CHAPTER 2

The need for needs analysis
in technology-mediated TBLT

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Needs analysis (NA) is an important component of any well-developed language curriculum and an essential component of a task-based language curriculum (Long & Crookes 1993; Long & Norris 2000). It is actually "the first stage in the design of a TBLT program" (Long 2007, p. 124). In this chapter, the tasks that make up such a program are understood in real-world terms, as something that the "learners need to *do* with the language" (Norris 2009, p. 578) in order to function in a certain situation which is based on authentic needs (Long & Norris 2000). It is through a NA that the tasks to be included in the program are identified, as well as the language needed to be able to conduct them effectively and appropriately. In a technology-mediated TBLT program, the NA should address not just the language necessities (linguistic and pragmatic) to complete the tasks, but also the informational and multimodal digital skills needed to effectively engage with the technology. In addition, a NA should help us gather information about what innovations and technological tools are most appropriate for the curriculum, as well as inform us about the necessary training for students and teachers to be able to use them successfully. Although NAs have been reported in the literature in the field of language teaching since the early 1980s, they are not yet a systematic practice in language educational curriculum development. This chapter defends the importance of such a practice, especially for technology-mediated language teaching. It presents the steps necessary to conduct a well-balanced, reliable NA for a technology-mediated TBLT program that would target not only the language needs and wants of students, teachers, and administrators, but also their multimodal digital and informational needs. The chapter includes examples of several NAs conducted for task-based technology curricula and discusses the possible challenges of conducting such NAs.

Introduction

One of the main tenets of TBLT is the important role played by needs analysis (NA) in the development and implementation of a TBLT curriculum. That is, the design of a TBLT curriculum – at least in strong versions of TBLT (see discussion in Samuda & Bygate 2008; Norris 2009) – must always begin with an empirical, ideally

multi-methodological, analysis of the needs, wants, and goals of learners, which will provide the basis for identifying target tasks they will eventually need to do in the new language (L2) and for understanding the linguistic demands posed by target tasks. It is only on the basis of the findings of a good NA that, according to Long (2005b), a TBLT curriculum can then be designed around representative pedagogical tasks sequenced in optimal ways. Consistent with this programmatic vision of TBLT, Norris (2009) noted that most task-based language programs subscribe to six key elements, of which needs analysis is the first, "following fundamental principles of program design (Patton 1997)" (p. 581). The rest of the steps are task selection and sequencing, materials development, pedagogical choices and teaching, assessment of learner progress, and program evaluation (Long & Crookes 1993; Long & Norris 2000; Norris 2009). However, as Long (2005a) pointed out at the inaugural TBLT biennial conference, NA is one of the areas of TBLT where the research lags behind. A few efforts have been made to address NA as a central element of TBLT, but in the 2009 TBLT conference four years later in Auckland, New Zealand, only 3 out of 81 presentations (or 6%) were devoted to NA or included an overview of a NA in curriculum development. This observation suggests that NA is still an under-researched area within TBLT scholarship. Beyond TBLT as well, the conduct of NA is a rare practice in most language learning contexts. This is in spite of the existence of numerous guidelines for tackling NA (e.g. Altschuld & Witkin 2000; Berwick 1989; Brown 2009; Graves 2000; Jonassen et al. 1999; Long 2005; Mackey 1978; Richterich 1983; Tarone & Yule 1989; Witkin & Altschuld 1995), and even though NA is considered an important and integral part of the development of any language curriculum or educational program (e.g. Brindley 1984; Brown 1995; Long & Norris 2000; Munby 1978; Norris 2009; Pratt 1980).

This chapter offers a review of the needs analysis literature available in the field of language teaching in general and in TBLT in particular. On the basis of this review, then, the position I wish to put forth entails three aspects. First, in any field, including the fields of language teaching and of instructional technology, a NA should be the driving force affecting every other aspect of the instructional design system such as planning, development, and evaluation (Norris 2009; Rossett 1995). Second, with a NA in TBLT, we can and should obtain information about: (1) the task (what the learner needs to be able to do in the L2), and (2) the language (the language needed to perform the task minus the language that has already been mastered by the learner) (Brown 2009; Long 2005b). Third, and most crucially for the goals of the present book, in a technology-mediated TBLT curriculum, an additional dimension regarding learner needs must be propelled to center stage as well: the technology. In order to evaluate technology needs, the NA must be designed to gather information about, for example, the technological tools involved in the task; the participants' skills and digital literacies; as well as technological accessibility, resources, and support.

Defining and conducting a NA: Needs, wants, desires

Understanding what the needs of a program are and whether these are met by the program is a fundamental principle for the implementation of any program (Patton 1997). Language education is not an exception. An L2 program would ideally be based on the analysis of the types of language use that the participants will have to undertake inside and outside of the classroom (Norris 2009).

In the literature about NA in educational settings, we encounter terms such as: *aims, demands, felt needs, lacks, necessities, objectives, wants, wishes …* All these terms come from distinct viewpoints and forms of NA (Allwright 1982; Hutchinson & Waters 1987; Mackay 1978; Robinson 1991). Terms such as *wants*, *wishes*, *demands,* and *felt needs* are associated with students' perceptions of what is important for their language learning. By contrast, teachers, administrators, curriculum and materials designers, future employers, and other professional bodies are kept in mind when using terms such as *necessities, aims, lacks,* and, *objectives.*

One of the first definitions of NA, by Pratt (1980), already suggested the complexity of conducting NA, which was described as "an array of procedures for identifying and validating needs, and establishing priorities among them" (p. 79). Richterich (1983) reinforced this idea by suggesting that in the process of analyzing, defining, determining, assessing, and identifying language needs, "things get complicated when in the process of preparation, arrangement and realization, we find ourselves faced with a number of unavoidable questions to which we must, in one way or another, find answers" (p. 1). Indeed, these answers, Richterich noted, are highly dependent on the context, circumstances, and the institution involved. In a definition including the final product and the process of learning, West (1994) described needs analysis as "what learners will be required to do with the foreign language in the target situation, and how learners might best master the target language during the period of training" (p. 1). More recently, Brown (2009) has defined NA as "the systematic collection and analysis of all information necessary for defining a defensible curriculum"(p. 269). Several authors in the field of language NA make a distinction between objective and subjective needs as they try to define the term. For example, Richterich and Chancerel (1980) pointed out that needs can be generated from an analysis of typical everyday situations (objective needs) but can depend on events, unforeseen circumstances, and people (subjective needs), and they reasoned both types of needs are imposed by linguistic and social realities and are external to the individual. The concept of objective and subjective needs is nowadays more associated with the involvement of the learner's wishes. Objective needs usually come from parties other than the learners, while subjective needs are usually associated with learners' feelings and ideas about not only 'what' to learn but also 'how' they want to learn it (Hutchinson & Waters 1987). Learners' ideas about

their needs often differ from what the teachers, administrators, and future employers think may be necessary (Long 2005b).

