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Chapter 19

CALL and Learner Autonomy: Affordances and Constraints

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[A] Summary

The last two decades have seen a growing interest in the role of the individual in the learning process. We are starting to better understand the contributions that learners make to their own learning and the ways in which as educators we can build on this. This is a positive development as the majority of language learning increasingly takes place outside the language classroom. A sizeable body of general education research now exists that identifies the importance of informal learning and the ways in which this can be supported. More research is now appearing on self-directed language learning, but a lot of work remains to be done to identify the best ways to prepare learners for this. Technology has the potential to provide teachers and learners with the necessary support in this process but also in itself poses a number of challenges, especially as the successful use of technology often requires precisely those self-directed learning skills it is intended to help develop as well as presupposing an adequate level of technological proficiency. In this chapter we begin by briefly reviewing the role of learner autonomy in language learning and teaching before outlining the potential affordances offered by technology in its development. Next, we highlight ways in which technology poses constraints on this development and suggest ways in which these can be overcome. We will show that the fields of autonomy and CALL have a potentially symbiotic relationship that has important practical benefits for learning and teaching.

[A] Introduction

Studies in individual differences, motivation and learners' beliefs (amongst others) point to the importance of increasing our understanding of the contributions learners make to their own learning (Breen, 2001) and the ways in which teachers can prepare learners for and support learners in making these contributions. Technology has often been seen to play an important potential role in this, both for learners to gain more control over the learning process, and for teachers to have more ways to connect with learners both in and outside the

classroom. However, in practice there has long been a lack of terminological consistency and clarity and a frequent confusion between objectives (e.g., the development of learner autonomy) and the tools used to achieve them (e.g., the Internet).

A common misconception for many years has been the idea that technology would single-handedly serve the pursuit of autonomy by providing learners with powerful tools that would enable them to control their own learning without the help of a teacher (cf. Levy, 1997). Partly this was the result of early optimism in the field of CALL. The promise of artificial intelligence (AI) in general and Intelligent Tutoring Systems (ITS) in particular was such that overly confident predictions were common about the demise of the language teacher and the empowerment of learners to the point where they would be able to control every aspect of their learning. Although subsequent developments lowered such expectations, a view persisted of technology as providing learners with all the tools they would need to be successful in their learning. In this view, offering learners access to unlimited resources and language input whenever and wherever they want, would be sufficient for learning to somehow take place automatically.

Reality has of course proven to be far more complicated. Although technology undoubtedly does support learners in a myriad of ways, it is also true that without adequate preparation, practice, feedback and support, many learners are unable to make effective use of technology's affordances, and indeed may suffer from using technology inadequately (for example by overreliance on machine translation).

In this chapter we look at the relationship between the development of learner autonomy and the use of technology through exploring this tension between technology as an affordance and as a constraint.

[A] The Role of Learner Autonomy in Language Learning and Teaching

Language teachers have always tried to find ways to reconcile the collective nature of most teaching environments with the (inevitably) individual aspects of learning. The development of learner autonomy, or learners' ability to take control over their own learning' (Holec 1981), has been one way in which teachers have tried to make links with learners at a more individual level, and to connect classroom learning with out-of-class language use. The theoretical and pedagogical rationale for the implementation of more learner-centred approaches to teaching is well developed and goes back many decades. Especially from the 1950s, educational psychology began to place greater emphasis on the role of the individual in the learning process. Humanist approaches considered the learner as an active participant in this process; as someone who actively shapes his or her learning experiences with the purpose of self-development and fulfilment (Atkinson 1993; Stevick 1980). Similarly, constructivism gave central stage to the learner by focusing less on the knowledge to be transmitted, and more on the process of constructing, reorganising and sharing that knowledge. These developments also influenced language education, both through the development of specific teaching methods rooted in these ideas, such as the Silent Way and Suggestopedia (Gattegno, 1963; Lozanov, 1978) and—perhaps more importantly—through a general influence on language teaching toward a greater focus on the learner:

> most researchers agree that a major shift is taking place … in education away from the teacher-centred classroom toward a learner-centred system where the learner is in control of the lesson content and the learning process. (Fotos & Browne, 2004, p. 7)

In addition to the educational aspect of autonomy, there is also an important political element. In its original meaning, autonomy encompasses the freedom and ability to make one's own choices (Winch, 2007). Economic and political obstacles, government policies and tightly

prescriptive curricula are some examples of practical impediments to learners exercising their autonomy. Nevertheless, technology can offer ways to overcome such impediments, as we shall see below.

