13. Second language development and electronic interaction

1. Introduction

This chapter investigates the ways in which second language development can be and has been aided by electronic interaction in the sense of instructor- and learner-led use of the rapidly involving digital technologies, by increasing the input learners receive and the interaction in which they engage among themselves, with instructors and so-called “native speakers”, or rather “expert users”, as we argue in Section 4. “Electronic interaction” here stands for two interrelated processes (cf. Barnes 2002): (1) human-computer interaction in terms of individuals using computer hardware and software online and offline, including desktop and mobile devices, designated learner software, websites and corpus tools; and (2) human-computer-human interaction, where learners communicate remotely with other people, mediated by networked media, most importantly the Web 2.0 with its focus on social, user-generated content, and its concomitant phenomena such as social networking, macro- and micro-blogging, the wikification of knowledge (Dvorak 2005), participatory and fan culture (Jenkins 2006) and virtual worlds (e.g. Boellstorff 2008).

As Lamy and Hampel (2007) demonstrate, there are distinct affordances and constraints associated with the computer as a mediating tool. These derive from its technical functionalities as an online and offline medium, which include browsing; artefact creation and manipulation; displaying, storing and retrieving artefacts; sharing textual and audiovisual tools; graphical user interfaces; asynchronous and synchronous communication (e.g. email, wall posts and chat); voice-over Internet (e.g. Skype); and the use of diverse communication platforms, e.g. video-conferencing (Lamy and Hampel 2007: 36). In the context of SLA, these material and interactional qualities lend themselves to considerations of language learning potential, of learner fit, meaning focus, authenticity, learning strategies, literacy (e.g. “new literacies”, cf. Lankshear and Knobel 2006) and adequacy of resources (cf. Chapelle 2001: 8).
To give just one example of how the material and interactional characteristics of CMC (computer-mediated communication) provide both opportunities and challenges for learners and teachers of a second language, let us consider email communication. Its affordances as a technology allowing asynchronous communication, repeated editing and redrafting, formatting, multimodal enhancement and the identification of specific addressees include the fostering of peer collaboration, giving and receiving closed or open feedback, and extended, reflective commentary (cf. Lamy and Hampel 2007: 39). On the other hand, however, as email is considered to be a more formal medium than, for instance, instant messaging or chat, certain netiquette skills are required which may be incompatible with the learners’ own cultural backgrounds, or indeed their level of linguistic competence in the language used with respect to register and style. It is difficult for moderators and instructors to control and balance the quantity and volume of messages posted by learners; and, as is the case with much computer-mediated learning, the amount of feedback required to negotiate errors, rules and idiocy inside or outside the classroom may pose considerable challenges to instructors.

Electronic interaction can take place both in instructional settings (computer-assisted learning) and in extra-classroom contexts (emailing, chat rooms, user lists, social networking, blogs and wikis). With the emergence of text-based multi-user virtual worlds, called MUDs, (Multi-User Dungeons), however, and, more recently, 3D Multi-User Virtual Environments (“MUVE”), the divide between virtual and real has shifted, and with it the ready-made assumption that classroom-based learning is by default situated in the physical world. After all, the experience of interacting in a virtual environment is perceived by many users as equally real as the physical world (Castronova 2001; Taylor 1999; Turkle 1997). We shall therefore use the term “actual” to refer to offline learner interaction (cf. Linden Lab’s Second Life™ MUVE, 2003-2010; henceforth “Second Life”) where learner interaction takes place in the physical world, and “virtual” to refer to interaction in cyberspace.