Following this variety of ideas and definitions, researchers have proposed multiple forms of conducting a NA. While not all researchers provide a step-by-step prescribed process to conduct a needs analysis, most coincide in the advantages and the importance of including a variety of information gathering tools and sources (Brown 2009; Jasso-Aguilar 2005; Long 2005b; Witking & Altschuld 1995). Following a tradition of mixed-methods research (see Johnson et al. 2007, for an overview of the field), a carefully chosen inclusion of multiple methods and sources is the most appropriate means of uncovering and explicating complex needs. This triangulation helps validate the data and increases the credibility of the results, especially if the combination of data is sequenced in a way that each procedure informs the next, so that the accumulated data results in greater quality than the different parts by themselves (Brown 2009). However, conceptualizing and carrying out a mixed-method needs analysis is not easy; it is costly and requires time and a certain degree of expertise for data analysis and interpretation. According to Altschuld and Witking (2000), this is the main reason why more published examples are not found, together with the fact that NAs are almost always internally funded and conducted in an organization, and not intended for outside dissemination. As with program evaluation in general, these studies are not considered typical forms of research and they are not envisioned to be shared outside of the involved constituents (hence explaining in part why there are relatively few published examples).

A few directly relevant models for conducting NAs exist. For example, Witking and Altschuld (1995) proposed a three-phase design. The first phase consists of the development of a plan, definition of a purpose, identification of major needs and issues areas, and decisions about what data to collect, what sources and methods to include, and the potential uses of the data. The second phase includes the gathering, analysis, and synthesis of the data. The third and last phase incorporates the prioritization of the needs, consideration of alternative solutions, development of action plans, and the evaluation of the NA in itself. Similarly, Brown (2009) also outlines three main stages for a NA. First is the preparation to do the NA, in which the purpose of the NA is defined, acknowledging its constraints, the population is delimited, the approach(es) and syllabus(es) are chosen, and the collection procedures are selected. Next comes the conduct of the NA, which includes the data collection and analyses as well as the interpretation of results. And the final stage pertains to the use of results to determine objectives, make decisions, and so on, as well as to the evaluation and report on the NA itself so that the project can be part of constant curriculum evaluation. As readers can appreciate, these two models have several commonalities and follow a similar progression. In fact, these models of NA are not exclusive to NA for language teaching curricula and can be applied to any educational areas.

Altschuld and Witking (2000) offered examples of mixed-methods NAs in nursing education, community centers, and health care; and Long (2005b) described a NA for flight attendants' training, for example.

Examples of NA in language teaching

Most of the first NAs in the field of foreign language education were conducted in Europe, motivated by the concern to optimize socio-economic resources and meet the demand for immigrants' learning of new languages. NAs became a popular tool in the field "to analyze and develop theoretical approaches and practical methods […] to set up teaching/learning systems" (Richeterich 1983: p. 1). This tradition of studies has continued into several different fields, such as sociolinguistics (Duff et al. 2000), educational anthropology (Hoffman 1989), and literacy education (e.g. Florio-Ruane & McVee 2000). As for large-scale NAs, there are a few examples conducted also in European educational settings: Rodrigues (1983) identified the nation-wide needs for French language in the educational system in Portugal; van Els and colleagues (Van Els 1994) investigated what foreign language and teaching methodology needed to be introduced into the education system in the Netherlands; and work in the Katholieke Universiteit Leuven's Center for Language Education uncovered the nation-wide societal and educational needs which ought to be met by the teaching of Dutch as a Second Language in Belgium (Van Avermaet & Gysen 2006).

In English language teaching, NA has become a key instrument in the development of courses and curriculum in the area of English for Specific Purposes (ESP), where several researchers have demonstrated its use as an important first step towards curriculum development. Already in the 1980s, Svendsen and Krebs (1984) identified the English needs for workers in health care occupations, using examples such as central suppliers and transporters in a hospital. Cameron (1998) conducted a needs analysis of L2 English graduating nursing students which focused on the language skills required for school, clinical practice, and patient interaction. Bosher and Smalkoski (2002) looked at the health-care needs of immigrant students in the United States, and more recently, Zhao (2010) investigated the English needs of students in several vocational schools in China. As for the subfield of language for occupational purposes, among many studies, Jasso-Aguilar (2005) looked at the language needs of hotel maids in Waikiki; Wettergren (2005) examined the language needs of Hispanic manufacturing workers in Texas; Cowling (2007) studied the needs of Japanese workers at Mitsubishi Heavy Industries; and more recently Wozniak (2010) conducted an analysis of the language needs of French mountain guides (see Brown 2009, for more studies). Long's (2005b) edited volume presents a comprehensive group of examples of language NA in a wide variety of settings and for very different populations: the needs

for multiple languages by the US military (Lett 2005), the need for English among journalists in Catalonia (Gilabert 2005), the Dutch language needs of international football players in the Netherlands (Kellerman et al. 2005), and the German language needs of Finnish companies (Vandermeeren 2005). In the subfield of English for Academic Purposes (EAP), NA studies have focused on the needs of international students enrolled in English-medium universities in terms of linguistic features (Bacha & Bahous 2008; Arden-Close 1993; Coxhead, & Nation 2001), learning processes (Narita 1999), and strategic and communicative competences and skills (Bosher & Smalkoski 2002; Kelliny 1988).

Finally, a few NA have been conducted for the general foreign language classroom. These contexts have often been described in terms of what Abbot (1981) identified as TENOR: Teaching English for no Obvious Reason. Seedhouse (1995) presented an example in the general English classroom arguing for psychological and social needs to be taken into consideration when developing materials and designing courses for such a context. It is, however, not impossible to uncover a range of worthwhile foreign language needs through well-designed NAs, as demonstrated by Iwai et al. (1999) in their investigation of the needs underlying the Japanese language program at the University of Hawaiʻi; Park (2010) in his analysis of a Korean middle school EFL classroom; and Lambert (2010), who conducted a NA of English majors in a university setting in Japan. Because of their focus on NA for TBLT specifically, these two last studies will be discussed in the next section.

All the studies mentioned here demonstrate that NA is not just a theoretical concept. Conducting NAs is a valuable first, practical step in the creation of any education program following a long tradition of program development work outside of education. This is also true for language teaching programs, be they large-scale national programs, programs with a defined population with very specific language purposes, or even language programs where the goals may not be as obvious or specific.

