hosted in a Computer Science department, the most common arrangement is for MAs in translation technology and localisation to be offered and managed in Translation or Applied Languages departments. Localisation can also be found as (mostly) elective subjects in various undergraduate Translation degrees, particularly in Spain.

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Conference ’10, Month 1–2, 2010, City, State, Country.

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DOI: <http://dx.doi.org/10.1145/12345.67890>

Obviously, the focus can vary substantially whether the subject (or the whole field of activity and study) is taught from the perspective of Computer Science, where technical, engineering and media-related aspects are emphasized, or from the point of view of Translation Studies, where the attention shifts to the mediating communicative role of the translator-localiser, and to cultural and linguistic transformations. Localisation-related activities are even being offered by Business Communication departments (e.g. in Aarhus University), where in addition to website analysis and web copywriting, communication modules also contain a web translation element.¹

It is in this context —sometimes conflictual, but also effervescent and flourishing through interdisciplinarity and the short-circuiting² contact of our humanistic and technological areas— that we have taught localisation in translation programmes for over ten years now. Our approach has been distinctly technological while translation-driven (rather than mainly business-oriented or technical in a mechanistic sense), in line with what we have coined as Translation-Oriented Localisation Studies (TOLS).³

In this position paper, we will present our view on the current challenges in our field, some of our strategies to cope with them, and future directions that we are considering in the interdisciplinary teaching of localisation, by trying to make the most of the linkages between technology, communication, social and user needs, as well as professional and research-driven translatorial action.

After all, the term "digital humanities" for us is the very way we live in our academic field. On the one hand, not only do we use technology as an aid to our profession, research and teaching, but technology is the medium and the product that we translate and transform. On the other hand, human needs are what ultimately drives technology, as well as localisation. Technology and localisation, in turn, have pervasive implications on society and human exchanges. They condition and determine, sometimes inadvertently, how we can operate, live and think on an equal footing with other citizens and in a multicultural environment. If we want to train localisers to give the best service to society, it is necessary to approach the task from the perspective of (cultural, functional) diversity and of the productive marriage of the technological and the human.

2. CURRENT CHALLENGES AND OPPORTUNITIES FOR LOCALISATION (AND ITS TEACHING)

2.1 The consequences of technology on the profession

The translation profession has traditionally been compared to journalism, particularly as regards the much debated need of formal training to produce professionals. The comparison may even be more apt today with the pervasiveness of two phenomena related to, and resulting from, our technological era [1,11,16,23].

The first of these two challenges is the general availability of the basic means for performing the jobs, and particularly for sharing and making them public. The digital world allows for the instant, ubiquitous, democratic, cooperative ability to capture and extract information, to translate it into something relevant or interesting, and to publish it online, thus giving rise to the phenomena of citizen journalism, crowdsourcing, and fan translation and localisation.

The second challenge comes with the big data paradigm. As in journalism, the potential wealth of overabundant information needs to be properly managed. In addition, in translation and localisation, the conventional nature of language makes it possible, under certain circumstances, to process massive corpora of aligned bilingual and monolingual (target-language) texts, as well as bilingual terminology, to statistically produce adequate automatic translation.

Our answer to the formal training debate, as we will argue later on, is that *specialised* or *expert* professionals are more than ever needed in order to manage, process and quality-control the massive amount of data, and to carry out the processes of transformation involving communication across languages and cultures. These professionals understand what complex processes and decisions *translation* engages in, as we will discuss in the next section, but they also need to take part, to a certain extent, in the *expert*, *technical* or *user* communities where they act as mediators [17].

One last ethical question: if we agree that we must live up to the challenge of adapting to the rapid pace of technology for all the productivity and quality benefits that it can provide, it is in the understanding that technology development is consistently geared towards the common good. And that means, among other things, trying to extend the reach of welfare, culture, and so on, to more and more people. In that respect, providing technological ecosystems for enhancing the benefits of multiculturalism and accessibility should be a central concern for technology development and its localisation.