[A] Technology and Learner Autonomy

Technology can play a role in the development of learner autonomy by supporting learners in a number of ways. Free and ubiquitous access to resources for example is one way in which practical and political limitations on autonomy can be overcome. But in order for learners to be able to make use of those resources, they also need to know which resources are the most suitable for them and to have the ability to use them appropriately. Technology can help learners develop this knowledge and the necessary learning skills. This can be done *indirectly,* for example by giving students access to a learning diary to record their learning experiences and the resources they use. It can also be done by developing learner autonomy *directly* (although this is less common). For example, there are computer programs designed specifically to help students develop the ability to identify their learning needs, plan their learning and monitor their progress. The 'My English' program developed at King Mongkut's University of Technology Thonburi (KMUTT) in Thailand, for example, actively encourages students to reflect on their learning and to make decisions based on past performance and future needs (see Reinders & Darasawang, 2011). Students are taken through a needs analysis process, are encouraged to develop an appropriate study plan, are guided in the selection of relevant resources, and are requested to monitor and reflect on their performance. Support is available through peers and online language advisors.

Although such programs are valuable in encouraging students to become more aware of their learning process and their own roles in this, studies into engagement levels with such software show disappointing results. For example, Reinders (2006) reports that many students had received the various prompts and alerts offered by an online support program

used at the University of Auckland, but did not have the metacognitive awareness to respond appropriately and as a result often stopped using the software. Reinders concludes that in this case learners should have received more specific training, not only on how to use the software, but also on the skills necessary for self-directed learning.

Related to this, not much is known about the ways in which learners use technology *outside* the classroom (or indeed how they practise and acquire language in general). A recent special issue of *Language Learning & Technology* (Reinders & White, 2011) and an edited collection (Benson & Reinders, 2011) are two of only a few publications to specifically look at the use of technology outside the classroom. Both of these collections confirm, amongst others, that many learners do have a desire to shape their learning experiences, and to a certain extent do so, but that they are often not successful in this. As a result, attrition levels are often high, in particular in self-study contexts (Nielson, 2011). Almost all existing studies show the need for extensive preparation, ongoing guidance, and follow-up support to ensure learners are able to make full use of resources given to them (Darasawang & Reinders, 2010; Reinders, 2006; Ulitisky, 2000; Vanijdee, 2003). Another common finding is that greater integration needs to take place between formal and informal education, and the use of teacher- and self-directed learning so that skills and experiences acquired in one domain can be built on and used in the other (Toogood & Pemberton, 2002).

[A] The Affordances of CALL for Learner Autonomy

CALL resources offer learners a range of affordances that are undeniable (Godwin-Jones, 2005; Zhao, 2005). Reinders and White (2010) reviewed these affordances and categorised them into two broad groups: those that carry mainly organisational or practical advantages and those that are more pedagogical in nature, as shown in Table 1.

[Insert Table 19.1 here]

Table 19.1 The potential advantages of CALL

Here, we are concerned with the ways in which these affordances are directly relevant for the development of learner autonomy and will now discuss each with this in mind.

[B] Access

At a purely practical level, technology has allowed learners to gain a level of access to resources that was previously impossible. Not only do learners in rural or underprivileged contexts now have better opportunities for access to materials, but because of this they are also less reliant on scarce or unavailable teacher support. Mobile-assisted language learning in particular offers great promise in this regard (Kukulska-Hulme & Traxler, 2005).

[B] Storage and retrieval

An extension of 'access', technology allows for the easy storage and retrieval of learning and teaching materials, as well as learning records, giving insight into learning behaviour, both inside, and potentially, outside the classroom. This extends not only to teachers but also to learners themselves, who can not only find and access resources but also monitor their own usage of those resources.

[B] Sharing and recycling of materials

Pedagogical materials can be easily created, shared and updated, with learners potentially contributing to this process. In relation to the development of learner autonomy, this last

point is particularly important as it gives learners control that they lack in more traditional environments.

[B] Cost efficiency

Technology is sometimes said to lower the cost of education by allowing learners to manage more of their own learning, thus relying less on teachers. Technology can reduce the cost of language materials in some cases by providing them in a readily reproducible digital format.