Furtheron, a broad overview follows on the rather short history of computer-mediated SLA and its many terminological, conceptual and pedagogic ramifications. We shall then move on to discussing the two theoretical approaches to SLA that are most relevant to second language development and electronic interaction, namely generative and interaction-driven frameworks. Especially the latter, coupled with interculturalist approaches, leads on to the question of what role language varieties, including the notion of the native speaker, might play in an increasingly globalized, networked, intercultural and multilingual learning environment.
Internet-based CMC is a global phenomenon yet dominated by a small number of world languages, including English (27.3% of all Internet users), Chinese (22.6%), Spanish (7.8%), Japanese (5.0%), Portuguese, German, Arabic, French, Russian and Korean (all between 2.0 and 4.2%). English is used (online and offline) by more people as an L2 or Ln than as an L1 (Crystal 2003: 69), and it is increasingly difficult to draw categorical boundaries between so-called native and non-native varieties. This raises the question of target norms, considering that linguistic forms and registers used in CMC across languages are as fluid, creative and inconsistent as the contexts in which they occur (Bazzanella 2010: 21; see also Herring 1996, Crystal 2001). Section 4 therefore focuses on the role of non-standard varieties in CMCL (computer-mediated communication for language learning, cf. Lamy and Hampel 2007), the deconstruction of the native speaker and the pedagogical implications inherent in these developments. In Sections 5 and 6 we then move on to CMCL applications. Due to the growing popularity of online learning and teaching (Meskill and Anthony 2010: 2), we put particular emphasis on Internet-based SLA activities. In drawing partly on Lamy and Hampel’s (2007) collection of case studies, we first exemplify various types of current and emerging CMCL, such as asynchronous and synchronous platforms; video conferencing; mobile devices; Web 2.0 facilities and virtual environments. Finally, we discuss another recent form of human-computer interaction in SLA: electronic corpora as learning tools within and outside the classroom.

2. From CALL to CMCL

Electronic interaction as a feasible alternative to face-to-face or handwritten communication in SLA first emerged in the 1990s with the increasingly wide-spread use of graphical user interfaces, local area networks, user-friendly software and, not least, the arrival of the World Wide Web. The development of networked media has “created enormous opportunities for learners to enhance their communicative abilities, both by individualising practice and by tapping into a global community of other learners [and speakers of the target language]” (Hanson-Smith 2001: 107).

Overall, the historical development of CALL (computer-assisted/aided language learning) can be seen roughly as a three-stage process (Warschauer and Healey 1998). Early approaches revolved around issues relating to the benefits of the digital medium to learning, and the question of whether the machine could and would ultimately replace the instructor, as

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1 These figures are available from internetworldstats.com, accessed on 24th March 2011.
opposed to merely serving as an additional learning tool (Higgins and Johns 1984). Pedagogically, pre-WWW CALL was typically behavioristic in nature, with the computer being used mostly as a drills provider to individual learners, and as a reading and writing tool for offline input and output (Lamy and Hampel 2007: 9).

Through the 1980s, CALL came to be considered by many to be highly compatible with communicative (Krashen 1982), content-based (Cantoni-Harvey 1987) and task-based approaches (Nunan 1989, 1995) to SLA, as well as the then newly developed constructivist principles of learner autonomy (e.g. Little 1991; Dam 1995), learner-centeredness, and the interplay of extrinsic and intrinsic motivation (Dörnyei 1994; 2001).

The final move from communicative to integrative CALL (Warschauer and Healey 1998) happened through the 1990s and into the twenty-first century, with the increasing democratization and multi-medialization of the Internet and its most recent manifestations of user-generated content, share-ware, upgrade and fan culture, social networking and micro-blogging. For SLA spoken and written language outputs became increasingly accessible from networked, multimedia-enabled computers, thus facilitating the integrative interaction with authentic learning materials across a wide spectrum of contexts. For language learners the implications are that “[s]everal skills can be deployed at once, approximating communication in non-computer-mediated environments much better. It also means that learning and teaching online can be group-based, affording the possibility that CALL can accommodate socio-cognitive and collaborative pedagogies” (Lamy and Hampel 2007: 9) such as group-based situated and task-based learning, as well as peer-to-peer feedback. The move to the participatory Read/Write Web (cf. Warschauer and Grimes 2007) has gone hand-in-hand with a perceived increase in the importance of learner creativity, both in terms of selecting tools according to their own needs (Mangenot and Nissen 2006) and in the sense of linguistic, stylistic creativity, as studied by Ensslin (2006) in a hypertext-based SLA creative writing environment.