2.2 Partial understanding of translation concerns in localisation

Typical approaches to localisation from non-translation-oriented spheres in the industry (or in the public opinion) tend to consider the work of a localiser, from a linguistic point of view, a question of literally substituting text strings in one language into another, a 'simple' matter of finding the right equivalent.

These views fail to take into account the basic principles of communication and language in action, for a specific purpose: among others, (i) the paramount importance of the *context* —the place, time, participants, circumstances and shared knowledge surrounding the production and reception or use of language, i.e. the *situational context*; the texts and signs that accompany the

¹ Information provided during a talk given by Marian Flanagan and Carmen Heine at the 8th European Society for Translation Studies (EST) Congress in Aarhus, 15-17 September 2016.

² In Michel Serre's positive sense of "short-circuits" as the consequence of the multiplication of productive interferences among disciplines [30], and as the cause of 'sparkles' that illuminate the different traditions and objectives.

³ That is, approaching the localisation of digital products in connection with the concerns and the analytical aspects of the translation profession and discipline: the study of product, process, function and applications of localisation; cultural and linguistic transfer; and communicative action [29].

language we want to communicate, with which they co-construct meaning, i.e. the *co-text*; and (ii) the pivotal role of expectations and *conventions* in the way people approach and process every text genre and, in general, every means and medium of communication and interaction, without excessive cognitive load or the help of external, complementary resources [11]. Both key aspects —context and conventions— can vary greatly from one language and culture to another.

Cultural variation is precisely one of the reasons why the localisation industry often reject the notion that localisation is a genre of translation, as mentioned earlier: for them, localisation aims at producing culturally and functionally appropriate products for the target locale and market —even if it means changing and adapting the content— whereas translation is mainly concerned with conveying the source message in such an accurate and fluent way as possible. For decades, however, cultural approaches to translation have placed great emphasis on the asymmetries and the different worldviews between cultures. Similarly, functionalist theories have claimed for a long time that the ultimate goal of the translation task is to achieve the expected or explicit function in the target culture, which can be different from that of the original text or product, while remaining loyal to all other factors and participants in the exchange⁴ [19].

In sum, culture-oriented and functionalist ideas far pre-exist the notions of localisation as a process of accommodating a product —and its message— to the target context. Nevertheless, it is also true that the much higher emphasis of localisation on the *usage* —rather than just the reception, reading and interpretation— of the end products would make it not only acceptable but even necessary to adapt certain technical or physical as well as cultural and linguistic aspects in order to make the product usable at all —and, crucially, marketable and purchasable.

We would also like to counter the idea held by some in the industry that equivalence and literalness are the basis or the main component or objective of translation, which, again, would, in their view, make it necessary to resort to a different activity altogether —i.e. localisation. On the contrary, in Translation Studies, literalness tends to be the 'devil' —an alluring possibility that more often than not needs to be avoided— since it usually gets in the way of the smooth transfer of ideas through the natural linguistic means (word meanings, syntactical structures, rhetorical devices, cultural nuances, metaphors, etc.) of the target language.

In fact, the central job of the translator is not to carry words, sentences or texts across languages, but to achieve or contribute to successful, effective communication. In localisation, by extension, this means regarding language and communication as a usability and user experience (UX) factor.

These two user-oriented dimensions, nonetheless, have only been sporadically referred to —either explicitly or implicitly— in prior localisation work. For instance, in the case of web localisation, it has been claimed that badly written sentences, mistranslations, terminological inconsistencies and drop-down menus for language selection can damage their final usability [32], while the

⁴ Among other factors and participants: the intentions, instructions or needs of the sender, producer, initiator or the client; translators' own responsibility as special readers, users, interpreters and arbiters of messages and contexts of communication; and society's as well as their clients' norms and expectations about what qualifies as an adequate translation.

appropriate adaptation of cultural markers, such as icons, colours or other country-specific symbols, can significantly enhance it [25]. In the same vein, scholars have brought web localisation and usability concerns together with regard to (i) the use of language style guides, asserting that the adaptation of writing techniques for on-screen reading is one of the many skills professional localisers should possess [10], and (ii) the layout of text, as it is important to design and localise the website to be skimmed or used —rather than read— by placing the most important content in key positions for typical web use patterns [18].

