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The theory and practice of technology in materials development & task design

Hayo Reinders and Cynthia White

Summary

Technology nowadays plays a prominent role in the development of language learning materials, both as a tool in support of their creation and as a means of delivering content. Increasingly, technology is also used to support the individual's language learning process and to extend language learning opportunities outside the classroom. The development of materials is still largely a practitioner-led practice, not always clearly informed by theories of learning (Chapelle 2001). In this chapter we aim to firstly identify the distinctive features of computer-assisted language learning (CALL) materials versus traditional non-CALL materials, and how these features affect their development. Theoretical principles for task design in CALL are reviewed followed by examples of current practice in CALL materials development discussed from a practical, pedagogical, and a theoretical perspective. We conclude by identifying a number of issues that are likely to affect future developments in this area.

Introduction

A decade ago Tomlinson's (1998) edited collection entitled 'Materials Development in Language Teaching' made little reference to the contribution of computers, apart from a discussion of corpus data and concordances and Alan Maley's observation that we stand on the threshold of a new generation of computerised materials for language teaching. The absence of a focus on computer-assisted language learning (CALL) materials in that collection was remarked on (see for example Johnson 1999; Levy & Stockwell 2006), as an indicator of the divide between CALL and the wider field of language teaching. In the decade since Tomlinson's book, opportunities for language learning and teaching have been further transformed by the rapid development of a wide range of technology-

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mediated resources, materials, tasks and learning environments. The place of these developments in the field of language teaching has been the subject of debate. Coleman (2005), for example, argues that current research and practice in CALL has the potential to enhance our understanding of language learning and teaching, but that it remains in a relatively marginal position. Chapelle (2001) maintains that anyone concerned with language teaching in the 21st century 'needs to grasp the nature of the unique technology-mediated tasks learners can engage in' (p. 2). The key challenge according to Gruba (2004) is to think of ways to construct tasks to make effective use of the vast computer networks available, noting that earlier attempts to migrate classroom-based tasks to online environments have not always been successful, largely due to a poor understanding of task design within the affordances of the new environments. And Levy and Stockwell (2006) propose that CALL can bring important insights such as understanding the language teacher's role as a designer in CALL, not only of materials but of whole learning environments. While innovations in technology and practice have clearly outstripped theory development in technology-mediated language teaching (White 2006), but important contributions have been made to the development of principles for the design of CALL materials which we review in this chapter. But first we need to define what is meant by CALL materials, and explore the central notion of design in technology-mediated language teaching.

Technology, Materials and Design in Language Teaching

CALL materials – that is artefacts produced for language teaching (Levy and Stockwell 2006) – can be taken to include tasks, websites, software, courseware, online courses and virtual learning environments. So clearly language teaching materials conceptualised in this way may include rather more than may be the case for materials conceptualised in face-to-face classroom settings. However, Levy and Stockwell identify earlier precedents for this view, drawing on the work of Breen, Candlin and Waters (1979) who distinguish between *content* materials as sources of information and data and *process* materials which act as frameworks within which learners can use their communicative abilities. CALL products then encompass both content and process dimensions of materials. While CALL materials can be seen as sharing many of the features of non-CALL materials, they also have a number of unique features largely due to the materiality of the medium. We review these features in the next section, but first consider the concept of design.

The centrality of design to the theory and practice of CALL identified by Levy (1997, 1999, 2002) has emerged as a recurrent theme in the literature on technology-mediated language teaching (Salaberry 2001, Gonzalez-Lloret 2003, Gruba 2004, Yutdhana 2005, Wang 2006, Hampel 2006,

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Rosell-Aguilar 2005). Levy and Stockwell note that design – including for example, materials design, screen design, task design and software design – ‘enters into the discourse of CALL in many forms and at a variety of levels, from the scale of an institution down to the level of an exercise’ (p. 10). Furthermore, the design process is extremely complex, endeavouring to draw on elements of theory, research and practice in an optimal way given the affordances of particular technologies and the opportunities and constraints of individual contexts, not the least of which are the needs and resources of teachers and learners. As such, design procedures and practices have been closely examined.