As a result of the distinctly social and communicative evolution of digital, networked multimedia, research into instructed language acquisition and electronic interaction since the 1990s has particularly concentrated on questions and research methods pertaining to discourse and conversation analysis (DA and CA), the study of written and, increasingly, oral learner participation and interaction, and aspects of motivation arising from collaborative and participatory activities, which have the potential to foster and develop not only communicative but indeed intercultural competence in learners (Lamy and Hampel 2007: 18; cf. Ensslin 2001). As these focal areas seem to shift increasingly toward human-computer-
human interaction, the theories and analytical practices of CMC are becoming more and more salient in SLA, for which reason Lamy and Hampel (2007: 8) replace CALL and its cognate terms (e.g. CALI, CELL, CBLT, HALL, ICALL, MALL, NBLT, TELL and WELL)\(^2\) with CMCL (computer-mediated communication for language learning).

Following Bax (2003), we use CALL as an inclusive term, comprising both CMCL and more traditional offline and data-carrier-based activities. Moving away from distinct terms for distinct types of computer-aided language learning seems plausible not least because the computer-aided L2 curriculum will increasingly be dominated by an integration of offline and online and of classroom-internal and external tools and interaction. Furthermore, with the advent of cloud computing, the storage, retrieval and processing of communicative data, conventionally done locally (at the user end), will increasingly happen online, via web servers, portable and online applications. Finally, the ubiquitous nature of smartphones, tablet devices and application software will have a considerable impact on how learners perceive spatiality, mobility and presence. As a result, offline and online, face-to-face and computer-mediated activities and materials will increasingly be merged and perform in a variety of “old” and “new” physical and virtual contexts. This requires careful reflection, planning and monitoring on the part of instructors, who typically find themselves acting as technological and linguistic facilitators, advisors and commentators in the electronic “feedback loop” (Lamy and Hampel 2007: 105). Similarly, integrating social networking roles such as “friends” (e.g. Facebook, Second Life), “followers” and “followed” (e.g. Twitter), CALL teachers may increasingly operate at the same social – and often affective – level as their students.

3. Theoretical and methodological underpinnings

This section considers the two main theoretical approaches underpinning CALL (as well as SLA research more widely): psycholinguistic SLA theories on the one hand, and sociocultural theory on the other. The former are informed by generative approaches, which see language learning as a largely internal, cognitive process and look at the activities contributing toward these developmental processes. The latter, inspired by Vygotsky’s (1978) 

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social interactionist theory, is more interested in the social and situative contexts and activities that trigger learning processes, as well as aspects of learner identity. As Levy (1998: 93) observes, “both theoretical positions have the potential to inform research and practice in [...] CALL”, and should be regarded as complementary rather than mutually exclusive.

The most potent metaphor of the cognitive SLA framework thus far is that of the human brain as a computer which processes input data by filtering out meaningful data from intake and storing aspects of these data as L2 knowledge and which produces, on the basis of such stored information, new informational output (cf. Ellis 1997: 35; cf. Robinson and Ellis 2008). Among the most influential models based on this concept is what is known as Krashen’s input hypothesis (1981; 1985), which assumes that only comprehensible input (or “intake”), i.e. input that “is just a little beyond the learner’s competence but is nevertheless understood” (Lamy and Hampel 2007: 20), can contribute to the development of new cognitive structures. As “the major function of the second language classroom is to provide intake for acquisition” (Krashen 1981: 101), a CALL-oriented methodology needs to ensure that primary linguistic data, i.e. the input stimuli received by and pitched at learners in terms of going “just a little beyond” their current competence levels. SLA theorists have been highly critical of Krashen’s views, however, not least because primary linguistic data does not always have to be comprehended to lead to SLA (e.g. White 1987). Similarly, in authentic CMC, a rigid comprehensible-input view can pose major challenges as learners will have to acquire very specific types of communicative competence in order to adapt to platform- and user-group-specific registers. Therefore, a flexible approach to Krashen’s theory, coupled with learner-led trial-and-error activities (such as hypothesis-testing), may be adopted as a compromise in the highly dynamic pedagogic sphere of CALL.

