20 YEARS OF AUTONOMY AND TECHNOLOGY: HOW FAR HAVE WE COME AND WHERE TO NEXT?

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Learner autonomy has become an assumed goal of language education in many parts of the world. In the 20 years since the launch of *Language Learning & Technology*, the relationship among computer-assisted language learning research and practice and autonomy has become both more complex and more promising. This article traces how the two fields have developed, how they have informed each other, and how they are now transforming our understanding of language learning and teaching.

Language(s) Learned in this study: Various

Keywords: Learner Autonomy, Language Learning Strategies, Learner Attitudes, Social Context

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INTRODUCTION

Learner autonomy has become an assumed goal of language education in many parts of the world. In the 20 years since the launch of *Language Learning & Technology* (*LLT*), the relationship between computer-assisted language learning (CALL) research and practice and autonomy has become both more complex and more promising. Early thinking considered a direct and often one-directional impact of the use of technology on learners' independence by providing them with access to resources and the possibility of working at times and in locations of their own choosing. Research and teachers' experiences in many different settings have shown, however, not only that the use of technology for learning often requires a degree of autonomy, but also that our understanding of the impact of technology is changing our understanding of learner autonomy and, more broadly, the roles of learners and teachers.

This article will therefore provide a critical overview of the relationship between technology and autonomy by describing some of the key developments in the study of learner autonomy and the role technology has played in them. We look specifically at five themes that have emerged in autonomy research in the last 20 years (learner training and strategies, teacher autonomy, self-access and language advising, telecollaboration, and social technologies for learning) and use exemplar studies to describe the role of technology within each of them.

Although great strides have been made in the last two decades, we argue that we are currently entering a phase in educational practice and thinking where the use of technology is enabling a shift of focus away from the classroom—and indeed in some cases formal education—taking instead the learners' lives and their experiences as the central point for learning. Our understanding of how learners design their own learning experiences and environments and the role technology plays in this design are starting to merge, requiring a re-visioning of the role and shape of education. We conclude the article by proposing a number of future directions for research and practice in the area of technology and autonomy.

WHAT IS AUTONOMY?

One of the earliest definitions by Holec (1981) characterises autonomy as "the ability to take charge of one's own learning" (p. 3). Although this basic principle has not changed over the years, a great deal of nuance has been added and our understanding now includes the impact that developing this ability has on both learners and teachers, and the wider role of education. As a comprehensive review of the history of autonomy is outside the scope of this article, we refer the reader to Benson (2011).

Since the early 1980s, the field of autonomy in language education has undergone significant change as a result of influence from other fields, such as (educational) psychology, the study of motivation, teacher development, and—especially in the last two decades—(educational) technology. All these have led to a reconceptualisation of autonomy as a multifaceted construct that operates on a number of dimensions. Benson (2011) summarises these as comprising four modalities: (a) location, or the physical setting for learning; (b) formality, or "the degree to which learning is independent of organized courses leading to formal qualifications" (p. 10); (c) pedagogy, or the type of learning or instruction; and (d) locus of control, or who makes decisions about the learning. Table 1 summarises these modalities. These more nuanced dimensions resulted from a deeper understanding about the (increasingly) wide range of settings in which learning can take place, how learning can be supported, and who controls that learning. Below, we will show how technology in particular has impacted this understanding.

Table 1. *Dimensions of Autonomy (based on Benson, 2011)*

Dimension	Opposition	Refers to...	Other terms
Location	Out-of-class vs. in-class	The setting in which the learning takes place	After-class, extra-curricular, self-access, out-of-school, distance
Formality	Informal vs. formal	The degree to which the learning is structured and/or linked to educational qualifications	Non-formal, naturalistic
Pedagogy	Non-instructed vs. instructed	The senses in which teaching is involved	Self-instructed
Locus of control	Self-directed vs. other-directed	How decisions are distributed between the learner and others	Autonomous, independent, self-regulated