A number of principled theoretical approaches to design have been proposed in CALL and are reviewed later in the chapter but the challenge remains one of closing the distance and bridging the gap between theory and practice. The nature of the gap and the relationship between theory and practice of design in CALL is also the subject of much debate. Levy (1997) argues that requiring CALL instructional design to be theory-driven is unnecessarily restrictive, noting too that many of the theories suggested for CALL have been created and applied in non-CALL contexts; rather, what matters is the fit between the capabilities of technology and the demands of the learning objective. Following Richards and Rodgers (1986) it is argued that the design of pedagogical activities may begin at any of their three levels: theoretical approach, pedagogical design, or teaching procedure. More recently, Hampel (2006) has applied the framework to computer-mediated communication (CMC) and online tasks, presenting a non-linear, non-hierarchical three-level model for task development in virtual classrooms, represented in Lamy and Hampel (2007: 71) as follows:

<i>Approach</i>	Scrutinising theoretical frameworks and concepts for their ability to inform task design appropriately (e.g. ensuring that cognitive theories inform conversation-based tasks or that community building concepts inform simulation tasks).
<i>Design</i>	Examining the triangular relationship between task type, tutor or student role and the affordances of the medium based on its materiality. For example... what can we say about the effectiveness of tasks designed for audiographic versus videoconferencing environments?
<i>Procedure</i>	Thinking about how tasks can be orchestrated in the virtual classroom in order to foster interaction between learners and improve their communicative

competence; taking account of research to ensure more frequent participation, release more control to the students, enable collaborative work and a problem-solving approach, and negotiate certain pitfalls (e.g. issues of power online).

The model is intended to represent dynamic, iterative processes of design and implementation, with each stage exerting an influence on the development and progression of other stages, and cyclical relationships between the stages. A key point here is that design and development processes for technology in language teaching have diverse points of departure, with a broad concern for the relationship between theory, research – including teacher research – and practice, and include matching the affordances of the technologies with the complexities of the teaching context in a pedagogically optimal way.

The distinctive features of CALL materials

CALL materials are similar in many ways to traditional materials in that they function as tools in aiding the development of L2 acquisition and are therefore subject to the same pedagogical affordances and constraints. Nonetheless, CALL materials do have certain features which allow educators to draw on potential affordances and deal with constraints in different ways. Many discussions of new software or CALL in general point out advantages of their use. Summarising some of these in relation to ‘new’ technologies such as peer-to-peer networking, gaming and messaging, Godwin-Jones (2005) suggests that CALL materials 1) help develop computer literacy (which some have pointed out creates a circular argument), 2) help develop communicative skills, 3) help with community building, 4) identity creation, 5) collaborative learning, and 6) mentoring. Although none of these are specific to language learning *per se*, they help facilitate using and learning the social aspects of language or aid learning indirectly.

Zhao (2005) suggests several advantages that are more directly related to language learning and teaching. According to Zhao, CALL materials help by 1) enhancing access efficiency through digital multimedia technologies, 2) enhancing authenticity using video and the internet, 3) enhancing comprehensibility through learner control and multimedia annotations, 4) providing opportunities for communication (through interactions with the computer and through interactions with remote audiences through the computer), 5) by providing feedback, 6) by offering computer-based grammar checkers and spell checkers, 7) through automatic speech recognition technology, and 8) tracking and analysing student errors and

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behaviours. Although this list combines technical (e.g. ‘speech recognition’) and pedagogical advantages (e.g. ‘authenticity’), it is clear that there is a broad range of potential areas where CALL materials can make a contribution. Below we offer an alternative selection, divided into organisational and pedagogical advantages.

Organisational advantages of CALL materials

Access

CALL materials can be offered to learners independent of time and place. This is a frequently cited advantage especially in relation to internet-based materials. For materials developers this means opportunities to provide materials to learners for use outside the classroom and to learners who are otherwise unable to attend classes. Although this has offered many practical opportunities, it is not yet clear what the effects of access to materials are on second language acquisition. Recent studies have especially shown the importance of support where learners access materials without the direct intervention of a teacher, whether in a self-access context (Reinders 2005; Ulitsky 2000), or in distance education (Hampel 2006; Wang 2007; White 2006). Without such support, learners tend to use fewer or inefficient learning strategies, motivation levels tend to be low, and dropout rates high.

Recent studies in Mobile-Assisted Language Learning (MALL) offer a similar picture. Thornton and Houser (2005; see also Levy & Kennedy 2005) offered a vocabulary learning programme based on principles of distributed learning. Text messages were used to present vocabulary items along with regular options for review. They found that the participants in their study did not necessarily access materials more often than when they did not have mobile access. At this point it is not yet clear what the effects of ‘anytime/anywhere’ material access are on second language behaviour and acquisition.

Storage and retrieval of learning behaviour records and outcomes

Learner progress and test results can be stored electronically (and potentially automatically) and retrieved at any time, which is not only an organisational benefit for teachers and administrators but also potentially a pedagogical benefit for students. And recently considerable progress has been made in the area of automatic essay scoring and evaluation (see for example Warschauer & Ware, 2006).