[B] Authenticity

In terms of pedagogical advantages, authenticity is often cited and potentially of major importance in the development of learner autonomy (Benson, 2007), allowing learners to use real-world materials that are relevant to their (and not just their teachers') individual interests. Discussions of autonomy often emphasise the importance of giving learners access to authentic materials, and the Internet provides a wealth of these for commonly taught languages and increasingly for less commonly taught ones as well.

[B] Interaction

An important tenet of most SLA theories is the importance of opportunities for input and output, provided through interaction. Autonomy researchers have long argued for the importance of providing learners with opportunities to *use* the language, especially in settings outside formal education (Benson, 2011). Computer-mediated communication through email, chat and social networking sites allows learners to easily connect with other learners, native speakers, and teachers. Tutorial software that offers students feedback on correctness (e.g., pronunciation grading through speech recognition) or input modification (Chapelle, 2001,

2005) (e.g., linked definitions, images, translations, etc.) also provides a level of interactivity that can be beneficial to the learner.

[B] Situated learning

Related to this, situated learning is facilitated by the use of technology, for example through the use of mobile phones that allow access to support tools in real-world settings, and that allow learners to connect with peers or teachers when attempting to *use* the language. Situated learning can help to blur the boundaries between the classroom and the target language context (Hung, 2002). By setting assignments that require learners to discover language on their own, they are encouraged to take more responsibility for their learning, in socioculturally meaningful contexts.

[B] Multimedia

Technology makes the production and distribution of multimedia resources easier, both for teachers and, increasingly, also for students. Multimedia resources may also give learners more control over the way they access target language input. For example, a movie can be watched with or without subtitles. Individual learner preferences and learning styles can thus be accommodated more easily.

[B] New types of activities

Related to this, technology can also offer new types of activities that are difficult or impossible to replicate otherwise. Drag-and-drop exercises, webquests, microblogging and social networking sites offer opportunities for interactive language practice that can empower

students to find authentic materials and interact with them without the constant intervention of teachers.

[B] Non-linearity

Technology allows for content to be displayed dynamically. Hypermedia give students the opportunity to move beyond the boundaries of the materials set by the teacher. It also allows students to easily access background information or support tools.

[B] Feedback

Technology makes the delivery of immediate and personalised feedback easier to accomplish. Natural language processing and parser-based CALL can provide feedback based on participants' prior language learning progress and their specific needs (Heift & Schulze, 2007), which can help to decrease reliance on the teacher. It also becomes easier to provide feedback in a range of different ways, through auditory, textual, and visual means. At the same time, it becomes easier for students to connect with other learners to obtain peer-feedback, encouraging them to consider alternatives for teacher guidance.

[B] Monitoring and recording of learning behaviour and progress

This is made easier with the help of technology. This not only supports teachers but also learners, who, when given access to this information, can learn to make choices about their learning process based on actual data on their progress. Electronic portfolios are an example of a tool specifically designed to encourage reflection and to support informed decision making.

[B] Control

Several of the affordances discussed above give students a greater degree of control over their learning. At a practical level, CALL materials can be accessed flexibly by students when and where they need to, and be provided with varying levels of support (e.g., with or without a glossary).

[B] Empowerment

At the pedagogical level, many of the above affordances empower learners to make decisions for themselves. By allowing learners to make choices on what materials to access, how to use them, by enabling them to work with other learners, both within and outside the school, and by giving them the data they need to know how they are doing, students are encouraged to become more reflective, more critical, and increasingly responsible for their own learning process (Blin, 1999).

[A] The Constraints of CALL for Learner Autonomy

As noted above, these affordances do not come as a free ride for autonomous learners—if they did, then the mere presence of technology should have been enough to spur a revolution in autonomous learning as it arguably has in listening to music. There are constraints, even potentially negative side effects of technology, when applied to this realm, a number of which we touch on in this section. Let us begin with the assumptions that 1) learners are working with teachers, tutors or other resources (e.g., computer programs) to help them become autonomous and 2) the learners themselves are in fact interested and motivated to become autonomous, and then discuss constraints from this idealized perspective. As with all language learning (and all education for that matter) additional issues will surface in settings where one or both of these assumptions are not met. We briefly review the preceding affordances with respect to constraints, limitations, and challenges to their effective

integration into autonomous learning, beginning with the four organizational categories and then continuing with the ten pedagogical ones.