The central role of NA in TBLT

The emergence of task-based syllabi in the 1980s as a reaction to structural and other syllabus approaches raised a central debate about the possible benefits of a type of syllabus that incorporates tasks as its basic unit of analysis, and the applications of task as learning tools (Long & Crookes 1993). Since then, the "strong" version of a task-based syllabus understands tasks in real-world terms, as something that the students need to do with language in order to function in a certain situation beyond the classroom confines (Long & Norris 2000). TBLT assumes the importance of offering courses that are learner-centered, that is, relevant to learner needs. It is for this reason that needs analysis is the first step in TBLT visions that are programmatic, that is, TBLT philosophies

that focus not just on tasks as a special type of language teaching materials or on task-oriented pedagogical choices as a special style of language teaching, but on the selection and design of tasks for structuring full educational programs (Norris 2009).

In spite of its prominent place in TBLT curricula, concrete examples of NA for TBLT programs are not abundant. This situation has several explanations: (a) possibly, because of the misconception that a NA only includes questions for learners about their future language use, coupled with the disbelief that learners actually have the answer; (b) maybe because practitioners in charge of language curriculum trust commercial textbooks to provide them with the materials necessary without worrying about the particularities of their program or learners; or (c) probably because of the difficulties, lack of support, and time commitment that are required for an effective NA to be properly conducted. Among the few examples of NA for TBLT, it is well worth highlighting here the already mentioned work of the Katholieke Universiteit Leuven's Center for Language and Education focusing on the teaching of Dutch as a Second Language in Belgium.

As part of this group, Van Avermaet and Gysen (2006) report on a needs analysis to identify those tasks and situations where Dutch was needed by adult non-native speakers in Flanders. Their sources included 56 students taking Dutch courses, 50 non-native speakers not enrolled in courses, 17 curriculum/course experts in Dutch as a second language, 30 native speakers of Dutch in frequent professional contact with non-native speakers, and 300 other native speakers of Dutch. As for their methods, they included surveys (with closed and open-ended questions) and interviews with experts in the field of teaching Dutch as a foreign language (e.g. head teachers, assessment experts, policy makers, and former teachers). From the surveys they gathered a set of needs profiles and language situations that the experts then helped refine and complete. In addition, in order to derive a set of tasks from the NA findings, they conducted observations in the target domain and situations, and gathered data through surveys and interviews with long-time experts in these situations and with learners who had already experienced the same. Also in Flanders but in a different context, Peters and Van Houtven (2011) conducted a NA to find the language needs for reading academic texts of students in Flemish higher education that also included a triangulation of sources (students, $n = 455$; lecturers, $n = 97$; documents; and several language experts) and methods (literature survey; a reading test; a questionnaire; and semi-structured interviews). As in the case before, the purpose of the analysis was to develop TBLT materials to help students succeed, in this case with a focus on the reading of academic texts.

An example of a different target language and context is a NA that was conducted as part of a federally-funded pilot project on TBLT for Korean as a foreign language at the University of Hawai'i. For this project, Chaudron et al. (2005) undertook a NA as the first step from which to derive tasks and create a pilot teaching module within

a TBLT curriculum. First, instructional staff and a random sample of students were interviewed. These unstructured interviews helped develop a written survey administered to 83 Korean students of all levels, from very beginners to advanced. From the results, the researchers identified two tasks that 90% of the respondents found relevant. After this, they collected and analyzed relevant target discourse samples for both tasks in Seoul and in Honolulu with the aim of identifying prototypical discourse structures. From the needs analysis results, pedagogical tasks were created for both tasks and sequenced to form two TBLT modules: one on shopping and one on directions. According to the authors, the needs analysis was essential to be able to build the curriculum.

Two final studies by Lambert (2010) and Watanabe (2006) offer examples of NA conducted in TENOR (i.e. Teaching English for No Obvious Reason) contexts in Japan. Lambert's NA at a Municipal university in Japan included five sources of information: job placement records, interviews with two experienced informants, an open-item survey of alumni (who had graduated in the five years previous to the study) with a follow up email survey of a subgroup of these, and a closed-item mail survey of graduates (who had graduated in a span of 25 years prior to the study). An interesting element in the needs analysis was the user-generated task types by two expert informants who helped develop the initial questionnaire. Also interesting was the multi-staged development of the survey. Specifically, in order to find what the domain-independent target tasks were, the first open-ended questionnaire was sent to graduates of the institution ($n = 28$) and was followed by two more rounds of questionnaires to fine tune the questions about their L2 use in their work places. The final closed-item survey was then developed based on the previous one and sent to 2,603 graduates of the institution, with a 7.6% return rate. From the data, five tasks emerged as high priority for respondents both in business and education fields: locating information, translating documents, summarizing information, editing documents, and interpreting between speakers. The study and its findings strongly suggest that it is feasible to develop a single task-based program to meet the English-related business and educational needs of college students, at least in TENOR contexts.

Also in Japan, but in a high school context, Watanabe (2006) conducted surveys (including open-ended and closed-response sections) with students ($n = 1,384$), full-time teachers ($n = 6$), and the head of the English department in order to find their English needs, and she triangulated these results with national curriculum guidelines for English education in Japan (including government testing tools). Some of the main results were that teachers, students, and government all agreed on the importance of minimal conversation skills, although the government testing tools were not in sync with this need. The NA also found high discrepancy between teachers and students on the importance they placed on writing skills. In order to incorporate all constituents' needs, Watanabe suggested a task-based language program that included tasks

to develop students' exchange abilities (speaking and writing) as well as addressed the contextual necessity of having to prepare for government mandated examinations.

The studies above started with a NA as the first step to identify the language needs of their participants as well as the tasks that they would need to be able to accomplish at the end of the program. All of these studies are excellent examples of the importance of triangulation between sources and methods and the incorporation of a variety of sources (students, experts, teachers, administration, alumni, documentation…) and multiple methods (surveys, questionnaires, interviews, observations…) to find the language needs and identify the language tasks. In addition, Lambert (2010) and Chaudron et al. (2005) show the usefulness of conducting a NA in stages (using some of the data gathered to create new tools to obtain more refined and in-depth data) to fully identify the constructs as well as being able to improve and develop successful data collection tools. These are useful models to follow when preparing to embark on a NA; however none of them had to deal with the inclusion of technology or innovation in the curriculum. The following section presents examples of NA that dealt with technology-mediated contexts.