Sharing and recycling of materials

CALL materials can easily be shared and updated. For materials developers, learning *objects* that meet certain international standards such as the

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shareable courseware object reference model (SCORM; <http://www.adlnet.gov/scorm/index.aspx>), are interoperable and can reduce development time as they can be employed in different contexts. Changes to online resources are immediately available to users and learners can thus be given new materials without having to return to class.

Cost efficiency

CALL materials are sometimes said to result in cost reduction, for example by providing learners with electronic instead of print materials or by having students study independently rather than with a teacher. However, the provision of hardware and software and their maintenance has proven costly. Also, as mentioned above, learners need considerable guidance and a reduction in staffing has not always proven possible. In future, mobile-assisted language learning may reduce the need to provide dedicated facilities and thus reduce associated costs. Text messaging, for example, is already being used as a cost-effective way to bypass unavailable or unreliable infrastructure in developing countries to deliver education (cf. www.kiwanja.net). Increasing interoperability of technologies and the use of *open source* technologies and content may also make it possible to reduce the overall costs of developing language learning materials.

Pedagogical advantages of CALL materials

Authenticity

There are two parts to this potential advantage: CALL materials aid in the development of more authentic materials (computer-based or not) by allowing the selection of content based on actual language use. Examples are the application of corpora in the creation of dictionaries and to inform the selection of content for textbooks. In addition, corpora are being used with learners in the language classroom, amongst others, to promote learning by discovery and as a type of consciousness-raising activity (cf. Aston, Bernardini and Stewart 2004).

The second advantage is said to be that CALL materials resemble the types of resources especially younger learners use in everyday life. The use of educational games is an example of ways in which materials developers have attempted to mimic learners' out-of-class activities. Computer games have been shown to be potentially beneficial to learning and literacy development. Gee (2003) identified 36 learning principles in the games he investigated. An example of these is the 'active, critical learning principle'. This stipulates that 'all aspects of the learning environment (including the ways in which the semiotic domain is designed and presented) are set up to encourage active and critical, not passive, learning.' In other words,

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computer games engage learners and get them involved in the tasks at hand. A second principle is the 'regime of competence principle' where 'the learner gets ample opportunity to operate within, but at the outer edge of, his or her resources, so that at those points things are felt as challenging but not "undoable." Despite their potential, early attempts at designing games for language learning have not been entirely successful. One reason for this is that developers have not yet adapted to the (open and interactive) characteristics of the game environment but instead have attempted to copy existing content into a game (Prensky 2001).

Perhaps more important is the claim that the use of computers can help learners engage in inherently more authentic forms of language use, for example through a language exchange, where two or more students with different language backgrounds communicate in each language for some of the time, or through a webquest, where learners have to interact with authentic materials. This claim raises similar questions as with traditional materials: what is our definition of 'authentic'? Are authentic materials always necessarily better than non-authentic materials? And if the answer is no, then what would be the ideal balance? Claims that CALL materials are 'authentic' are only useful to the extent that this concept is operationalised and has been shown to be beneficial to learning.

Interaction

A major advantage of CALL materials is said to be that they facilitate interaction and language *use*. Chapelle (2005) refers to 'interaction' as 'any two-way exchanges'. This can be between two people, or between a person and the computer, as well as within the person's mind.

Swain's output hypothesis (2005) claims that by producing the language, learners can become aware of gaps in their interlanguage, and others (e.g. N. Ellis 1996) have argued that language production can act as a form of practice, thereby strengthening existing connections in the mind. Sociocultural theory emphasises the importance of interaction in a meaningful context (Lantolf 2000) and various popular CALL programmes aim to create this context and opportunities for language use through email or chat communication, or through language exchanges between learners (where a learner with a specific L1 is partnered with someone who wants to learn that language as a second language). Some researchers, however, have pointed out that the comprehensible input from the interaction alone is not sufficient to result in the development of accuracy and that some type of attention to form is necessary. In computer-mediated communication (CMC), materials and instructions would thus have to include some direction as to what learners are expected to do and what aspects of the language they are required to use.