Nevertheless, these concerns only seek to achieve, in our view, 'partial usability', as they merely focus on the surface structure —or the front-end— of the localised product. We argue that a higher localisation level (in Jiménez Crespo's [11] terms), involving adaptations and re-engineering also in the underlying structure —or back-end— of the digital product, needs to occur if we are to deliver a linguistically-and-culturally suitable, operable, understandable, comprehensible and robust (i.e. fully functional) localised product that is usable for all. This should include those who suffer from some type of sensory loss (e.g. blindness or low vision) or those who cannot interact adequately with the said product by means of conventional WIMP (Windows, Icon, Mouse, Pointer) technologies to access a graphical user interface (GUI). For this to happen, as we will discuss in the following sections, we consider that localisation professionals, trainers and students should adopt a more human-computer interaction (HCI)-driven mind-set.

2.3 Coming to terms with technological concerns in Translation-Oriented Localisation Studies

If we accept Dunne's [5] idea of localisation as “translation on the computer, for the computer”, it would not be unreasonable to expect localisers to be more tech-savvy than traditional translators. However, within Translation Studies, this technological literacy has been commonly limited to a set of skills that encourage localisers to approach technology from a restrictive perspective, in a passive manner. For example, it is generally understood that technical knowledge is needed in localisation projects to better identify the translatable elements within a digital product (be it a web or software application), as well as to wisely use translation aids to extract and process that editable content, with a view to protecting the robustness of the non-translatable product architecture [15]. In this sense, the localiser adapts digital content to a target audience from an outsider's point of view, without necessarily understanding the nature of the product, or feeling the need to know how it has been constructed or the various contexts of use in which it will be received.

This apprehensive view of the product to be adapted, where an excessive intervention on the part of the translator would imply an unnecessary risky behaviour, contrasts starkly with common practice (and expectations) in other translation disciplines, such as scientific translation or legal translation. For instance, legal translators are expected to have not only the necessary linguistic skills associated with the profession, but also deep levels of knowledge and know-how about the corresponding fields of expertise their texts are dealing with, as well as the legal frameworks in which they are and will be operating, both in the source and the target cultures.

Like Jiménez Crespo [10], we argue that for localisers, producing the most usable, effective localised product should also imply improving end-users' experience and interaction with it. This is only possible by understanding the macro- and micro-structure of the product at hand and how users from the target audience might have access to it. In this sense, localisers should equally be aware about the fact that users might be functionally diverse and that they may use different computer operating systems, browsers, and devices to interact with the final digital product.

Such access-enabling approach to localisation may imply making modifications that go beyond the standard feature set offered by the base product, to meet the expectations of a target market [23]. In this regard, translation training programmes would benefit from a more holistic, integrated approach to localisation training, such as the one proposed in the following section, reflecting the interdisciplinarity of our field, as depicted in Figure 1.