Complementing Krashen’s input hypothesis is Swain’s theory of comprehensible output, which provides learners with “the opportunity for meaningful use of [their own] linguistic resources” (Swain 1985: 248). Output is useful to the learning process as it raises consciousness toward existing lexical, grammatical and pragmatic gaps; it helps learners test hypotheses; and it enables learners to reflect on and negotiate their output on a metalinguistic level (cf. Pica et al. 1989; Shehadeh 2002; Hong 2002). In a CMCL environment, output is readily confirmed or corrected by interlocutors (cf. Pellettieri 2000: 83), and it has to be within the remit of a CALL instructor to monitor appropriateness levels and intervene in cases of verbal abuse (e.g. flaming).

Clearly, this implies that neither input nor output alone can suffice for learners to develop their interlanguage. Cognitivists therefore claim that “interaction between learners
and other speakers, especially, but not only, between learners and more proficient speakers
and [to a slightly lesser extent] between learners and certain types of written texts” (Long and
Robinson 1998: 22; cf. Gass et al. 1998) is key to SLA. For this reason, CMCL can be
considered a powerful methodological toolkit within CALL, although its design and
implementation needs careful planning and piloting.

As interaction-driven approaches are conceptually linked to the cognitivist concept of
the “black box” and are therefore mostly interested in what in the environment stimulates
internal processes, they typically neglect influences that are external to the learner.
Undeniably, however, interaction is contextually determined (Wertsch 1991), and it has been
the prime interest of sociocultural SLA theorists to look at the social aspects of interaction-
driven learning. Tarone (1983), for instance, sees interlanguage (not unlike expert user
language) as a stylistic continuum, which ranges from careful to vernacular style (for a recent
discussion on the controversial boundaries between World Englishes, Standard English and
English as a Lingua Franca and the debates surrounding Interlanguage Theory, see Kilickaya
2009). Learners are likely to adapt their stylistic choices to the communicative situation at
hand. In CMCL, asynchronous communication and its inherent quality of allowing planning
and editing, enables careful style, whereas synchronous chat will, due to time constraints,
invariably lead to more vernacular uses. These differences in situative context require
learners to develop communicative and strategic competences needed to adapt to a variety
of medium-specific and socially contingent levels of formality and in-group registers.

Closely associated with the use of different interlanguage styles is the importance of
social accommodation (Beebe and Giles 1984; Rogerson-Revell 2010) and acculturation
(Schumann 1986; Mady 2010). SLA has been identified as a process of “long term
convergence” (Ellis 1997: 39) between learners and their perceived expert user norms, which
can only succeed, however, if learner are willing to engage with and develop an affirmative
attitude toward the target-language group and their cultural practices. Both psychological and
social distance needs to be minimized to maximize learning outcomes, and common
emotional factors such as language shock and motivation play a significant part in the social
conditioning of SLA. In this respect, CMCL’s specific communicative parameters play an
important part in stimulating accommodation and acculturation. As Walther (1996) observes,
written CMC is typically characterized by a lack of audiovisual, paralinguistic cues such as
body language, physiognomy, pitch and intonation, which are among the key affordances of
face-to-face interaction. Thus, in CMCL, scaffolding, collaborative dialogue and instructional
conversation (van Lier 1996) needs to adapt to a cues-filtered-out communicative context, by increasing the amount of verbal explication and the negotiation of meaning for the learner.