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The accompanying instructions can affect whether the interaction focuses predominantly on meaning, on form, or on both. In a study of the effects of peer-feedback in online communication, Ware & O'Dowd (2008) assigned students to either an e-tutoring group (where they were asked to correct their partners' mistakes), or an e-partnering group (where they were not asked to do so). Even though participants in the e-tutoring group provided more corrections, it was clear that many participants were not well-equipped to provide feedback:

We speculate that, from a student's perspective, online exchanges are likely "forward-oriented" toward the next message containing new information, unlike, perhaps, teacher-directed class assignments that can be iterative products that are revised multiple times for accuracy (and a grade). Therefore, we would suggest that teachers structure carefully sequenced tasks so that they build on the previous interaction. (p. 54)

Situated learning

Above, mention has already been made of the importance of providing learners with the opportunity to use the language in a socioculturally meaningful context. Mobile technologies may make it easier to provide materials and support tailored to a particular situation. Ogata & Yano (2004), for example, developed a system that used PDAs to provide information on which Japanese forms of address to use in which situations. As participants moved from room (situation) to room, and from interlocutor (more status) to interlocutor (less status), the information changed. Developing materials for such situations requires knowledge of the entire domain (participants, situations, language used) and may be prove to very challenging, unless learners can actively tap into a larger database or access support from teachers when faced with difficulties in using the language. A more open-ended and somewhat less ambitious approach was used by Reinders (2007b, Reinders & Lewis forthcoming) who created exercises for use on Ipods and gave students tasks to complete for which they had to go out, talk to people, find and share information, and answer questions. The ability to have access to guidance and support, to record progress (using a microphone plugged into the Ipod), and to complete real-world activities with other learners, seemed to have a positive effect on students' motivation and their ability to speak. However, more research is needed to investigate how situated language learning can be structured and its effects on language acquisition.

Multimedia

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The ability to integrate different modes of presentation is an improvement over traditional materials. Different modalities have been shown to result in vastly different processing on the part of the learner (Leow 1995) and the ability for the teacher to 'repackage' materials to emphasise one modality over the other can be of benefit. Learners too, can choose on the basis of their preferences or to request more help (for example by turning on or off the subtitles on a DVD). The ability to use multimedia thus results in an enriched learning environment. Simulations are an example of a multimodal environment that have the potential to mimic real-world processes. In practice, however, CALL simulations have been built on very specific domains and are therefore limited in scope. This is largely because of technical challenges.

New types of activities

CALL materials can include activities that are difficult or impossible to achieve using other learning materials, such as moving objects across the screen (matching), recording one's voice etc. Of course, the effects of each of these activity types needs to be investigated for what it aims to measure or teach, and this has not always been the case.

Feedback

Immediate feedback is possible, dependent on the user's input and a whole range of other factors (past input, timing). Different forms of feedback are possible, such as those using sound, movement, text etc or a combination of them. Also, it is possible to implement forms of feedback such as modeling, coaching and scaffolding that are hard or impossible to implement in traditional learning environments. Natural language processing and parser-based CALL can potentially provide feedback based on participants' prior language learning progress and their specific needs (Heift and Schulze 2007).

Non-linearity

A long-recognised benefit of hypermedia is its ability to display information non-linearly and for students to access information as and how they want to, rather than in a predetermined sequence. This is a benefit only insofar as students know how to find the information they need and have strategies to learn with hypermedia. Of course, and first and foremost, this is also only an advantage insofar as the quality of linked resources is sufficiently high.

Monitoring and recording of learning behaviour and progress

CALL programmes can record and monitor learners' behaviour and progress and dynamically alter input, or make suggestions to the learner. They can also compare learners' progress with their own goals and other learners' (Reinders 2007b). The records can be made accessible to the

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student to encourage reflection on the learning process. Part of the rationale behind initiatives such as the European Union's e-portfolio project, that encourage the keeping of personal records to support ongoing study and planning, is to develop learners' metacognitive awareness and to engage their metacognitive strategies. Metacognitive awareness helps learners to prioritise their learning and helps learners select the most appropriate study plan and learning strategies. This, in turn, gives learners a sense of control over their learning and may help them to self-motivate (Ushioda 1996). Metacognitive strategies also help learners develop autonomy by allowing them to self-monitor and self-assess. In practice, however, it has proven to be particularly difficult to encourage learners to keep records or to plan their learning. Reinders (2006) found, for example, that many learners did not respond to computer prompts to create or revise learning plans and concluded that more training and staff intervention was necessary.

Control

As an extension of monitoring, learners potentially have more control over how they use CALL materials as they can often be accessed randomly or adapted to suit individual needs in level of difficulty of the input or in the amount of support available (e.g. with or without glossaries, spell checkers, etc).