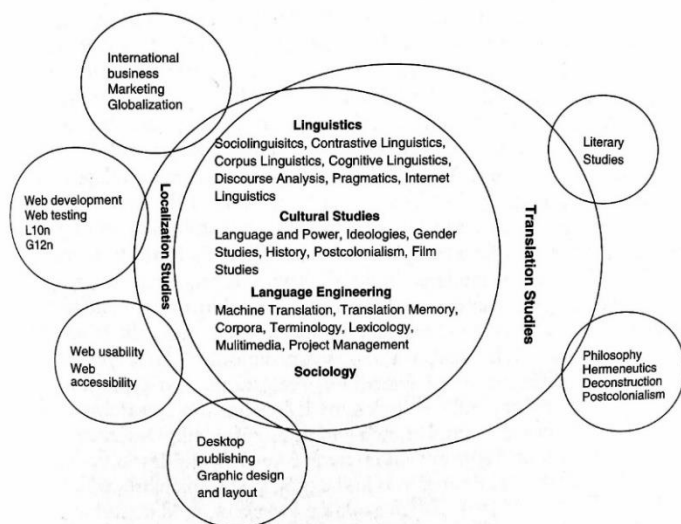


Figure 1. Map of Web Localisation Studies as proposed by Jiménez Crespo [11]

3. A HOLISTIC, INTEGRATED APPROACH TO THE TEACHING OF LOCALISATION

The birth of Translation as an academic discipline in tertiary — particularly undergraduate— education meant inaugurating a novel cross-disciplinary mentality in the traditional university landscape of Spain and other countries. Translation Studies (TS) was borrowing from various disciplines, approaches and competences: Applied Linguistics, Cultural Studies, Sociology, Communication Studies, Psychology, the acquisition of basic knowledge from the domains where translation was to be undertaken, and so on. At the same time, TS established that translation expertise revolves around high-level cognitive, social and interpersonal competences such as problem-solving, decision-making, information and knowledge management, intercultural mediation, and communication skills.

Coming from a Translation department, our priority would be the professional advancement of our students, who as a rule come to our studies with humanistic backgrounds and predispositions. However, given the various challenges and opportunities that we have described in the previous section, it is paramount that they,

and we, consider the possibility, maybe the necessity, to embrace a new cross-disciplinary turn for localisation, with humanistic and technological competences blending together.

In our view, the overpowering expansion of technology into all our activities will definitely boost the need for many translators to specialise in either sensitive translation-intensive domains (conference or social interpretation, biomedical, legal, etc.), particular areas and activities of project management involving linguistic and cultural transfer, or technology-intensive processes involving language and communication (localisation, machine translation with post-editing, language engineering, computational linguistics).

It is from this perspective that we have approached the teaching of localisation for the last decade. First of all, we have focused the activity of localisation on what concerns translators most: the process of transforming a text or a product to allow for enhanced cross-cultural communication through that text or product. Business and market issues are also important, and determine various process, product, function and application aspects of our job, but they are not the primary concern for the translator.

Technology, on the other hand, although not the *core* substance of our job either, constitutes the very product that we transform, and is a profound signifier itself, by —explicitly or implicitly, through verbal and non-verbal language— conveying what it can do and what can be done with it, producing feedback on our actions and on its current state, and so on [14].

What is more, technology and, in particular, the disciplines of Human-Computer Interaction, Usability, User Experience and Accessibility, also bring about a renewed interest for the user, a key factor for Translation Studies and Localisation, as we mentioned earlier.

In this context, we have advocated a Communicative, Objectual, Social Approach (ECOS, in the Spanish acronym) to the teaching of localisation [27]:

- The *Communicative* aspect has to do with what translators can do best, and are particularly well prepared to deal with, as explained earlier and in relation to actual users and their needs; but it also involves the interactive digital product as a communicative device —through affordances, signifiers and constraints [14], and as a medium of communication.
- The *Objectual* is about both the technical, material composition of the product, and the ability to participate in its process of re-composition; but it also has to do with the (often metaphoric) objects that convey meaning through the interface; and with allowing students to touch, experience and transform the product in order to fully assimilate it.
- Finally, by being able to mediate and partake in the process of communication, and of objectual de- and re-composition, to some extent, we would be placing students in an advantageous socio-professional position to claim their expert role as equals with other agents in the process of localisation. Last but not least, the *Social* also has to do with the responsibilities of public education towards society, through the promotion of open-source initiatives, accessibility, and, of course, multiculturalism.