Early NAs in technology-mediated education: Tasks, language, and technology needs

Technology NAs are done routinely in many fields when new technologies and innovations are introduced, systems are upgraded, or large investments are planned. Some examples are Williams's (2003) needs assessment of the construction industry or Hartley et al.'s (2008) report for the Nevada Department of Education on the technology needs in state schools and classrooms. However, little can be found on technology-related NA of the kind that is the focus of this book, that is, NAs for language learning and teaching purposes mediated by technologies. As stated by Holland and Fisher (2008) "An important but often overlooked stage along the path of CALL research is analyzing the needs of the intended learners so as to focus the technology efficiently… Viewing CALL as a branch of instructional science demands empirically based needs analysis as a guide for development." (p. 67). Although many studies indicate some type of needs analysis behind their rationale for the creation of different computer language learning software, platforms, materials, etc. (with statements such as "taking into account the students' needs for learning X…", or "to adapt to the needs in the new communication era…"), there are very few studies that actually include a description of how those needs were discovered, and even less present their data or data gathering tools. Most of the exceptions come from the European CALL literature and are linked to large multi-country materials development projects (i.e. Bayyurt & Karats 2011; Beaven et al. 2010; Sampson 2003). Needs analyses in CALL have been conducted

for three main purposes. First, they have been used in finding language needs for the development of CALL materials (and/or a platform): for example, Greene's (2006) development reading materials for dyslexic teenagers in Ireland, and Bayyurt and Karats' (2011) materials for mobile devices for at-risk language high-school students. Second, they have been done to find what the technology needs (rather than the language needs) of institutions or language learners and teachers are (e.g. Kohn 2012; Sampson 2003; Yutdahna 2004). Third, they have been conducted as part of Intelligent Language Tutoring Systems (ILTS) that contain their own in-build needs analysis to adapt to students' language needs (e.g. Reinders & Darasawang 2012). These CALL NAs incorporate mainly traditional forms of gathering data, with questionnaires as the preferred (and almost always exclusive) data gathering tool. An interesting exception is Dodigovic's (2005) computer-assisted vocabulary profiling for language needs analysis. In CALL NA, questions about technology focus on discovering what is the technological infrastructure and context of the participants, what are the learner's technological needs, and their need for training on ICT.

Few examples exist of NA as part of a TBLT curriculum that embeds a large technological component, or what the co-editors of this volume call technology-mediated TBLT. Given that this type of research on technology-mediated TBLT is a fairly recent phenomenon, the lack of NAs in this area is to some degree predictable; particularly since not many technology-mediated TBLT full curricula exist yet. Those instances of task-based technology-mediated examples reported in the literature focus mainly on how to create technology-mediated materials or integrate technology and tasks with an existing curriculum (e.g. Lai et al. 2011), but very few include all the steps proposed (Norris 2009) for the development and implementation of a full TBLT curriculum.

The first examples of NAs in technology-mediated TBLT focused on finding out what the main tasks were that the given learners would need to perform in the L2, and then developed or adopted technologies that would help accomplish these tasks. The technology was not, therefore, an integral part of the NA itself. Thus, in a second language context, Schrooten (2006) presented the development of an information and communication technology (ICT) application in a TBLT framework for unemployed adult non-native speakers of Dutch in the Flemish labor market. As part of the process, he evaluated existing computer software, which he found inadequate for a TBLT curriculum (mostly 'drill and practice'). These programs did not provide learners with any control over their learning trajectory and were mainly structured in terms of linguistic complexity. Since no appropriate software was found, several task-based multimedia activities were developed for a "general technical language course" (p. 140). These multimedia activities were designed based on the tasks that the students would be expected to perform on their vocational training, and they were to be undertaken in pairs simulating work-related situations. As part of the on-going evaluation of the project, students and teachers were then observed while working with the multimedia

tasks and later interviewed to assess their experience, and the teachers were also interviewed about students' behaviors. The reactions were mainly positive, pointing at the possibility of creating a rich and dynamic computer environment.

Decamps and Bauvois (2001) reported on the NA that was conducted for the creation of their "Languages in the Toolbox" software as part of the *Leonardo da Vinci* project in Europe, the goal of which was to provide language teaching through self-access technology to those in the restaurant sector who cannot, or most likely will not want to, formally study the new language. The NA included three different parts: the analysis of training needs (to identify needs specific to a certain domain); the selection of training needs (what they call "professional tasks"); and finally the analysis of skills to identify and teach appropriate content and linguistic behavior. In addition, the analysis included a cultural component, specific for each participating country. Data were collected through questionnaires (for the servers and for the trainers) and transcriptions of dialogues during the tasks done by the participants themselves. From the results of the NA, a multimedia CD-Rom software with practice of different tasks was created.

In another example of an early exploration of technology-mediated TBLT, González-Lloret (2003) mentions a NA as the first step used to design a task-based activity to teach giving and following directions in Spanish to second-semester college students enrolled in a Spanish program. Interviews with three teachers as well as two administrators at the tertiary institution where the study was conducted revealed the need to create an environment where students could practice giving and receiving directions in the foreign language. In addition, the analysis of documents (exams, syllabus, and textbook) confirmed the need for the students to learn this task before passing to the next semester. Finally, audio recordings of two native speakers and one non-native fluent Spanish speaker were used to collect target discourse that was later incorporated into the activity. The product was a simulated web environment of the students' physical learning context with a task to complete: finding a hidden map in their virtual building. As with the cases before, the needs analysis did not include questions about technology. Instead, the technology-mediated task-based activity was a product of the found needs.

Finally, an interesting example of the synergy between technology and tasks is Yasuda (2012) who found e-mail writing a pressing need among teachers and students learning English for Specific Purposes in Japan, when conducting a needs analysis to develop task-based materials for academic writing. In her research, "e-mail writing" was considered a genre rather than a digital skill in itself. No emphasis was set on the technological aspects needed to complete the email-writing task (i.e. the digital competency to carry out the task was assumed), focusing instead on the content produced through the technology. As we move forward in a technology-enhanced world and the technologies that we use every day become more transparent and inherent in our

daily routines, we will see more examples like Yasuda's. But for now, the integration of technology and TBLT deserves a closer look when planning technology-enhanced TBLT materials.

Propelling technology to center stage in NA for technology-mediated TBLT

Ideally, NAs that aim at informing the development of technology-mediated TBLT programs should target not only tasks and language needs but technology needs and the intersection between them as well: that is, those target tasks that require access to and use of a technology-mediated environment, those technologies that would facilitate the realization of the task, and those that would serve as vehicles for communicating for particular purposes. This realization is likely to be widespread in coming years but, at present, implementations of NA for technology-mediated TBLT from this position are scarce. Two examples are presented here.