Empowerment

An important benefit of the characteristics of CALL materials discussed above is that together they have the potential to *empower* learners by offering easier access to materials, greater control to learners, and more opportunities for the development of metacognitive skills and learner autonomy (cf. Shetzer & Warschauer 2000). At the same time, people have worried about the 'digital divide' or the potential for new technologies to leave disadvantaged groups even further behind. On the other hand, people (including we) have argued that technology can actually help close that gap and numerous examples exist of the technology bringing access to resources and opportunities that before did not exist, especially in the area of mobile technology (see also Warschauer 2004).

Conclusion

Many differences exist between CALL and traditional materials, however, the above brief review makes it clear that whether or not these differences translate into improved learning and teaching depends entirely on how the technology is implemented. It is also clear from the above that considerably more research is needed to establish how the differences impact (or not) our learners and how we can best take advantage of this. In the remainder of the chapter we look at two sets of theoretical principles for task design in CALL

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and then describe two approaches to the design of CALL materials, one in distance language teaching, the other is self-access.

CALL in theory

A recurrent theme in CALL is the need for more explicit links between materials development and SLA theory. Here we review two influential frameworks of principles for task design proposed by Chapelle (2001) and Doughty and Long (2003). Drawing on interactionist second language acquisition theory, the aim of Chapelle's (2001) framework of criteria for CALL task appropriateness is to provide 'ideal cognitive and social affective conditions for instructed SLA' (p. 45). The first of these criteria, language learning potential, and arguably the most critical, is based on general processes for SLA, referring to the degree to which the task promotes focus on form; it is this focus which distinguishes language learning activities from an opportunity purely for language use. The requirement for focus on form is closely aligned to the requirement for meaning focus, referring to the need for learners' attention to be directed towards the meaning of the language required to complete the task: both focus on form and meaning focus need to be present in the completion of a meaning-focused task. The importance of the individual learner is captured in the criteria of learner fit, including characteristics which need to be considered in designing CALL activities such as learning style, age and willingness to communicate. Authenticity in CALL as discussed above is based around the links between classroom and real-world language use, centring on texts and tasks that learners can find relevant in their language use beyond the classroom. Positive impact refers to effects beyond language learning potential including engaging learners' interest and the development of literacy skills, learner autonomy and metacognitive awareness, for example. The final criterion practicality is an important one in that CALL activities should not impose too much of a burden on teachers and learners in terms of accessibility and use; the resourcing of CALL is a key dimension to this criteria.

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Table 3.4. *Criteria for CALL task appropriateness*

Language learning potential	The degree of opportunity present for beneficial focus on form.
Learner fit	The amount of opportunity for engagement with language under appropriate conditions given learner characteristics.
Meaning focus	The extent to which learners' attention is directed toward the meaning of the language.
Authenticity	The degree of correspondence between the CALL activity and target language activities of interest to learners out of the classroom.
Positive impact	The positive effects of the CALL activity on those who participate in it.
Practicality	The adequacy of resources to support the use of the CALL activity.

(Chapelle 2001, p.55)

Another example of such an explicit formulation of design principles is offered by Doughty and Long (2003) based on cognitive and interactionist SLA theory. Specifically ten methodological principles of task-based learning are proposed:

1. Use tasks, not texts, as the unit of analysis.
2. Promote learning by doing.
3. Elaborate input (do not simplify, do not rely solely on "authentic" texts).
4. Provide rich (not impoverished) input.
5. Encourage inductive (chunk) learning.
6. Focus on form.
7. Provide negative feedback.
8. Respect "learner syllabi"/developmental processes.
9. Promote cooperative/collaborative learning.
10. Individualize instruction (according to communicative needs and psycholinguistically). (p. 52)

Distance foreign language learning is the specific technology-mediated context Doughty and Long have in mind, and much of their discussion is based around the constraints of that context. For example they identify the

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practicalities of developing an understanding of learners, and emerging learner needs in the distance context as key issues in adopting a task-based approach in distance language learning. Doughty and Long's work informs many of the most significant contributions to task design in distance foreign language teaching including research on task design for desktop videoconferencing (Wang 2006) and for audiographic conferencing (Hampel 2006, Rosell-Aguilar 2006). The relative weight given to theoretical and practical issues is interesting in Doughty and Long's framework: Chapelle (2005) comments that the guidelines for instructional materials given by Doughty and Long rely strongly on a theoretical view of how language is acquired through interaction and that this is 'a defensible course of action for materials development' (p. 57). From another perspective, referring to Doughty and Long's contribution, White (2006) argues that there remains an important gap in the research literature, since no one has yet extended and elaborated such a synthesis, putting it into practice not only for course design but for sustained course delivery, and then identifying implications for theory, research and practice.