THEMES IN TECHNOLOGY-MEDIATED AUTONOMY RESEARCH AND PRACTICE

Although the field of learner autonomy is over three decades old, it was not much influenced by technology until the mid-1990s, in particular with the advent of the Internet and the possibilities for online collaboration and communication. Although areas of interest come and go and are often revisited over time there are several areas of autonomy research and practice that have received considerable attention. Below, we identify five autonomy-related themes which have emerged as strong trajectories of research and practice in language learning and technology. We do not aim to be comprehensive in our discussion or referencing. Instead, for each area we have selected exemplar studies to illustrate some of the findings from this type of research. We also address how these have shaped our understanding of both autonomy and technology, and the relationship between them.

Learner Training and Strategies

One of the earliest areas of intense interest and research activity in the field of autonomy centred on identifying the characteristics of successful language learners (Naiman, Fröhlich, Stern, & Todesco, 1978) and the strategies they use to develop skills for learning the target language (Oxford, 1990). A number of influential taxonomies of learner strategies were developed, which broadly agreed on a distinction between social, affective, cognitive, and metacognitive strategies. In particular, metacognitive strategies were considered important in developing skills for lifelong learning (Boud, 1981; Candy, 1991), enabling learners to manage their learning throughout their lifetime in order to respond to changes in their lives and work circumstances. An important concern was how teachers could assist learners in developing optimal strategies for learning both within and outside the classroom. Learning to learn became a specific component in many language courses, and specialised print-based materials were developed for this purpose (Ellis & Sinclair, 1989;Willing, 1988). Technology had very little impact during this time period. However, as personal computers and networks became more widely available particularly in institutional settings, some attempts were made to use technology to support learners in developing independent learning skills.

One example was the Electronic Learning Environment, an online program designed to give learners access to resources and support them in developing skills for managing their own learning. Reinders (2007) describes how at the University of Auckland at the time, a significant increase in international students and falling standards in academic language skills among domestic students meant there was a significant demand for language improvement, which could not be met by traditional language courses. A self-access centre was established to enable learners to study by themselves and get advice from language advisors. In addition, a computer program was developed that guided learners in their self-directed learning by helping them to identify learning needs, prioritise goals, find appropriate materials, record their learning, and reflect on their progress. The program also included a number of monitoring tools with varying fuctions, such as prompts that reminded learners of upcoming goal deadlines or that identified mismatches between set goals and materials used (e.g., excessive use of grammar resources where a learner had set *speaking* as their priority goal).

Technology allowed a more interactive implementation of some of the earlier ideas about learner training and facilitated research into its effects. A mixed-method study was conducted that included extensive queries of an SQL database containing records of all the learners' interactions with the program and their responses to the various prompts they had received, as well as surveys and interviews which gauged satisfaction and identified possible impediments to using the program. The latter showed that students were highly satisfied with the program as well as their ability to use it as and when they pleased. Usage records showed that many students had accessed the resources and had done so frequently and over periods of several months. Many students also reported using more resources and more often than they normally did or would have done without the program. In this sense, the program'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, the SQL queries of 1,200 student database records collected over a period of one year gave a somewhat less positive picture. Despite numerous automated suggestions, many students did not complete their initial needs analysis and very few updated their learning plans as a result. Similarly, the suggestions made by the computer were seldom followed by students. When students had set their minds on learning with particular materials or in a particular way, it was clearly difficult to encourage them to change. Another finding from this study was that although the online provision of learning resources had made it easier for students to access materials, most still felt they had not been able to spend nearly as much time on their English as they wanted. Part of the reason was that time spent using the program was not recognised by some of their (degree) programmes or language courses. Some also reported that they received no follow up in their language classes on work they had done. Clearly, self-study had not been

given the same recognition as formal, classroom-based learning. This lack of validation for learners' own work is a recurring theme in autonomy research as is the lack of clear links between classroom and out-of-class learning.