The first example can be found in González-Lloret (2007), who conducted a NA to develop several web task-based activities for a class of university students enrolled in graduate-level Spanish literature courses. Several sources and methods were employed in the NA. The sources included: (1) a survey of the existing literature on needs analyses targeting students in academic settings, and especially those for TENOR contexts; (2) all graduate students enrolled in Spanish literature courses at the institution; (3) three professors with over 10 years of experience at the institution teaching both language and literature courses; and (4) several course-related documents that included class syllabus, exams with teacher's feedback, and class notes of two native speaking and two non-native speaking students (one with low and one with high proficiency level). The syllabus provided an idea of general academic and literature-related tasks that the students needed to complete in the foreign language: essay writing, class presentation, text analysis, etc. In-class and take-home exams and quizzes were an effective information source, especially exams including feedback, since they provided information on the professors' perspectives of what was important in order to achieve success. As for methods, the NA included semi-structured interviews, questionnaires, class observation, and class tape recordings. The sequencing of methods was as follows. First, one class was observed and recorded. From this class, the professor's lecture was used as a target discourse sample to be later included in listening tasks. After the class observation, interviews with the professors and three students were conducted. Several follow-up informal talks followed the interviews in order to clarify answers or ask new questions. The results of these interviews provided the basis for the NA questionnaire, which included closed and open-ended questions.

Since the tasks to be developed would be web-based, it was important to include technology as an explicit area for the identification of needs, which at the most concrete

level meant to find out the level of technical expertise of the students. Questions were incorporated into the leaner questionnaire to find out the level of confidence they had in performing several basic web activities and skills such as navigating a web environment, opening and closing windows, uploading and downloading audio files, etc. Their perceptions were elicited as well on how useful they thought web-based tasks could be for their learning, and how inclined they would be to use them. In addition, an observation of students engaged in a web activity at their computer lab was conducted. The interviews with the professors revealed awareness of differences between the two subpopulations of students enrolled in literature classes in the Spanish program (native and non-native speakers) and the professors' concern about the non-native speakers' need of extra practice to perform at the same level as the native speakers on classroom tasks and exams. Students' strongly agreed (95%) that if they had a chance to practice class-related tasks in a web environment they would do it.

As reported in more detail in González-Lloret (2007), the results of the NA were translated into tasks, task types, and pedagogical tasks, and several learning modules were created. These included listening input, terminology, text analysis, and writing tasks; and in each module, activities were sequenced according to complexity. The technology-related NA findings were also put to good use in support of the TBLT program design. Specifically, most, but not all, students expressed in the NA that they felt somehow confident in their ability to navigate web pages but not in their capacity for uploading and downloading multimedia. In light of these results, several tutorials were built in into the final task-based materials in order to help students manage multimedia, and a 'help' button was incorporated in all tasks providing navigation help (see González-Lloret 2007 for details).

A second example of a NA that includes finding out about technological needs was conducted by Park (2010) in a middle school EFL classroom in Korea (13 and 14 year old students). The study was modeled closely after Watanabe (2006). Teachers ($n = 12$) and students ($n = 204$) completed an online survey with open-ended and closed-response items to find out about their needs and perceptions of their English curriculum. In addition, the NA included review of documentation (textbook, school's website, and schools documentation on English program innovation, as well as a government guidelines for national English curricula). The data analysis centered on describing students' and teachers' needs for target tasks based on the four language skills, language use contexts, classroom participation style, topics, learning strategies, and computer-assisted activities. Park was interested in finding out what students' and teacher's preferences for computer-assisted activities were. The NA revealed a mismatch between teacher and student perspectives in this regard. The teachers preferred the use of the computer software (CD-ROMs) accompanying the textbook in class as well as using online materials as their main source of realia. Students, on the other hand, showed a preference for playing computer games, watching video clips, and

chatting in English, followed by having an e-pal, listening to English pop songs, and surfing the Internet. From the results of this needs analysis, Park (2012) designed a series of computer-assisted TBLT lesson plans for two instructional units that included multimedia (video) models for the task, the use of Internet, word processing tools, and presentation software (e.g. PowerPoint). The target tasks included writing an online self-introduction message, finding and contacting an e-pal online, and talking about this e-pal (i.e. introducing him/her) to the class. The two reports by Park (2010, 2012) offer an excellent example of the value of a NA for the development of a technology-enhanced TBLT.

The NA conducted prior to the creation of a Chinese online TBLT course that is reported by Nielson (this volume) provides a final example where the analysis of technology needs was an essential part of the curriculum building. The process and findings of the NA component are worthy of attention here. One hundred potential students of Chinese across the U.S. were surveyed, including questions about their technological skills (whether they were able to email attachments, use software to record videos, etc.) and capacities (learning environment, type of hardware and software, etc.), as well as questions about their access to different technologies. Two Chinese instructors, assigned to the new course, were also surveyed about their technological capabilities. Since for this TBLT course both the content and the learning management system (LMS) were being developed at the same time, the two instructors and seven conversation partners involved in the piloting of the course provided ongoing feedback about their technology needs as they emerged (features in the grade book, structure of the forum, etc.), which was then applied and integrated into the final course design. Particularly given that this was to be an online course, the collection of data about technological needs was an essential dimension of the NA that informed final course development decisions. For example, the NA was able to show that some of the tools planned for the course could actually not be used by the students because they did not have administrative rights in their computers to download applications or connect to Skype. As a result, VoIP (Voice over Internet Protocol) had to be built into the course to facilitate teacher-student interaction.

The three examples of NA reviewed in this section show the essential synergy that must be addressed between a NA and a technology-mediated curriculum. For example, in a field such as English for Academic Purposes, identifying a task such as "conducting research" cannot be separated anymore from the tasks of (1) searching the Internet for resources (which implies navigating the web, understanding hypertextuality, connecting to multimedia, and so on); (2) doing a critical reading of online sources; and (3) deciding on the selection of those sources (see, e.g. Stapleton 2012; Stapleton et al. 2006). As technologies in daily life increase in use and sophistication, so will they in L2 curricula. Considering this fact, it is not sufficient for a NA to just include a few questions about technological skills any more. A NA needs to acknowledge the role

that the technology plays in the achieving of the task, just as much as it does for the language. But if we must evaluate technology needs in a technology-mediated TBLT NA, then what key elements should be included in the NA effort?

What to include in a NA of technology-mediated TBLT

I argue that contemporary NAs for the design of technology-mediated TLBT must gather information about not just the tasks, but the technological tools involved in the task; the participants' skills and digital literacies; as well as their accessibility, resources, and support. It is also essential to find what the population of students is, not only because the realization of the tasks themselves may vary, but because their technology skills, digital literacies, and access to technology may vary greatly and would without a doubt affect the way we design the TBLT syllabus. In this section, I describe approaches to each in turn.