Doughty & Long's design principles

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	Principles (adapted from Long, in press a)	L2 Implementation	CALL Implementation
ACTIVITIES			
MP1	Use tasks, not texts, as the unit of analysis.	task-based language teaching (TBLT; target tasks, pedagogical tasks, task sequencing)	simulations; tutorials; worldware
MP2	Promote learning by doing.		
INPUT			
MP3	Elaborate input (do not simplify; do not rely solely on "authentic" texts).	negotiation of meaning; interactional modification; elaboration	computer-mediated communication / discussion; authoring
MP4	Provide rich (not impoverished) input.	exposure to varied input sources	corpora; concordancing
LEARNING PROCESSES			
MP5	Encourage inductive ("chunk") learning.	implicit instruction	design and coding features
MP6	Focus on form.	attention; form-function mapping	design and coding features
MP7	Provide negative feedback.	feedback on error (e.g., recasts); error "correction"	response feedback
MP8	Respect "learner syllabuses"/developmental processes.	timing of pedagogical intervention to developmental readiness	adaptivity
MP9	Promote cooperative/ collaborative learning.	negotiation of meaning; interactional modification	problem-solving; computer-mediated communication / discussion
LEARNERS			
MP10	Individualize instruction (according to communicative needs, and psycholinguistically).	needs analysis; consideration of individual differences (e.g., memory and aptitude) and learning strategies	branching; adaptivity; autonomous learning

CALL in practice

In the next section we discuss two projects in terms of their unique CALL features and the theoretical/pedagogical considerations reviewed above. The first project concerns a distance education environment, the second an online self-access programme.

Task Design in Online Distance Foreign Language Teaching

The challenges in materials design for the distance context have been well documented (see for example White 2003), including the fact that the teacher-designer is at times distant from the learners and the sites of learning. One result of this challenge has been that a number of researcher-

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practitioners have articulated rich accounts of the design processes they have undertaken. Here we explore one such account and relate it to our previous discussion.

Regine Hampel's (2006) exploration of task design centres on the fact that while the computer medium in terms of its materiality differs from the kinds of resources generally used in face-to-face language learning settings, the field has been slow to appreciate and accommodate the particular features of technology-mediated learning environments, with reliance on transferring face-to-face tasks to the new settings. In the process of 'rethinking task design' Hampel explores how tasks can be devised appropriate for a multimodal virtual environment. A fascinating contribution of the research is the sustained comparison between task design and task implementation with different groups of learners and different tutors - that is exploring what happens to tasks in audiographic conferencing.

The learning environment named Lyceum was developed by the Open University UK, and is an Internet-based application which allows learners to interact synchronously using a range of modes: the modes include audio, writing and graphics, and the environment includes a voicebox, whiteboard, a concept map, a document facility and text chat. The key point is that while multimodal environments offer seemingly similar modes of communication to those of conventional classrooms, they have very different affordances which in turn impacts on how the environment, and tasks, are used by learners. (For a detailed description of audiographic environments see Hampel and Baber (2003).)

In discussing task development Hampel draws on the three-level approach discussed earlier, with approach, design and procedure stages, noting that the approach influences not just the design and implementation stages, but also that the evaluation during implementation feeds back into how the approach is understood in online environments. The theoretical approaches Hampel draws on are primarily interactionist SLA theory, sociocultural theory, and theories of medium, mode and affordances, all of which are needed to understand and inform the design of sociocollaborative tasks in multimodal environments.

The tasks designed by Hampel aim to address one of the key challenges of the distance learning context, that is providing opportunities for learners to develop the kinds of real-time interactive competence that is required to use language in interpersonal social processes (Kötter, 2001; White 2003). They have been designed to be part of online tutorials, and are just one learning source within the course. Hampel notes that the tasks 'show a number of criteria which Chapelle [...] has summarized for CALL and CMC' (p. 113);

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she does not indicate whether the criteria were used implicitly or explicitly at different stages of the development process. What is clear, however, is that learner fit is critical for distance students in a technology-mediated mode, and that, addressing Doughty and Long's concerns, detailed, practical knowledge of learners was drawn on in identifying the kinds of experiences they were likely to bring to tasks which would facilitate interaction and participation. Beneficial focus on form and meaning focus were also considered, as was authenticity, focusing on current issues in German-speaking countries using predominantly authentic texts. Hampel notes that while the scenarios and participant roles were not of themselves authentic they simulated authenticity and the authentic texts were seen as having a positive impact – another of Chapelle's features - on student interest. Practicality, in terms of having resources to support the CALL activities was a key concern as learners were mostly located in their home environments, and careful planning – including online socialization - were directed at supporting this aspect of the process. Finally, and critically, positive impact was central to the tutorial tasks as learner motivation is often vulnerable at key points in distance learning processes and opportunities for interaction and support have been found to impact very positively on persistence and progression. Below are the sequences of activities available in Lyceum, including the online resources used and the skills practised:

Table 2: Outline of tasks

Steps	Sequence	Activity	Resources	Skills
1	In advance of tutorial (voluntary)	Reading preparation document (tutorial summary)	Course website	Reading
2	In advance of tutorial (voluntary)	Preparatory activity: finding information about the topic	Course materials; WWW (via selected links on course website)	Reading; processing information from different sources
3	Tutorial (plenary)	Sound check; warm-up activity	Lyceum (audio, images, text)	Listening; speaking
4	Tutorial (plenary)	Introduction of the topic through brainstorming or	Lyceum (audio, images, text)	Listening; speaking

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		preliminary discussion; instructions for group work (e.g. allocation of roles)		
5	Tutorial (group work)	Preparation for final activity (e.g. preparing roles, arguments, presentation or written text)	Lyceum (audio, images, text)	Summarizing information; negotiating positions; collaboration; preparing presentation or discussion
6	Tutorial (plenary)	Final activity (e.g. discussion, presentation)	Lyceum (audio, images, text)	Taking part in presentation or discussion
7	After plenary	Feedback on task, error correction	Lyceum or email	Reflection on learning
8	After the tutorial (voluntary)	Additional group activity: expanding the task	Lyceum and/or email	Writing; collaboration

Hampel 2006: 114. **Permission granted**

The second part of Hampel's study moves from theory and design to implementation, identifying significant differences between tasks as conceptualised and tasks as realised. Firstly Hampel notes how tutors adapted the tasks largely for practical reasons such as student numbers fluctuating, for unforeseen issues of learner fit, particularly in terms of learner needs and interests, and finally because of timing, with different stages of tasks taking much longer than anticipated. While positive impact was carefully considered at the design phase Hampel notes that not all students found the tasks engaging or motivating: in some cases this was due to the actions of peers who were linguistically or technologically more proficient, in other cases it was due to the lack of assessment awarded to this part of the course, pointing to wider issues of curricular articulation for technology-mediated tasks (White 2006). In addition the complexity of the multimodal environment was found, certainly in the initial stages, to overwhelm some students, having a somewhat inhibiting effect on communication, as did the absence of visual cues. Thus the mediating role

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of what can be broadly defined as learner interpretation of tasks (Batstone 2005) was key to understanding task enactment in synchronous online environments. Hampel concludes by underlining the importance of context-dependent features noted by Chapelle (2003) which must be taken account of in designing and implementing tasks: in this case the materiality of the multimodal environment and the ways in which learners and teachers responded to those features had a dramatic effect on what happens to tasks in audiographic conferencing.

An online self-access environment

In a rather different project carried out at the University of Auckland, the development of an online self-access environment (called ELSAC, or English Language Self-Access Centre) was initiated as a response to the large numbers of students needing English support. Studies done at the University estimated as many as 10,000 students could be in need of improving, especially, their academic English skills. The online self-access environment was designed as a practical solution to supporting this many students from all different backgrounds and faculties, and also as a way to foster learner autonomy and to allow students to develop skills to continue improving their English on their own (see Schwienhorst 2003, 2007, for a discussion of the relationship between autonomy and CALL). In terms of the unique features of CALL materials discussed above, especially the organisational advantages of anytime/anywhere *access*, the automatic *storage and retrieval of learner records*, and the hopes of *cost efficiency* were important drivers. Pedagogically speaking, the key aim was to offer students *control* and *empower* them, through allowing *non-linear* access to a wide range of *multimedia* resources to cater for a wide range of learner differences, and to offer *feedback* and support through the *monitoring* of learning behaviour and progress.

To this end, the online environment was developed consisting of two elements: 1) a large database of electronic resources (shown above), some commercially published, some developed in-house, to cater to all learner needs and interests, and 2) several tools to support the students' learning *process*. Examples of the latter included a needs analysis, a learning plan, a learning record, and learning strategies worksheets. In addition to these tools there were several mechanisms that monitored student learning and gave feedback at key points in the learning process. An example of these was a process for comparing students' needs (as identified in their needs analysis) with their learning plans and their actual learning. It was not uncommon, for example, for students to establish, say, writing expository essays as one of the priority skills for improvement, but then to continue using grammar resources. At this point the computer would prompt the students to revise their plans and/or materials use.