A predominant theme within new media theory has been the concept of hyperidentities (Filiciak 2003). As simultaneous co-habitants of multiple (text-based, 2D and 3D) virtual environments, contemporary CMC users often develop multiple, malleable identities and, as a whole, contribute toward a fluid, ever-changing and socially dynamic view of selfhood (Poster 1990: 128; cf. Turkle 1997). These identities are researched via textual markers, such as email signatures, the choice of user names and, more generally, textual choices such as syntactic complexity (clause structure), lexis and morphology (such as clipped forms, abbreviations, acronyms and leetspeak\(^3\)), and various non-standards uses of punctuation, fonts, formatting and emoticons for emotive language and modality (Yates 1997). The concept of hyperidentities in SLA underscores the importance of learners being subject to and subject of social conditions, and as users of creative virtual environments (such as Second Life, Facebook, MySpace), learners can significantly shape their social learning context, thus increasing their cultural capital and ability to assert themselves as equal participants in the target language community (Peirce 1995). As Warner (2004), for instance, observes, learners in a synchronous networked CMC environment (a MOO) negotiate their identities in playful ways, by playing with form (such as the sound of new word combinations), meaning (e.g. idiomatic phrases and modifications thereof) and pragmatic frame (such as commenting on and satirizing roleplay).

As Kern (2006: 27) states, CMCL “is not a genre in itself but more a collection of genres, each with its specificity, partly depending on the communication channel chosen (IRC, SMS, chatting, emailing, blogging, instant messaging, MOO) and partly due to the social and cultural context as well as the circumstances surrounding the communicative act under scrutiny”. Teachers should therefore aim not only at communication per se but include meta-communication as well, by “exploring the relationship between language, culture, contexts and technological mediating tools”. This underlines the importance of interculturalist models of learning to CMCL, which makes use of networked media, thus fostering connectivity and global communication. Interculturalist pedagogy in CMCL therefore needs to draw learners’ attention to differences, for instance, in institutional cultures (Belz 2002) and interaction styles (Belz 2003) and to work toward resolving misunderstandings that invariably result from cultural diversity (Ware 2003), as well as the

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\(^3\) Leetspeak refers to a specific CMC register, which replaces letters with other ASCII characters, such as numbers. “Leet”, for instance, is often spelt “1337”.
fluidity and complexity of learner identities (Lemke 2002; Goodfellow and Hewling 2005; Kramsch 2006).

Methodologically, the focus on interaction and social context in CALL has given rise to DA and CA research frameworks. After all, “CMCL produces large quantities of interactional texts, and […] the computer-based nature of CMCL activities allows these data to be captured with ease through digital recordings of the visual, aural and written traces of human interactions” (Lamy and Hampel 2007: 51). As Santacroce (2004) points out, DA and CA share an interest in naturally occurring conversation, its sequentiality and underlying logic. Due to a difference in methodological heritage, however, DA tends to focus more strongly on structural and content-related elements (linguistic, textual and semiotic patterns in context) than CA, which is more interested in the social implications and shared rules of interaction. CA therefore focuses on phenomena such as turn-taking, politeness and tensions between self-interest and interlocution interest in conversation. Applications of DA and CA to CMCL largely include research into grammatical, pragmatic and discursive aspects of learner language (Pellettieri 2000; Sotillo 2000; Williams 2003); communication research into strategies and learner engagement with native speakers (Lee 2002; Schwienhorst 2004); studies of intercultural competence and politeness (Belz 2003; Davis and Thiede 2000); as well as work on the affordances of digital media (Simpson 2005) and pedagogical implications for teacher training, power and equality online (Meskill et al. 2002; Meskill 2005).

4. Encounters of the native kind

In this section, we aim to look at the significance of language varieties in relation to electronic interaction, thereby deconstructing the notion of the native speaker. With the term “language variety” we cover both standard languages and their dialects and various accents, whether these are standardized, prestigious or not. As mentioned above, all second language learners, whether within or outside the classroom, will come across various registers and styles in online interaction. On a microlevel, the continuum will range from a careful style to more vernacular uses; on a macrolevel, learners will come across, for instance, Iberian Spanish, North-American Spanish, South-American Spanish, but other varieties too.