Teacher Autonomy

Developments in technology introduced new ways for learners to access increasingly rich environments for language learning. At the same time, significant shifts were being made towards learner-centredness in language education (Nunan, 1988), focusing on the relevance of the learning experience, a responsiveness to individual learners, a commitment to knowledge construction by teachers, and the development of a prevailing culture of enquiry (for a critical overview of learner-centredness in technology-mediated language teaching, see White, 2007a). These principles of learner-centredness signalled a profound shift in language education which meant that teachers had to reconceptualise their roles and develop new skills. The concept of *teacher autonomy* (Lamb & Reinders, 2008) was introduced into the field to capture the notion that teachers had to have a degree of agency themselves, together with requisite knowledge, attitudes, and skills, to foster autonomy. However, in practice, assumptions about teacher autonomy proved to be more problematic than initially envisaged.

White (2007b) provides one study enquiring into the experience of teachers as they moved to new technology-mediated language teaching environments and the ways in which they chose to respond to the more autonomous settings. She traces how teacher identities were disrupted and challenged as they began to work in new learning spaces which gave more control to learners in terms of participant structures and choice of learning opportunities by referring to a number of separate studies—one relating to a new online programme for adult migrant ESL students in Canada (Reynard, 2003) and another relating to the introduction of an information and communications technology format for French and Italian tertiary language programmes (Strambi & Bouvet, 2003). Despite prior training which aimed to support the shift in roles, teachers experienced evident conflicts in the richer, more open learning environments, and a degree of resistance to the changes required of them. Such responses had not been anticipated, and affected the ways in which the learning environments evolved and, more broadly, the course of innovation. White's (2007b) critical commentary highlights issues relating to teacher identity in innovation with new technologies, arguing that questions of identity go far beyond questions of adequate knowledge, a shift in teacher roles, and a need to acquire new skills. It also highlights that the ways in which teachers are prepared to exercise their autonomy in technology-mediated environments may not align with principles of learner-centredness and may not always be facilitating or beneficial for learners.

Questions of teacher autonomy also underpin the paper by Lund and Smørdal (2006) entitled "Is there a space for the teacher in a WIKI?". Their study explored the introduction of MediaWiki in a class of upper secondary school learners in Norway. While no collaborative technologies had been used in that setting, there was a Learning Management System in place. Lund and Smørdal analysed teacher practices in two wiki-based projects with differing designs. Referring to the multiple, rapidly evolving, complex learning environments that emerged in the wiki space, they argue that "teachers may find themselves lost in the online environment because the more common structuring functions of LMSs are not found in wikis" (p. 44). Focusing more explicitly on autonomy, working with wikis was seen as challenging the idea of an individual who is an autonomous knower. Lund and Smørdal's study highlights further the need to re-examine language teacher autonomy working within the open environment of wikis based on the collective activity of participants.

A more recent study of teacher autonomy and computer-assisted language learning (CALL) comes from Kessler (2010) who argues that "the ability to utilize, create, and manage CALL environments for integrated language skill development is a critical foundation upon which CALL teacher autonomy rests" (p. 378). The discourse of 33 pre-service teachers across a 10-week CALL course was analysed, drawing on student-led in-class discussions, web-based wiki, chat, and discussion forums. A pervasive theme in

the discussions was that of CALL as a threat, articulated most strongly in a "sustained concern over a potential loss of control over the teaching environment and students" (p. 376). However, a number of interesting points of shifts in attitudes were also identified, including the value of reflections from teachers who had initially felt most threatened by CALL; it was their questioning of their preconceptions in class-based discussions that had an evident impact on the attitudes of their peers. Kessler's study contributes to our understanding of the contested and often conflicted nature of teacher autonomy and control in CALL, and the importance of enquiring into teacher expectations and perceptions alongside knowledge and skills in specific domains.