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Studies into the effects of these tools and mechanisms on student learning (Reinders 2006, 2007a) made a number of interesting findings. In general, both questionnaires and interviews showed that students were extremely satisfied with the programme. Usage records showed that many students had accessed the resources and had done so frequently and over longer periods of time. Many students reported using more resources and more often than they normally did or would have without the programme; in this sense the programme's *access* features were a clear advantage. Staff too were satisfied in that they could look up students' progress and did not have to spend much time on administration; an advantage of the automatic *storage* and *retrieval* of learners' work. However, SQL queries (queries of information stored in the records of a SQL database) of 1,200 student database records collected over one year gave a somewhat less positive picture. Despite numerous suggestions, many students did not complete their initial needs analysis and very few updated their learning plans as a result. Similarly, the prompts made by the computer were seldom heeded; when participants had set their minds on learning with particular materials or in a particular way, it was clearly difficult to encourage them to change.

The results of these studies were interpreted as showing a need for more learner training and more staff support. Students obviously needed more information about the rationale behind the programme and how to respond to its prompts. As a result of these studies, additional support structures were put in place. These included language advisory sessions where students met face-to-face with a language advisor to discuss their learning needs and progress. Although the advisors made extensive use of the electronic records of the programme, obviously the cost-efficiency factor of the software has turned out to be lower than expected. In addition, a range of workshops was implemented to help students develop independent learning skills.

Taking the above findings into account, a more recent incarnation of ELSAC was developed for King Mongkut University of Technology in Bangkok, called My English. Developed in a similar context (albeit in an EFL setting) and for similar reasons, this differed from the above programme in the inclusion of additional support mechanisms so as for students to contact staff more easily to get help, as well as several elements to encourage communication in English, such as chatrooms and online communication activities.

Hayo owns copyright.

[INSERT 'MY ENGLISH' SCREENSHOT HERE: SEE ARTWORK FILE]

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As with ELSAC, the programme is a shell for teachers to place language learning materials in, and so its main intended advantages are at the level of the learning process (containing both *process* and *content* materials) rather than individual tasks. Nonetheless, the inclusion of interaction-oriented modules is in line with Doughty & Long's recommendations. An important difference between ELSAC and My English is that the latter is not designed to be mainly used by students independently, but rather as an integral part of and complement to the existing language courses; the aim is to encourage ongoing study during and after those courses finish. In this way it is hoped that over time students engage in more language use and are exposed to more input than without such support programmes.

Conclusion

In the preceding sections we have tried to identify some of the features that make CALL materials unique and have discussed relevant theories and pedagogical approaches. Next, we have reviewed several examples of CALL materials and programmes. Although it is paramount to consider language learning materials from a pedagogical perspective it is important to remember that, even more so than with non-CALL materials, issues of practicality play an important role. Organisational and practical advantages offered by the use of technology can sometimes be sufficient reason to adopt a new technology, even outweighing any pedagogic advantages. Among the many important questions arising during the process of the development of CALL materials, a key one is how to reconceptualise language tasks in ways that enable us to provide the best opportunities for language learning. And a key way to meet this challenge suggested by Gruba (2004) can be found in our collective attempts to define tasks, write them and try them out with students; equally importantly there is a need to strengthen the links between theory, research and practice, and to acknowledge that the divide between CALL and non-CALL materials is disappearing. We hope that this will lead to a new understanding of materials development.

Discussion Questions and Tasks

Reflection

1. Look at how CALL materials are defined in this chapter – how does it relate to the way you think about language teaching materials?

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2. Think about a CALL program that you have used. Which of the benefits in table 1 do you think it offers? Are there any missing from the table that you would add?
3. How useful is the idea of the role of a language teacher as designer? What are some of the strengths and the limitations of this as a perspective on what language teachers do?
4. Think about a teaching context you are familiar with. Which organisational and pedagogical advantages of CALL materials are the most evident?
5. What do you think can be the effect of providing students with non-linear access to CALL materials?
6. Can you identify the kinds of differences that may take occur between task design and task implementation in the kinds of synchronous online environments described by Hampel (2006)?

Evaluation

7. Look at some CALL materials in terms of Breen et al.'s (1979) distinction between content materials and process materials. Do you find this distinction helpful? How would you evaluate materials in terms of content and in terms of process?

Adaptation/Design

8. Choose a set of language teaching materials designed to fit a particular learning need. How would you need to adapt them to take account of the opportunities and constraints of a particular technology-mediated environment and pedagogical context?

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