4. ACCESSIBILITY AS AN OPPORTUNITY FOR TRAINING LOCALISERS

The ECOS approach above is only one step towards a holistic, integrated didactic strategy to the teaching of localisation in translation programmes. It focuses on the *what* and the *why* of pedagogical action, and to the extent that it advocates a holistic, situated approach to training, it also deals with the *how* — methodology.

While developing this model, we were already interested in integrating technological accessibility into it, especially regarding web content, as we feel that it is a basic human right in modern societies and, therefore, attention to it should also be a basic concern for localisers. In this regard, it is worth mentioning that, although web accessibility (WA) has been recognised as one of the paradigms that nurtures the interdisciplinarity of Localisation Studies (see Figure 1), the reality is that traditionally WA expertise has not been observed as a requirement for localisation professionals.

Some authors have, nonetheless, discussed the shared interests between both fields, suggesting that when an accessible website is rendered multilingual, localisers are expected to ensure that accessibility achievements are maintained across the different website language versions they are working on [9,26]. Furthermore, it has been argued that the localised version should never be less accessible than the original, and that depending on how much freedom is given to the localiser, the localised version could even provide more functionality than the source website to accommodate the needs of a wider range of users [21,26]. The positive impact that this functionality enhancement may have on the quality of interaction between users of assistive technologies and the localised product has been empirically demonstrated with the particular example of images, for which accessibility is achieved not only if localisers translate their text alternatives, but also if they are aware of their functionality and can assess (and amend, if needed) their appropriateness [22].

Based on the evidence gathered throughout both these and other previous investigations, and in agreement with other scholars' opinions that accessibility is one of the ethical problems that localisation is facing today [18], we decided to turn accessibility into an integral part of localisation, and also a benchmark for localisation quality. This was based on the rationale that the endorsement of accessibility best practices would serve to make sure (i) that the localised product works, both in technical, cultural and pragmatic terms; (ii) that its content is perceivable and understandable; and (iii) that higher levels of user satisfaction and efficiency are met. Each new research avenue we would take, each new educational development we would make would have to take accessibility well into account. No new tasks, exercises or activities in general could be conceived without accessibility in mind, without looking into the way that the products, processes or functions that constitute the object of localisation learning could be accessed (or not) by all users, whatever their functional diversity under consideration. This represents a step forward with respect to the pedagogical strategy that we have been adopting until present, where isolated seminars on the topic were offered within localisation modules [20], unintentionally leading students to see accessibility only as an added-value feature.

All these accessibility considerations also provided us with a great opportunity and a critical, radical idea for action research. Besides treating accessibility as a content to be analysed and dealt with in

the process of localisation and its teaching, accessibility could also be used as a methodological tool to teach localisation, by focusing on the main principles of Perceptibility, Operability, Understandability and Robustness [3], the guidelines and various remedial and reactive action associated to them, and the realisation of these through computer information (computer objects, architecture, logic, language, data).

Training localisers from the (disad)vantage point of accessibility allows teachers and students to become aware of what the product does, means, can be used for; who, and how, its beneficiaries and users would be; and, most importantly, how the above is achieved and can be achieved (or adapted for functional diversity) in different locales or cultural contexts. In other words, to ensure accessibility, it is necessary to “de-compose and re-compose the product into objects, actions, intentions, information and knowledge structures; analyse 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” [27].

A clear example of the benefit of accessibility in the analysis and performance of localisation can be found in TV programmes that feature both 'normal' subtitles and subtitles for the deaf and hard of hearing (SDH). The quality of the latter tends to be much higher than the former, as SDHs need to use and make reference to the whole context, setting and material aspects of the film, whereas common subtitles are often commissioned hastily without providing the translator with the actual images, which are often essential to understand certain meanings, intentions and tones.