Tasks

Tasks are the building blocks of a TBLT curriculum and the units of analysis in NA for TBLT (Long 2005). Finding what is that the learner need to do with the language informs us on not just what language/linguistic items to target but also what interactive practices, in what specific contexts, etc. Given a growing digital world, many language tasks are without a doubt mediated by technologies (see Yasuda's 2012 example above) and as technologies become more ubiquitous, finding what the learner needs to do with the language is as important as finding through what medium this needs to be accomplished and how each affects the other. It may well be that our NA will discover that some language tasks are not mediated by any technology (for example, listening and understanding directions from another person on the street), others are mediated by well-known technologies (for example, writing an email message, request information on the phone), while others may require much more knowledge of the technologies involved, more digital competence and more specific language (for example, enter clients data in a database and generate a report from it, follow a Google map in your phone while listening to directions). It is important then that a NA addresses not only the question "What do the learners need to do?" but also, "in what context is it going to happen?", "will it be mediated by any tools?", "what language will be needed to accomplish the task?" and "what technical knowledge/skills will the student need to complete the task?"

Tools

Many tasks in today's world require, or are facilitated by, the use of digital tools. However, not all tools are equal, and a NA should help us discover the most effective digital

tool(s) for the completion of a given task, given the group of participants involved, their digital literacies, contexts, and purposes. This is of great importance because the choice of tool also affects what language skills are required for the completion of the task. For example, the same activity of interacting with a speaker remotely can be accomplished via text-based or video chat. The use of text-based chat requires reading and writing skills, while video chat requires listening and speaking. That is, the technology and not just the language mediates the communication (Baym 2010; Walther 2012). It is the medium that provides "the contextual regulations under which human interaction occurs" (Yzer & Southwell 2008: p. 14).

To better illustrate the important principle that technology mediates communication, and thus NA should help evaluate the choice and suitability of digital tools for a given task, let us examine a hypothetical, if clearly familiar, technology-mediated real-world task example: making a hotel reservation. When we make reservations for a hotel in an unknown city, we would most likely explore different websites to find: the best location, hotel amenities, price and availability, and other patrons' reviews. The same task could be done instead through the phone – and in fact it was typically done on the phone for many years. However, the technologies involved in making a hotel reservation online or on the phone are quite different. To accomplish this same task online, we would need to be able to turn on a computer, open a web searching tool, navigate the web (be able to click on appropriate links), understand and be able to use an interactive calendar, an interactive map, etc. The language skills are also fundamentally changed by the technology. With a computer we need mainly reading and writing skills, whereas with a phone we would need mainly listening and speaking skills. These differences shape the real-world task in itself and, in turn, they also affect the nature of the pedagogic tasks that will shape the TBLT curriculum.

In order to glean information about needs associated with the choice of technological tools to accomplish each task, a variety of methods can be employed: (a) using surveys, interviews, focus groups, and so on to ask experts (e.g. in the hotel reservation example, CEO assistants, travel agents, experienced travelers who book their own trips) about what tools they regularly use to conduct the task; (b) observing them conducting the task; and (c) using existing documentation (e.g. published research on tools, manuals, help sites) to evaluate the tool capacity, difficulty level, reach, etc. (see Figure 1 below). It is important to keep in mind that the need for certain technological tools may come directly from the task (for example "Find X" is going to require the use of a search engine) but in a time where multiple technologies have the capacity to accomplish the same task ("Communicate message X to person Y" can be done via email, SMS, voice message, whatsApp, Facebook, Skype, etc.) we should also consider the population that is going to engage in the task, the difficulty level of some of these technologies (using virtual environments requires much more training than connecting with a video camera), the accessibility that the participants have to the tools, as well as an essential point: their digital literacies.

Possible sources	Possible methods	What can they tell us?
Students	Questionnaires Interviews	What they think they know/can do How they feel about it Their access to technology Their access to training/willingness to learn
Students	IT Exam Observation of in-situ interactions/Hands-on task Screen capture recordings	What they know/can actually do
Teachers	Questionnaires Interviews Meetings/focus groups	What technologies they have available What digital skills they have What training they need
Administration	Questionnaires Interviews	What SSs will need to be able to do What technology is accessibile Technology support available for teachers
Alumni Employers	Observation of in-situ interactions/Hands-on task	What they need to do Technologies available
Job descriptions	Text analysis	What SSs will need to be able to do
IT Staff/IT Experts	Questionnaires Interviews Observation of in-situ interactions/Hands-on task Screen capture recordings	What is needed to complete the task Technology support available for teachers Technology training available
Manuals/Research	Text analysis	What are the technology capacities
CALL experts	Interviews	What is the potential of tools for LL What support/infrastructure is needed What training is needed
Society/ Netiquette	Observation of in-situ interactions Text analysis	How it needs to be done What are the new digital trends

Figure 1. Possible sources, methods, and questions they can address

Digital literacies

In connection with the tools needed, it is important to find out the learner population's digital skills. More specifically, in the same manner that a NA usually includes finding out about the language skills necessary to perform a task and those the learner already has (through a diagnostic test), it is imperative to find what digital skills are necessary to be able to perform a technology-mediated task as well as what digital skills the learner already has. Technology skills are part of the much larger concept of "digital literacies", also known as "electronic literacies" (Shetzer & Warschauer 2000). These include: (1) the knowledge of basic operations of the hardware and the software

(*computer literacy*); (2) the ability to gather, understand, manipulate, and critically select information from the web (*informational literacy*), which includes a technological component (e.g. being able to browse the Internet or navigate a web map) and *critical literacy* skills (e.g. being able to analyze and evaluate texts); (3) the capacity to manipulate different types of media (*multimedia literacy*) such as video, pictures, text, and so on; and finally (4) the ability to communicate effectively with others through the Internet (*computer-mediated literacy*). In the "booking a hotel on the Internet" task illustration, several literacies are needed: the use of the tools described above (computer literacy); being able to access, read, and critically make choices from hotel and clients' reviews (informational literacy); being able to manipulate a calendar for selection of dates, an interactive map, and view photos (multimedia literacy); and being able to write appropriate information such as a message for room preferences in the reservation's form (computer-mediated literacy). Most young learners, in most parts of the world, are relatively computer and multimedia literate and have experience with some forms of computer-mediated communication. Nevertheless, these skills clearly vary across settings and populations and they interact with (lack of) familiarity with differently available digital tools. Typically, informational literacy, that is, the second component in Shetzer and Warschauer's (2000) model of electronic literacies, is an underdeveloped critical need for many individuals.

In order to assess the need for digital skills, several methods and sources can be used (see Figure 1). In terms of sources, the most commonly used is the learners themselves. Learners can inform us of their wants and can also be surveyed as to what their digital experiences and their opinions about technology are. They can also self-rate their digital skills and knowledge about technology (with well-prepared clear scales and questions), but they will most likely not know what technological skills are required to perform a certain task. To find this, experienced individuals who conduct this type of task daily could be surveyed, interviewed, or observed when performing the task. Other possible sources could be job descriptions, work manuals and alumni who are now performing the target tasks. As for methods, questionnaires are undoubtedly the most used tool when conducting NAs on CALL. Other possible methods could be non-participant observation, video recordings, screen capture recordings, as well as other computer logs of the task. To find out about the level of digital literacy of the learners, self-assessment through questionnaires may be appropriate for large numbers of individuals, while observation of students performing tasks where these literacies must be applied may be the most effective method, although time consuming and more difficult to carry out. Alternatively, screen capture recordings and other computer logs while they conduct the task can be gathered and analyzed. In addition to identifying learner's needs and their skills, other aspects of working with technology and developing digital literacies have been suggested as important in a NA for instructional design. For example, Rossett (1995) suggests identifying learners' feelings, that

is, their levels of comfort and confidence about the task and the tools and the possible causes that would precipitate task failure.