[B] Access

On the surface at least, access is a positive feature, but access has negative potential as well. Mobile learning, for example, is gaining ground for its 'anytime/anywhere' access but the mobile experience can be a degraded one due to the limited screen size (for phones, though not tablets) and the often distracting environments in which they are used. For learners to be autonomous, they need to control access and not have that access control them to keep from being constantly interrupted in tasks or being swamped with data that cannot be processed in a way that supports language learning. Rather than relying exclusively on whatever is familiar and convenient, they need to develop knowledge and skills for selecting the best available technology for particular learning objectives.

The question is basically to what extent the practical benefits of technology access extend to the pedagogical level. The simple availability of materials for self-study is not sufficient. Previous studies (for example, Jones, 1993; Reinders & Lewis, 2006) report that such materials frequently lack the necessary support structures, such as clear instructions or even answer keys, and do not explicitly encourage students to reflect on the learning process. Materials not designed for learning purposes will offer even less guidance. Hurd emphasises the importance of preparation for learners to take full advantage for access:

> if learners are not trained for autonomy, no amount of surrounding them with resources will foster in them that capacity for active involvement and conscious choice, although it might appear to do so. (Hurd, 1998, pp. 72-73)

[B] Storage and retrieval

In terms of materials, the constraints lie in two areas: 1) initially indexing or tagging content for easy and accurate retrieval and 2) developing the skills in both teachers and learners to locate and sequence that material for learning. Indexing and tagging for language learning functionality can be a time and resource-consuming enterprise—ways need to be found to increase the pool of stored and indexed resources, ideally in a universal format. For the second, at the broad Internet level, this means having advanced skills at searching with Google or other search engines, which many students lack (Duke & Asher, 2012). At a more localized level, it can mean having those skills within a dedicated content or learning management system, such as Blackboard, Moodle or Drupal. Besides materials, learning records may also be stored and retrieved. To do so requires first finding settings in which such records can be gathered and then ensuring that both teachers and learners have the ability to retrieve and interpret them. It is relatively easy to collect data, but data is not the same as knowledge. Both teachers and learners have to develop the skills to identify sources for such data and the means of transforming that data into useful information to support decisions and actions.

[B] Sharing and recycling of materials

Despite its advantages for teaching, the process of distributing and recycling material sets up the potential for problems in creative language production for the learner. We live increasingly in a 'mix' culture, where repurposing chunks originally produced by others and synthesizing them into something different is taken as a legitimate form of creation. Learners must become aware of the limitations of this practice for developing and demonstrating language proficiency. Also teachers need to be aware of the limitations in their own materials development.

[B] Cost efficiency

When we think of technology and language learning these days, the Internet and apps for mobile devices come to mind. There is an expectation that everything should be free, or in the case of apps, cost very little. As a result, free material is often preferred by both teachers and learners to other, potentially better, material that carries expenses with it. But there are hidden costs to much of such 'free' material, most notably the distraction of advertising on websites, the lack of systematicity (Decoo, 2010), and the limited quality control in much of its production. Additionally, for technology at the institutional level, there are costs for hardware, infrastructure, maintenance, and training, costs that may be difficult for the autonomous learner to absorb away from the institutional setting.

[B] Authenticity

There are at least two issues of authenticity that can have negative consequences for the autonomous learner. One involves the language of social interaction found in online chat and discussion boards. The anonymity and cultural practices of many such settings support forms of discourse differing from what may be the learner's or the institution's goals. The second involves the relative level of the material. The plethora of options for commonly taught languages can readily lead learners to content that is authentic but linguistically inaccessible. If material is too far beyond the learner's level, it is not processed naturally, and thus is not useful for learning (Breen, 1985). In addition, accessing material that is incomprehensible can be demotivating. There is a temptation to rely on translation, especially machine translation, for both comprehension and production. Autonomous learners need to understand the limitations of such practices and identify appropriate material for their level and goals.

[B] Interaction

Interactions mediated by technology may suffer from being either inauthentic, leading to a distorted view of target language use, or authentic, as noted above, but beyond the level of all but the more advanced learners. There are examples of online interactions in authentic settings that have led to apparent successes for autonomous learners, such as Lam's (2000) case study of an English learner expanding writing proficiency through postings to fan sites. However, unfettered interaction may not support sufficient focus on form, and the lack of systemization (Decoo, 2010), is likely to affect efficiency of learning as well as leave gaps in the acquired language system. There is a need to ensure that autonomous learners understand the forms of interaction that will be most useful for them. Many of the purported benefits of CMC may be limited because a very narrow range of language is used over and over. In synchronous chat in particular, there is not much *extension* and not much opportunity to focus on accuracy or complexity.