Technology in Self-access and Language Advising

Language advising (also known as *language counseling*) is "a type of language support where teachers meet with students on an individual basis to offer advice and feedback and to help students develop self-directed learning skills" (Reinders, 2008, p. 16). Although it can be followed by language instruction, the primary focus of language advising is on guiding learners in their own learning. Technology has had an impact on the way in which this type of language support is offered. In particular, communications technology has made online access easier for learners and has enabled multiple forms of communication (e.g., synchronous vs. asynchronous exchanges, the use of multimedia, shared editing of documents, etc.). Beyond offering a wider range of locations for such advising to take place (see Table 1), language advising also enables alternative pedagogies, greater learner control, and alternatives or complements to formal education (the *formality* dimension in Table 1) by placing the learner's experiences and needs first. Technology has been used to further enable learners to developing their language learning skills outside of the context of formal instruction—for example, by developing online advising software. One example of this was the Virtual English Language Advisor (VELA) developed at the University of Science and Technology in Hong Kong. The aim of the program was to help learners identify their strengths and weaknesses and to recommend appropriate learning strategies. It comprised a *Browse* section to help learners find online resources, a *Plan* section to enable them to develop a personalised and manageable learning plan, and a *Diary* section to record and monitor their learning. A key feature of the VELA discussed by Oxford (2008) is that it provides opportunities in a gradual way and through many different pathways for learners to become autonomous in the sense of taking responsibility and making decisions about their learning. In this way, students were able to access support anonymously and on their own terms.

Another, more recent example is Kaleidoscope, developed at the University of Helsinki (Kidd & von Boehm, 2012). Its aim is to encourage reflection and to help learners "situate themselves in their own language-learning context" (p. 130). It does this by using awareness-raising prompts that require learners to reflect on their language learning history, their needs, motivation, learning preferences, and current skills, in order to build a language learning profile. Responses to prompts and students' overall profiles are shared with other learners, and posted comments and advisors' responses are visible to them. As such, Kaleidoscope includes a broader, social component that is often missing in traditional advising sessions, which usually occur between one learner and one teacher. Kidd and von Boehm used action research to establish how many students used the program, why they did so, and how effective they thought it was. Students indicated that they liked the structured approach to learning to learn and appreciated the other students' comments and advisors' responses. An interesting finding was that most students did not find much additional benefit from working with an advisor as they felt the program had already helped them enough. Developments such as VELA and Kaleidoscope are giving greater control to learners and are using the benefits of technology to enhance learner awareness, both as individuals and in the social context of learning communities.

Telecollaboration

From the late 1980s, a range of online collaborative experiences—based initially on email exchanges—

were designed to enable learners to come together to learn collaboratively or learn each other's language. Early research into these forms of Internet-mediated tandem learning opened up important theoretical developments in learner autonomy, particularly through the work of Little and Brammerts (1996) who argued the following:

> If learning is essentially an interactive process, then the development of learner autonomy is a collaborative matter; and the support that learners can give to one another plays a crucial role in the transition from dependence on the teacher to wholly independent task performance. (p. 28)

The kinds of experiences available through tandem partnerships on the Internet—including decisions about the topic of the cooperative exchanges, the nature, extent and focus of feedback and correction, and the balance between conversational activity and peer feedback as decided by the learners—were all identified as the means by which learners develop and exercise autonomy in their language learning. Importantly, the responsibility learners were required to assume for their own learning and for the nature of the learning was seen as the product of an interdependent, collaborative process (Little, 2001), thus introducing the notion of *collaborative autonomy*. It was at this point too that Little identified writing as central to autonomy-focused pedagogy in that it acts as a focus for metalinguistic reflection, a point which is part of wider assertion concerning the potential of the written medium to promote attention to language form (e.g., Tudini, 2003).