Access to technology

Finally, it is important for a NA to determine the access that students have to technology, considering their context (e.g. country, urban versus non-urban area); access location (e.g. home, school, community center); physical resources (e.g. type of connection, hardware, software, privileges to install and control software); and type of technology support available to them. Although access does not directly define the target task (or the pedagogic tasks), it is vital for its successful completion since technical and contextual capacities will determine whether the needed tools, media, and content can actually get to the learner and be processed by the computer that she is using. Developing technologically sophisticated pedagogic tasks requiring fast speed Internet, and fast computer processors, would be a waste of time for a context where learners' access would be via an old library computer with an unreliable connection. Technology support for participants is essential, but especially for the educators involved in the teaching. The more sophisticated the tools, the more chances that something will fail at some point during the implementation of the pedagogic tasks. Without support, the "inherent unreliability" of technology (Cuban 1999) may produce a sense of frustration for both instructors and learners, which may grow to a point of abandonment of the curriculum and reversion to old practices (Erben et al. 2009), especially by those novice teachers that need to worry about the learners, their learning, and the technology (Meskill et al. 2002).

As a summary, the figure below presents possible sources and methods to consider, as well as questions that may facilitate interpretations about the tools, digital literacy, and access to technology necessary to accomplish a technology-mediated task.
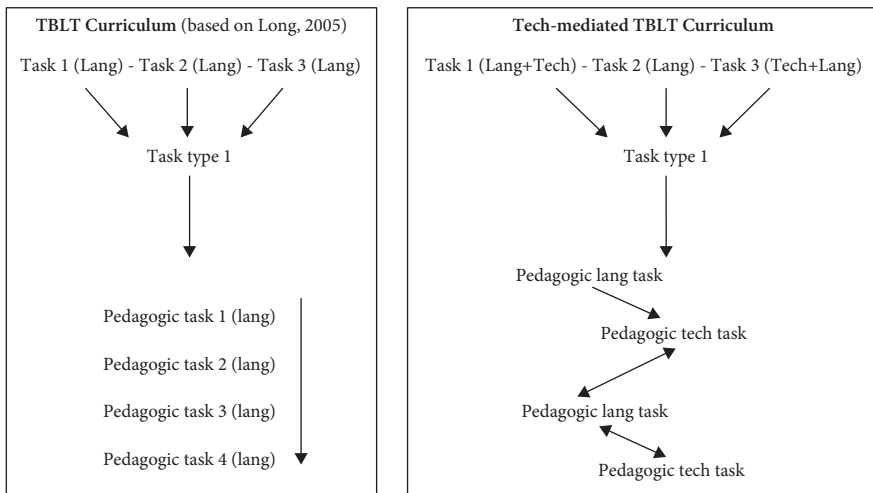
Looking forward to the future: A new model of TBLT and needs analysis

The idea of the need for a much more complex NA for a technology-mediated TBLT, compare to the extant discussion on traditional NAs as suggested thus far, may just be an indicator of a larger ontological issue. It may very well be that the incorporation of technology in TBLT will force traditional model(s) of language use and language learning to bend to the affordances and challenges of the technologies themselves. In an increasingly technological world, the questions "What tasks do the students need to be able to perform" and "what language do they need to know in order to perform a task?" remain incomplete unless we add "and what technologies are going to mediate (and hence transform) the task?" It seems that a model of technology-mediated TBLT

needs to incorporate technology at different levels and in different dimensions, especially if the technology is not seen as a mere instrument or tool, but rather as a task – or integral to the task – in itself. In this model, the task includes a language component. But language learning is not the sole goal; rather, it is a goal as well as a vehicle that facilitates the completion of the L2 technology task, and the use of technology for the expansion of technological literacies becomes a new worthy goal that is enmeshed in the goal of language learning. As Warschauer (2004) points out, technology used to be a tool for learning English, but increasingly, learning English has become a tool to access Internet and engage with the technology and with others through technology.

In this model of technology-mediated TBLT, therefore, technology tasks and language tasks are of the same importance, and the curriculum needs to comprise not only pedagogic language tasks (PLTs) arranged depending on specific task features and sequenced according to principles of complexity, for example (Robinson 2005, 2007), but also pedagogic *technology* tasks (PTTs) arranged and sequenced following a similar rationale. Continuing with the example of the task "make a hotel reservation" earlier, PLTs would include reading comprehension activities such as identifying key concepts in on-line hotel reviews, lexical activities to help understand and learn terms for all amenities possible in a hotel and its surroundings, or writing activities such as inquiring about a feature missing from a hotel description or requesting special services. As for PTTs, these would include how to use web search engines to find the hotel, critically understand a hotel review (comparing the hotel description with past guests descriptions), interact with an online calendar to find room for the appropriate dates, access multimedia, write, and send an appropriate inquiry (number of words, vocabulary, and language would be very different from a formal inquiry letter), navigate an interactive map (finding the distance between the hotel and a business venue, calculating time between them depending on time and traffic), and so on. The differences between the traditional TBLT model and the new model for technology-mediated TBLT are shown in Figure 2.

In this model, language and technology are always interacting with each other. Pedagogic language tasks (PLTs) determine pedagogic technology tasks (PTTs), and PTTs require language that can be facilitated by PLTs. For example, we may find out that one of the needs for a group of students is to write correspondence at their work place, and that at this workplace there are daily communications with clients for a variety of reasons and through different media. One target task type that we can identify, then, might be "request information from clients". We have also discovered through the NA that the two major forms of communication with clients are through paper letter writing and through email, and therefore we need to consider not only the task (request information from a client), but also the language needed to accomplish the task successfully (which we can find through the evaluation of documents, interviews with senior personnel, etc.) and the technologies required to do so: email (including

TBLT Curriculum (based on Long, 2005)	Tech-mediated TBLT Curriculum

Task 1 (Lang) - Task 2 (Lang) - Task 3 (Lang)

Task type 1

Pedagogic task 1 (lang)

Pedagogic task 2 (lang)

Pedagogic task 3 (lang)

Pedagogic task 4 (lang)

Task 1 (Lang+Tech) - Task 2 (Lang) - Task 3 (Tech+Lang)

Task type 1

Pedagogic lang task

Pedagogic tech task

Pedagogic lang task

Pedagogic tech task

Figure 2. Traditional TBLT and Technology-mediated TBLT compared

the specific software) as well as the digital level of the students (how comfortable they are using email, creating group lists, attaching files, archiving and filing incoming emails, etc.). This may seem like a simple task to most of us if we think about doing it in our L1 or L2, but what about doing it in a different language with a different alphabet? And it also seems simple because this is a task in which we engage every day, but, what if our population of students was high school students from Cambodia whose digital literacies do not include emailing?