Although we will constrain our initial analysis to the above strategy, accessibility can also be approached from more than just the content of the product. Trying to experience a product using various user agents and, particularly, assistive technologies, can help localisers understand what the basic and the secondary information or interaction is; how form, content and the affordances of the medium are perceived (or not) to produce meaning or to guide for action; or even how the different interfaces, and input-output methods, have a bearing on localisation and internationalisation.

Looking at authoring and evaluation tools and resources⁵ from the perspective of how they support the creation of accessible content can also help (student) localisers understand the mechanisms and processes of content development, transformation and quality assurance, as well as their potential role in that process. On the other hand, approaching those tools and resources by analysing and experiencing how accessible they are can offer useful information on the way such tools structure and define the process, promote quality, and are aligned with the needs of end users and localisers. In this sense, we understand that computer-aided translation and localisation tools could be considered a kind of authoring and evaluation tools.

⁵ Authoring tools include: CMSs, IDEs, among others. Typical resources are software libraries and, particularly in localisation, standard files for exchanging data such as XLIFF [28].

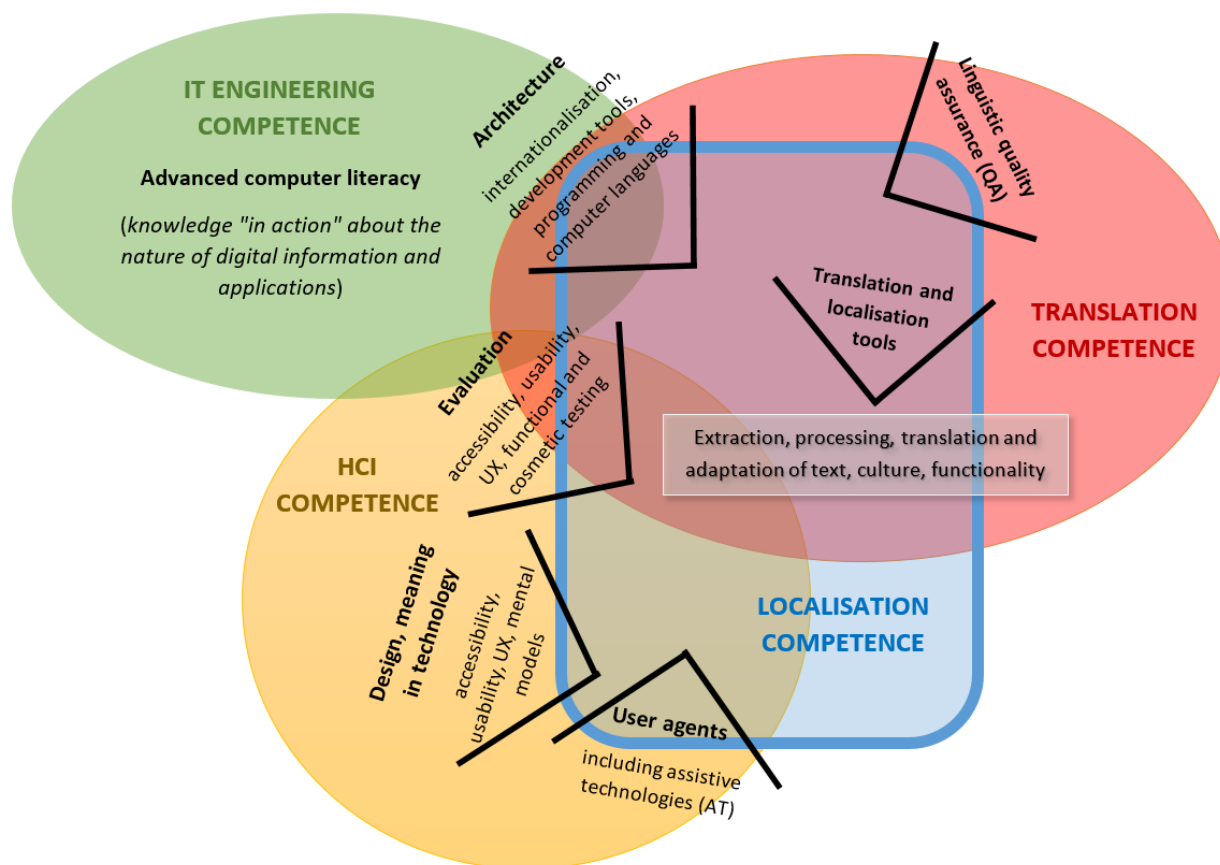


Figure 2. Localisation competence, at the intersection of translation, HCI and advanced computer literacy and engineering competences and components

There are other process-oriented approaches to accessibility that can be beneficial: for instance, by looking at the way localisers and trainees integrate accessibility concerns into their work⁶ we can extract interesting data about common, complementary or diverging concerns, processes and strategies.

If, as Kiraly [13] argues, the emergence of *complex* competences like translation—localisation in our case—is co-determined by the tasks and projects that students "engage in and learn from, their personal and interpersonal dispositions" for localising and learning, "the human and material resources available and drawn upon, as well as the affordances of their learning environments", accessibility could provide an excellent opportunity to engage in enhanced, highly didactic tasks and projects, boost students' personal and interpersonal disposition for localising and learning, and constitute some sort of inspiring new affordance or learning environment, full of potentially enriching human and material resources which offer excellent "possibilities for occasioning" the development of such blended competence.

Finally, if we want to be able to measure how successful we are in the application of this holistic approach, including the 'opportunistic' integration of accessibility as a content and as a methodology and catalyser, we need to have a viable model of