Telecollaboration—whether focusing more on language learning or intercultural exchange—gave rise to further theoretical perspectives on learner autonomy. Fuchs, Hauck, and Müller-Hartmann (2012), for example, describe two task-based telecollaborative projects involving four countries. Participants in the first case study were teacher trainees (in Germany and the USA), and learners of German (in Poland and the UK), while the second case study involved a mix of pre-service and in-service teachers in the four countries. In these settings, autonomy was defined as entailing "the informed use of a range of interacting resources in context" (p. 82), and the aim was to promote autonomy through the development of multimodal communicative competence and multiliteracy. In the two case studies, the authors refer to the importance of *telecollaboration 2.0* (Guth & Helm, 2010) which is seen as an important site for developing and enacting this form of autonomy. Emphasis is placed on dialogue building using commonly available social networking tools which require the on-going development of multimodal competence, language proficiency, and intercultural communicative competence. The projects described by Fuchs et al. bring together the notions of learner autonomy and teacher autonomy in that a longer-term goal was to prepare teachers to design tasks which would in turn foster their learners' multimodal competence and autonomy. The study exposes further gaps in our understanding of the complex interrelationships between autonomy, multimodal competence, and multiliteracy, a point which leads into our final theme focusing on autonomy and social technologies.

Social Technologies for Learning

Over the past two decades, the field of learner autonomy and technology has been dramatically shaped by the development and diffusion of social technologies for learning. Such technologies introduced the possibility of forming learner networks (Candlin & Byrnes, 1995) through which learners could interact, share experiences and resources, raise questions, and so on—all of which were seen as supporting learning processes. One of the earliest examples came from Lamy and Goodfellow (1999) who used computer-mediatated communication technologies to provide opportunities for reflective conversation around both language topics and language learning in a Lexica Online project for tertiary learners of French at the Open University, UK. An important finding at this stage was that developing learner networks as a means of fostering learner autonomy involved new expectations of language learners, including the ability to develop individual competence within a context of effective participation in networks and communities. It also required both technological and pedagogical inspiration.

These same themes re-appear—inflected slightly differently—in a recent study by Lee (2011) on the use of blogging to promote autonomy and intercultural competence for studying abroad. For the blog project, three principles of learner autonomy were identified as key to the study: self-directedness, critical reflection, and cognitive engagement. Task type was found to promote autonomy in different ways: More open topics were identified as giving students opportunities to control their own learning, while teacher-assigned topics were seen as promoting critical reflection and cognitive engagement. Issues of identity and community also emerged in the study. Students reported that using blogs gave them "a sense of belonging, as they collaboratively shared and exchanged cultural perspectives" (p. 103) and collaborative interaction was in turn related to critical reflection. In a concluding discussion of the affordances and challenges of using blogs to foster learner autonomy through intercultural learning, Lee suggests that future research could usefully focus on the teacher's role in such settings and on teacher autonomy using personal reflections.

Social technologies for language learning draw our attention back to the value of ecological approaches to understanding learner autonomy. They focus on the multiple environments in which individuals pursue their learning, the role of others and their contributions, and the ways in which learners work with and restructure aspects of their learning environments to establish more optimal learning conditions moment by moment. Importantly too, as Lamy and Mangenot (2013) point out, social media-based language learning highlights the role of learners, their personal use of technology, and their ability to learn autonomously. This means that affordances include "the ways in which users appropriate the tools, dealing with constraints as well as spaces allowing them opportunities for action" (p. 201).