For our TBLT syllabus we then need to create several pedagogic tasks, some focusing more on the language needed to accomplish the task (PLTs) and some on the necessary technology and digital skills (PTTs) (see Figure 3). The possibilities are countless and so are the pedagogical choices (always keeping main TBLT principles in mind). For this example, I will include a few pedagogic tasks, but several more may be needed (depending on students' language level, type of students, context, experience with the task…) in order to bring the students to a level where they can accomplish the task. A possible first pedagogic language task would help students learn appropriate greetings for the clients through input tasks. They would first read several short letters with greetings and pick those that they think are appropriate for their clients, discuss them in pairs or groups, then get confirmation from instructor and review those that are not appropriate, discussing the reasons. At this point the syllabus could go to a PTT or continue with another PLT. For example, they might move to a PLT that would be help them differentiate between formal and informal communication (especially for some languages where this is a prominent language characteristic such as Spanish, French, German, or Japanese). Students in pairs could read several email letters and highlight

those language features that render the letter formal or informal, discuss them, and then bring them to an entire class discussion. For a more production-focused PLT, students would collaborate writing similar letters on paper and then move into more independent writing.

At this point, the need to include a PTT is evident to facilitate the move from paper to email. The first PTT would teach students to open the email program and initiate the composing of a message (find recipient in address book, appropriate use of CC and BCC, etc.) and ask them to compose a message from a possible list of phrases (learning to copy and paste). From this point, we could add another PTT to learn to create an email list. This task might proceed either by a hands-on showing session (most traditional way) or by providing them with the steps needed to do so out of order and asking them to figure out in pairs (while trying it at the computer) how to create a mailing list. Another possible pedagogic task would teach students the appropriate language forms to indicate that an attachment is included in an email. In this case, the language is intimately linked to the technology skills of actually being able to find the file (navigating the browser or file finder to a place in the computer where this file is stored), attach it, and include the file name in the message.
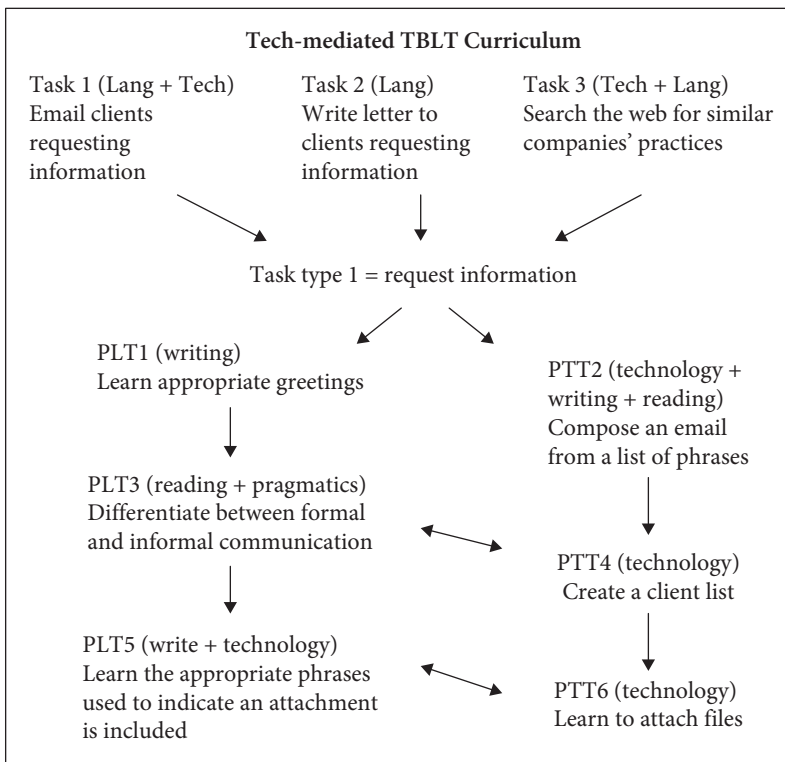

Figure 3. Example of tech-mediated curriculum

Clearly, several other PLTs and PTTs could be added to this example (e.g. learning about the structure of an email, appropriate farewells and signatures, manipulation of the text color or font, the addition of a digital signature, the creation of an automated response, etc.). The key when developing the pedagogic tasks is to consider how the language and the technology are intertwined, how they affect each other, and how we learn them and learn to use them.

Conclusion

In any field, including instructional technology, a NA should be the driving force affecting every other aspect of the instructional design system (Rossett 1995). As such, a NA should always be the first step in any TBLT curriculum (Long 2005b), and this principle applies fully to technology-mediated TBLT. In technology-mediated TBLT curricula, however, this is true not just because a well-conceived NA will help determine the tasks, the digital literacies needed and possessed by the learner in a given context, and issues of technology access and support, but even more importantly because it will hopefully help decide the degree of impact that the technology will have on the performance of the task, which in turn will directly affect the curriculum and the development of materials as well as its assessment. A NA for technology-mediated TBLT needs to elicit information that will help identify: (a) language tasks and technology tasks, (b) language and digital needs to accomplish the tasks, and (c) language and digital levels of learners. From this information, a TBLT curriculum can be designed that is optimally mediated by technology, by means of identifying the main task(s) and task types and developing both language pedagogic tasks as well as technology pedagogic tasks interlaced to help the student achieve the identified main task(s).

Many important questions about technology-mediated TBLT remain. The chapters in this volume try to answer some of these questions, although many still are pending future investigation. We need research on the impact that the technology has on the task, on how the environment where the task is conducted affects the task and the task outcomes, on what the effect of participants' digital skills is on the task, and on how we can best benefit from the different affordances of an array of media and tools. Among these and many more questions, the field of technology-mediated TBLT could also benefit from more accounts of NAs conducted in technology-mediated environments, discussion of what sources and tools best extract information about the tasks and their associated technologies, and how language and technology intersect and mutually adapt and change each other and the tasks. Finally, more detailed descriptions of how the information from the NA can be translated into fully fledged technology-mediated TBLT curricula are also needed. As the inclusion of technology permeates language classrooms and more researchers and educators include them in their investigations, these questions will bring important answers for the evolution of TBLT at large.

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