[B] Situated learning

Despite the generally positive aspects of situated learning, a key point is for autonomous learners to be able to select the right range of situations for their learning to occur, ideally situations that are readily transferable. The range of situations in online and especially mobile settings can be limited relative to face-to-face language use, an issue common in foreign language vs. second language settings in general (see Stockwell, this issue). Learners may become successful within a given comfortable range, but lack experience with key lexical, grammatical, and discourse elements as well as cultural expectations outside of those settings. On the other hand, as everyday communication and professional and business interactions increasingly move into the digital realm, it is important that the learning tasks and settings reflect such authentic environments. Autonomous learners need to have the knowledge and

skills to seek out such tasks and settings, rather than just pedagogically convenient ones, as often occurs when activities connected to print textbook are transferred online.

[B] Multimedia

Combining media can be useful, but multimedia by itself does not guarantee better learning (Mayer, 2005). Multimedia may cause distractions, and the quality of online material is inconsistent. Further, learners may not take appropriate advantage of multimedia when offered. For example, a recent review of research on multimedia glosses for vocabulary learning noted the following: 'In summary, previous studies have found that L2 vocabulary is remembered better when learners look up picture or video glosses of unfamiliar words in addition to text glosses (translations in L1 or definitions in L2) but that when given the choice, learners tend to prefer and use the simple translations of words' (Chun, 2011, p. 139). Such disconnects between what has been shown to help learners and what they tend to do on their own need to be resolved for effective autonomous learning.

[B] New types of activities

Useful new activities, such as Webquests for language learning (Godwin-Jones, 2004), are possible in computer settings. However, they may be technology-driven without a suitable pedagogical foundation. Additionally, autonomous learners may be unaware of the range of new activities and unable to discover them on their own. Needed steps include expanding and refining language learning tasks and activities mediated by technology that suit autonomous learning and developing procedures for making teachers and learners aware of their range and relative strengths.

[B] Non-linearity

Along with the positive elements of non-linearity, there are also drawbacks. With few exceptions, both text and audio/video is linear, and textual cohesion can be interrupted by linking within a text to online dictionaries or glossaries to illuminate meaning or to resources that enrich and expand the content. Non-linearity also vastly increases the choices learners can make, and learners need to have the ability to make informed decisions regarding when breaks in linearity lead to more rather than less efficient learning. One common aspect of non-linearity in digital environments is multi-tasking, which, despite the impressions of those engaging in it, is increasingly being shown to reduce rather than enhance efficiency and quality of engagement (e.g., Ophir, Nass & Wagner, 2009). This is another example of a disconnect between many learners' perceptions and the results of empirical studies.

[B] Feedback

Technology offers the opportunity for feedback, but the overwhelming majority of dedicated programs for language learning offer very limited programmed feedback (Reinders & Lewis, 2006). Exceptions include certain ICALL (intelligent CALL) programs, but as noted in the introduction, these have not met their original promise (see Schulze & Heift, this volume). Feedback from humans is available, but a common approach for autonomous learners is to use volunteer native speakers for this purpose, especially through tandem language exchanges (e.g., livemocha; mylanguageexchange). Feedback from programmed or untrained human sources may include information that is incomprehensible, inaccurate, or irrelevant. In autonomous settings, it is important for learners to become adept at both soliciting and interpreting feedback so that it serves their needs.

[B] Monitoring and recording of learning behaviour and progress

Touched on under the ‘storage and retrieval’ topic above, this affordance is often not available except in commercial learning packages. Even there, the data supplied may be of limited value, often representing only progress through the material or course based on quizzes, but not progress in language use or general proficiency. At the individual level, this is further constrained by a lack of reliable student models: one size fits all often prevails. Electronic portfolios offer an option, but autonomous learners are likely to require additional skills and knowledge to use them effectively. For this affordance to be realized, we need extensive development of learning management systems specific to second languages and more sophisticated ICALL applications, as well as greater learner understanding of how the information from those sources connects to future actions.

[B] Control

Issues of control have been with us since the early days of CALL (Stevens, 1984). Learners first need an understanding of the control options they have for a given device or application, and often they do not have this ability at the required level (Winke & Goertler, 2008). There is arguably a need for ‘technological autonomy’ in both the learners themselves and the teachers who are guiding them toward language learning autonomy. Beyond this core understanding of controls, autonomous learners need an understanding at a more strategic level of when to use specific control options to serve their learning objectives.