Social technologies are ubiquitous and significant constituents of everyday life—obscuring the boundaries between the educational and the everyday in terms of activities and settings. Yet tracing the interrelationships between learner autonomy and social technologies in the contemporary experiences of language learners provides a challenge to the field. In a survey of 587 foreign language students in Australia, Steel and Levy (2013) investigate the technologies that students use in class and also outside of formal classrooms as well as applications they identify as beneficial for language learning. Findings revealed that social technologies tended not to be used within class settings, but were deployed extensively out of class to initiate and develop activities and networks around their language work. From this study, we have a picture of students actively setting up and drawing on social networks to underpin and support their learning activities. Referring to the language students in the survey, Steel and Levy conclude that "the evidence suggests they are becoming more independent and autonomous, and more able to use their own technologies purposefully to meet their goals" (p. 319), with social technologies playing a key role. Clearly, social technologies provide significant tools and settings in which students can be, as White (2008) describes, "active agents who evaluate the potential affordances within their environments, and then create, select and make use of tasks, experiences and interlocutors in keeping with their needs, preferences, and goals as learners" (p. 7). More empirical studies are now needed which include observational data of individuals engaged in language learning using social technologies and of the ways in which "formal and informal processes are perpetually combining and recombining" (Lamy & Mangenot, 2013 p. 212), with learners as central orchestrators of these processes. An important component of such studies would be the on-going critical re-examination of the construct of learner autonomy, to address the critique put forward by Sockett and Toffoli (2012), who argue that a dynamic systems view of the informal learning of English using social technologies displaces the learner autonomy paradigm.

AUTONOMY AND TECHNOLOGY: A TRANSFORMATIVE FUSION OF IDEAS

What the above examples show is an unfolding development of ideas and practices in what were initially seen as two separate domains: learner autonomy and technology-mediated language teaching. At the earlier stages, each of these operated largely in isolation and with relatively little reference to each other,

or indeed to any other domains. The movements had a number of common features: Each was often treated as an idea or an innovation, to be bolted onto existing classroom practice. Each largely involved a focus on individual rather than collaborative learning. Each also had a significant, often unforeseen, impact on learner and teacher roles. Both were initially seen as peripheral to standard language teaching practices and struggled to be recognised as valuable contributors to the field. Both, however, also attracted enthusiasm around the world and significant research and development activity. In both domains existing pedagogy largely prevailed. Formal instruction continued to be seen as the most efficient form and initiator of all learning, the classroom was the place where learning should take place, and the teacher was in control of the learning process. Assessment practices, funding models, and language policies all perpetuated this paradigm.

However, an idealistic shift began to take place in the late 1990s. In the area of technology, the advent of the PC and the Internet greatly contributed to making technologies for learning more visible and available to teachers, opening up new language learning opportunities within the classroom. At the same time, learner-centredness became a key principle of language learning and teaching (Fotos & Browne, 2004), and both autonomy and technology were seen as offering potential ways for teachers to realise these ideas in the classroom. From this point on, both technology and autonomy increasingly became features of mainstream practice. A great deal of experimentation took place by teachers and researchers, keen on exploring the use of technology to enhance the learning experience. At the same time, teachers began to find ways to implement learner autonomy in the classroom context as well as through self-access centres. The focus, however, remained clearly on formal learning settings as the key locus of learning, and teachers being the primary facilitators. A common theme from within this period is teachers' characterisation of learners as reluctant to take on additional responsibility for their learning. In addition, the explicit use of technology for developing autonomy was still limited.

In recent years, technology has become ubiquitous and ever-faster developments are putting considerable pressure on our conceptualisation of language learning and teaching. Technological changes are placing new tools and options in the hands of learners, available to them in the context of their own lives. This has required a radical rethink of the roles of teachers and our perspective on pedagogical practices in general. While there have been numerous calls to respond to these challenges, much practice remains unchanged. This is partly because established educational structures remain as they were, with limited recognition and understanding of learning outside formal settings and structures.

The model in Figure 1 represents this development across the last two decades with increasing rates of change being evident. The model also shows that while formerly the domains were clearly separated, they have moved together and started to exert mutual influences. Also evident is the increasing permeability of the field, in terms of influence from other fields. Over time, the fusing of autonomy research, technology research, and practice is enabling a wider range of pedagogies in more locations that are less formal and that give more control to learners.