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4 For a comprehensive study on Conversation Analysis and online chat, see Tudini (2010).
Starting off with a cartoon found in the *New Yorker* (Steiner 1993) depicting two computer-savvy dogs with the caption “On the Internet, nobody knows you’re a dog”, we observe that the nature of electronic interaction is often anonymous. This makes it difficult for language learners or anybody else to know whether or not the language used in an online venue has been spoken or written by a “native speaker”. In the Luxembourgish lessons on YouTube provided by one co-author of this chapter, for instance, some users are unsure (or even wrong) about the author’s/language instructor’s identity. One commentator speculates that the instructor learned Luxembourgish “[f]rom being a nosy brit [sic]” (Krummes and Hotham-Gough 2007-2010), whereas another asks in Luxembourgish *Ass daat lo e letzebuergер oder en englenner ?????* [‘So is that a Luxembourger or an Englishman????’] (Krummes and Hotham-Gough 2008-2010). CMC, especially when anonymous or falling within Lange’s (2007) dichotomy of “publicly private” and “privately public”, thus raises the question “whether the native speakers and second-language learners invariably recognise one another” (Davies 2003: 199).

Davies further on argues that “[r]ecent evidence suggests that there is no discrete borderline and that the NS-NNS connection is a continuum” (Davies 2003: 15) and distinguishes between five “flesh-and-blood or reality definitions” (ibid.: 214):

1. native speaker by birth (that is by early childhood exposure),
2. native speaker (or native speaker-like) by being an exceptional learner,
3. native speaker through education using the target-language medium (the *lingua franca* case),
4. native speaker by virtue of being a native user (the post-colonial case) and
5. native speaker through long residence in the adopted country. (Davies 2003: 214)

Appreciating the complex identity of native speakerhood in terms of how one speaks a language, Prodromou (2003) suggests for the case of English the term “successful users of English” (SUE). In discussing Prodromou, O’Keefe et al. (2007: 30) explain that “SUEs are highly successful L2 communicators, but they will achieve this goal by strategic uses of their resources in ways different from those of native speakers. It makes more sense, therefore, not to see SUEs as failed native speakers, but to look upon all successful users of a language, whether native- or non-native speaking, as ‘expert users’”. Tomlinson (2005: 6) reports on Prodromou’s SUEs that “they have a virtually flawless command of grammar and vocabulary and even seem to have a wider range of lexis than native speakers. However, proficient non-
native users of English use less ellipsis and fewer idioms and rarely make use of ‘creative idiomaticity’.

With this in mind, we advocate the conflation of L1 native speakers and L2 (or Ln) expert speakers and refer to Belz and Vyatkina’s (2005a) term expert user. In the light of potential anonymity, of learning a language as a second, foreign, or even auxiliary language (Luke and Richards 1982), learners of a language aim at the language spoken of expert users, whether these speakers are native speakers or not. Clearly, learners cannot assume that all their target electronic interaction partners will be native speakers. Boundaries are blurred between who is an expert speaker and the canonical homelands of native speakers are in competition with other language communities. The important thing is that learners get the input they want and need.

5. Varieties of CMCL

This section provides examples of case studies carried out by CMCL researchers on asynchronous and synchronous communication platforms and interaction, video conferencing, mobile devices, some recent Web 2.0 facilities such as blogs, wikis and social networking, and virtual environments such as MUDs, audiographic environments and graphical virtual worlds such as Second Life. In so doing, we assume as given the Web as a huge repository of authentic language material, and the concomitant challenges for learners and teachers to distil input that is both meaningful and beneficial for SLA. To emphasize the importance of freely available participatory online services, commercial products such as TELL ME MORE™ and RosettaStone™ (cf. Godwin-Jones 2010) are sidelined.

5.1 Asynchronous and synchronous CMCL

In this section, we look at the two oldest and most established forms of CMCL: asynchronous fora and email, and synchronous chat. Due to its user-friendly, low-tech nature and its common use by the majority of the population on the empowered side of the digital divide, asynchronous CMCL has received a large amount of interest among researchers. Holliday (1999), for instance, found that “electronic [and specifically email] communication provides a range and distributive frequency of linguistic features comparable to other genres of writing and speaking” (quoted in Hanson-Smith 2001: 109). He further established that email interlocutors tend to refer to and comment on each other’s messages, thereby negotiating meaning and using scaffolding mechanisms for distance communication (see also Peyton
An extensive study of how to implement learner email projects is offered by Warschauer (1995), who provides information on where to obtain suitable online teaching and learning materials and on how to establish international exchanges (cf. Rosenthal 2000: 366).