[B] Empowerment

Empowerment is closely connected to several of the previous categories, in particular feedback and control. All too often, learners are ‘empowered’ without the preparation to use that power effectively. There is also a clear connection to motivation so that the desire to build on the empowerment affordance of technology is activated and channelled. In a digital

world, Dörnyei and Ushioda's (2009) theory of the 'L2 self' may hold promise for understanding and developing motivation for the connected autonomous language learner.

[A] Overcoming Constraints and Challenges for Developing Learner Autonomy

Autonomy is a growth area within language teaching and learning, and we have seen in the first part of this chapter how technology offers an unparalleled set of affordances to support it by connecting learners to one another, teachers, and others as well as to programmed tutorials and rich content. However, we have also seen that there is a great potential to ignore or misappropriate these affordances. The affordances that modern technological devices, applications, and networks create are only opportunities. For autonomous learners and their teachers, at least four promising paths exist for overcoming the constraints and challenges so that those opportunities can be exploited effectively.

First, there is the potential for learner training (Hubbard, 2004). We have argued that what learners do 'naturally' with the affordances of technology is often at odds with what is ideal for autonomous language learning. Teachers and developers need to begin by identifying efficient and effective techniques and procedures for using language materials or engaging in language learning tasks and activities mediated by technology. Then they need to find ways to communicate those to learners through training activities. Romeo and Hubbard (2010) suggest that learner training for technology environments should include three types: technical, strategic, and pedagogical. Pedagogical training, which provides a knowledge base for accommodating new technologies and situations overlapping that of teachers themselves, is of particular importance in the development of autonomy. We are still in the early stages of

clarifying the scope of learner needs in using technology, but despite the challenges inherent in language learner training (Rees-Miller, 1993), we cannot continue to ignore it.

Second, once we move away from fixed curricula, a potential area of inefficiency and frustration for autonomous learners is that of materials and task selection, especially selection of material that is too challenging to be of much use in promoting language acquisition (see, for example Nation and Waring's (1997) discussion of vocabulary level needed for text comprehension). There is a need for more information to be provided to autonomous learners in a form accessible to them so that they can make appropriate choices. Hubbard (2011) has suggested expanding the notions of Decoo (2010) regarding systemization so that the content of freely available text, audio and video resources are annotated and tagged in a way that autonomous learners can access material linked to their proficiency level and interest. In parallel to this is the propagation of more online tools like Tom Cobb's vocabulary profiler (www.lextutor.ca/vp) or various readability applications (e.g., www.read-able.com) that learners can use on their own to approximate levels for materials.

Third, at a time when collaborative learning and online social interaction are both on the upswing, there is the potential for learners to support and scaffold one another through communities of practice (Lave & Wenger, 1991). The value of peer interaction in independent learner settings has been noted previously (e.g., Lee 1998), but little work to date has focused on the specifics of the use of technology to support that. This is indeed another of technology's affordances—community building. Despite the obvious momentum from current social networking sites and 'cultures-of-use' (Thorne, 2003), making such collaborations work well for autonomous language learning will likely require the combined efforts of teachers and students, at least at the initial stages.

Finally, there is a need for more technological initiatives within CALL, or borrowed from related disciplines, that specifically target advancing learner autonomy. This includes

applications that enhance learners' metacognitive development and provide support for cognitive, social, and affective strategies (Oxford, 1990) *specific* to the technology environments. Like their teachers, learners need to be guided to a level of technological autonomy whereby they can embrace and incorporate new devices and applications in the service of language learning. This call is embedded in the TESOL Technology Standards, Learner Standards Goal 3, Standard 5: 'Language learners recognize the value of technology to support autonomy, lifelong learning, creativity, metacognition, collaboration, personal pursuits, and productivity' (Healey et al., 2011, p. 252).

These four areas, combined with the prior discussion of affordances and constraints for technology in support of language learner autonomy, provide an exploratory framework for research and practice in this growing domain. It is clear that technology can play an important role in the development of learner autonomy, but it is up to the language teaching profession to help learners to be able to fully benefit from the affordances it offers.

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Table 19.1 The potential advantages of CALL

Organizational advantages	Access
	Storage and retrieval of learning behaviour records and outcomes
	Sharing and recycling of materials
	Cost efficiency
Pedagogical advantages	Authenticity
	Interaction
	Situated learning
	Multimedia
	New types of activities
	Non-linearity
	Feedback
	Monitoring and recording of learning behaviour and progress
	Control
	Empowerment