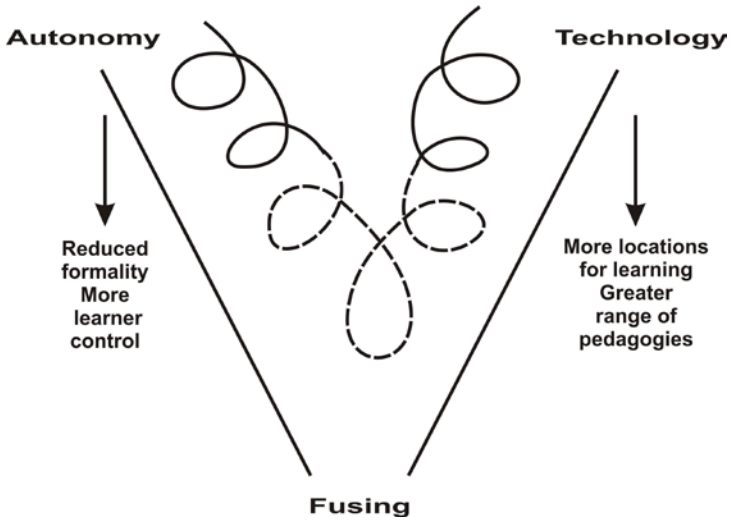

Figure 1. A model of convergence

IMPLICATIONS FOR FUTURE RESEARCH AND PRACTICE

The October 2011 special issue of *LLT* on learner autonomy reflected the widening of the agenda for research and practice in technology-mediated learner autonomy. Nielson's (2011) study into workplace language learning marked the shift to lifewide learning and its challenges. The collaborative digital video project by Hafner and Miller (2011) showed the value of drawing on students' literacy practices developed in informal learning contexts. Collentine's (2011) use of user-tracking technologies extended the tools to examine learners' autonomous moves in a task-based 3D World. Finally, Lee's (2011) study—discussed earlier—examined the potential of blogs to develop intercultural competence through reflective and social processes. As such, the special issue articles highlight the kinds of developments which now shape the fields of learner autonomy and language education.

Our aim in this article was to provide a critical perspective on developments in learner autonomy, while pointing to the expansion and diffusion of everyday contexts and practices for language learning. A key implication arising from the overview is that future enquiry and practice into technology-mediated learner autonomy will need to be increasingly aligned to the tools, settings, and activities that are of significance to language learners. To achieve such an alignment will require increasing flexibility on the part of teachers as well as an openness to learners' lives, their technologies and literacy practices and a willingness to relinquish control—like never before. It will also involve finding new ways to validate and assess out of class learning and to pragmatically bridge the shifts between the tools, practices, and contexts which now define language learning. A fundamental question for research and practice is as follows: How can we extend our understandings of learner autonomy to match the dynamic contexts and practices for language learning within and across online settings? A further implication relates to the diversity of contemporary arenas for language learning: Given that the potential range of settings, tools, and experiences is now virtually limitless, individuals need to be increasingly adept at critical adaptive learning in order to benefit from and contribute effectively to those settings. There is an urgent need for studies which address this perspective through such questions such as the following: How do students evaluate the affordances of technology-mediated environments? How do they engage with technology-mediated environments to develop learning experiences that meet their needs and goals as language learners? How do individuals become adept at configuring their online learning experiences in optimal ways, orchestrating the emergent dynamics in those settings? Teachers and teacher education are part of this broad challenge stemming from the diversity of contexts, tools and practices for contemporary language learning, hence the following questions: What do the on-going shifts in online language learning

contexts and communities mean for teacher autonomy? How can teachers adapt to those shifts and learn to add value to learners' autonomy within and across new contexts and settings? To conclude, the complex, diverse inter-relationships that emerge between learner autonomy and technology-mediated language learning will continue to challenge our understandings of both language learning and technology. Now that everyday technologies have emerged as contemporary dwelling places for language learning, learner autonomy is required, developed, and exercised in ways that we are only just beginning to understand.

NOTE

Further resources can be found on the autonomy bibliography, containing over 1,000 autonomy-related references.

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