Asynchronous fora are discussion platforms centered around specific areas of interest, allowing users to negotiate controversial issues, to ask and answer questions, and to obtain alternative opinions from a wide range of people from different cultural backgrounds. They came to be used as language learning tools in the mid-1990s (Lamy and Hampel 2007: 107), and have been researched, for instance, in terms of how they contribute to SLA through uptake, peer-sharing of lexical units, collaborative dialogue and communicative strategies (Savignon and Roithmeier 2004). Another study (Weasenforth et al. 2002) looked at how fora offer opportunities for effective SLA following a constructivist agenda, which focuses on “active, collaborative construction of knowledge instead of knowledge transfer from one person to another” (58). More specifically, Weasenforth et al. (2002) examined the conditions that allow instructors to implement collaborative technologies in such a way as to enable a learner-centered approach. Working with a sample of 52 advanced-level graduate (mostly Asian) ESL learners (aged from mid-twenties to early thirties) over a period of 18 months, the researchers arranged a participation pattern requiring the learners to contribute new forum threads on a weekly basis, and to join a total of 12 discussions revolving around course content (Weasenforth et al. 2002: 61). The sample was divided into six classes, and the instructors were asked to observe, participate in and trigger discussions, to evaluate learner performance and give examples of appropriate discourse. For the online forum assignments, the classes were split into groups of three or four students.

Using an analytical framework that involved cognitive and metacognitive factors (e.g. strategic thinking, learning context, goals of the learning process), motivational and affective factors (emotional influences, intrinsic motivation and effects of motivation on effort), developmental and social factors (such as physical, intellectual and social constraints on learning) and individual learner differences, the research surveyed learners’ assessment of the benefits of the assignment. The study established that asynchronous fora give learners time to “read [...] and compose postings”, which “encourages reviewing and responding to classmates’ arguments” (Weasenforth et al. 2002: 74), as well as reflection in introverted students. Although not all participants in their study could be encouraged to engage with the technology, overall, it was found to be conducive to a constructivist learning framework with respect to social, cognitive, affective and individual principles of learning (ibid: 59). Like
many other CALL and CMCL researchers, however, they emphasize the importance of careful integration in curriculum design and of providing sufficient tutor support, which is mostly due to learners’ differing participation patterns and the discrepant need for tutor guidance and moderation.

Synchronous CMCL occurs in either written or oral form and is either embedded in websites, wikis, social networking sites and virtual environments, or offered as stand-alone “channels”. Because chat and instant messaging exchanges can be logged with relative ease, instructors and researchers can readily access transcripts of student conversations for assessment and analysis (Lamy and Hampel 2007: 115). Regarding register, written synchronous CMCL comes closer to oral than written discourse (Weininger and Shield 2003: 329) and has therefore been studied particularly for its contribution to the development of oral SL skills in negotiating meaning (e.g. Chun 1994; Ortega 1997). Blake (2000: 132) found that carefully designed chat exercises allow linking between remote learners as well as “promot[ing] learners to notice gaps in their lexical interlanguage [i.e. their vocabulary] in a manner similar to what has been reported in the literature for oral learner/learner discussion” (cf. Varonis and Gass 1985). Grammatical gaps, however, were not as readily negotiated by learners in Blake’s (2000) study. However, a contrastive study by Salaberry (2000) on the development of past tense verbal endings in L2 Spanish in an instant messaging scenario found that “the first signs of change in developmental stages of morphosyntactic development are more clearly identified in the computer based interaction task than in the face-to-face oral task” (5).