localisation competences that embrace the complexity of the interdisciplinary expertise involved in it. Although several proposals have been made [7,11,16], we need a more holistic definition that combines at least three macro-competences: (i) translation competences, (ii) basic computer literacy, and (iii) HCI competences (including Usability, UX and Accessibility). Figure 2 shows our first attempt to illustrate what the basic configuration of this blend of competences may be, as well as the different components and actions of each discipline that may be relevant for the localiser.

5. CONCLUDING REMARKS

As Folaron [7] states, localisation has been collaborative in nature since its inception. This might be derived from the fact that, as she puts it, "localisation practice reflects a unique convergence of disciplines: foreign languages, linguistics, translation, computer science, desktop publishing, graphic design and layout, and international business, to name but a few".

Localisation is a very dynamic profession which is firmly set on the constantly moving ground of technological evolution. Training students to become functional localisers in communicative, intercultural and technical terms requires a complex blend of competences which can sometimes appear to be mutually counteractive in their respective (sometimes exclusive) focus either on meaning/communicating or on functioning/performing.

⁶ But also how accessibility experts or people with functional diversity (with basic translation competence, including bilingual competence) deal with localisation.

However, language is also action, as speech acts theories have shown [12]; and artefacts and their functions have meaning that must be communicated, and they also provide experiences to users [14,31]. Both perspectives merge in localisation, where language is typically associated with functions, and functionality is structured in a (hopefully) meaningful way, and structured according to tasks and objects that need to be recognised and identified through language, even if subconsciously [33].

Accessibility adds a new dimension to this relationship. Just as usability "is an outcome of interaction rather than a property of a product" [2] which must be defined according to its context of use—consisting of users, tasks, equipment, and physical and organisational environments [28], accessibility opens our eyes and mind to interactions, users, contexts and meanings that may be taken for granted, but which are integral parts of successful communication and usage of the product.

In our search for holistic, integrated approaches to training in a fascinating field—localisation—we have tried to take advantage of the theoretical and experiential wealth of cross-cutting interdisciplines while embracing accessibility as an integral concern. It is now time to start uncovering all the productive linkages between localisation and accessibility and other user-centred interaction areas while adopting an action research strategy that gradually involves and analyses current practices, theoretical assumptions, participants and beneficiaries.

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