In a study centred around mediational factors, Thorne (2003: 38) sought to “develop a conceptual framework for understanding how intercultural communication, mediated by cultural artifacts (i.e., Internet communication tools), creates compelling, problematic, and surprising conditions for additional language learning”. To do so, he looked at three case studies examining telecollaborative exchanges between university students from the US and France (aged between 18 and 24), where two of the three used instant messaging facilities. Working with interview and observational video-recorded data, Thorne established that, despite synchronous CMCL facilitating classroom-external and therefore individual learning, it may necessitate “the mediation of another person, specifically an age-peer […] willing to provide immediate and explicit linguistic feedback as part of a socially meaningful relationship” (Thorne 2003: 51). Interpersonal online mediation can thus be used strategically by learners to replace and indeed outperform individual dictionary consultation.
5.2 Video conferencing

Digital or desktop video conferencing allows “the real-time sharing of video and audio information between two or more points”, thereby enabling interlocutors “to communicate synchronously while being able to view the person at the other location” (Dudding 2009: 179). The most popular forms in use today operate via Internet Protocol and via dedicated web-based applications such as Skype. Offering a “manageable context for […] real communication” (Butler and Fawkes 1999: 46), video conferencing has, since the 1990s, become a frequently used and documented tool in SLA (see O’Dowd 2006). That said, students’ responses to seeing themselves and their interlocutors on screen tend to be mixed, which is due to the medium allowing the inclusion of potentially alienating paralinguistic features resulting from a clash of cultural expectations. On the one hand, it enables learners to gain an insight into the body language(s) used in the target culture (O’Dowd 2000), thereby helping them develop intercultural competence. On the other, delays in transmission can impair turn-taking and the meaningful decoding of body language, thus creating a somewhat unnatural, potentially discouraging communicative situation (Goodfellow et al. 1996; Zähner et al. 2000). Therefore, it is important to surround video conferencing activities with reflective and evaluative offline tasks and discussions (Kinginger et al. 1999; O’Dowd 2000; Zähner et al. 2000), and to train instructors in the most effective and logistically realistic uses of the medium.

5.3 Mobile devices

The current generation of mobile devices, especially smartphones, personal media players, personal digital assistants, tablet computers, e-readers and handheld gaming devices, offer a growing diversity and convergence of communicative activities (texting, telephone, email, multimedia messaging, typing, stylus-handwriting and voice recording), downloadable software applications, web services and games, thus giving rise to a wide range of new and potential functionalities for intra- and extra-classroom learning. Today’s learners “have resources to interact from a distance, through an ever more sophisticated array of communication technologies (and prominently mobile technologies)”, which has sparked “[t]he development of ‘connected presence’, in which social relationships are accomplished through a seamless web of frequent face-to-face encounters and variously mediated interactions at a distance” (Licoppe 2009: 1925).
The term MALL (Mobile-Assisted Language Learning; cf. “mobile device-assisted language learning”, Lamy and Hampel 2007: 150-151) was first adopted by Chinnery (2006), and many experts agree that, due to its distinct spatial, creative and social qualities, it should be treated as a separate area of investigation and practice within CALL/CMCL. Not only do contemporary mobile technologies offer a host of language learning facilities in the form of 'apps' (specialised applications that can be downloaded onto smartphones and tablet computers), such as flashcards (e.g. AccelaStudy, StudyCards and Flash My Brain), vocabulary and pronunciation building tools (MyWords) for numerous languages “that allow comparison of learner’s pronunciation with that of a model native speaker using the iPhone’s recording and playback functions” (Godwin-Jones 2008a: 4). Equally importantly, Kukulska-Hulme (2007: 123) highlights MALL's affordances for “contextual learning”, whereby learners can, for instance, when located in a specific building and “walk[ing] into node areas indicated on a map”, use GPS-enabled mobile phones to collaboratively produce spatially sensitive walkthroughs. The context-sensitive lexical labelling of actual-world locations and objects through mobile devices in augmented reality scenarios, as well as concomitant communication and social networking facilities, which are all integrated in state-of-the art mobile devices, can significantly improve learner access to authentic material, and make it relevant to their individual spatio-temporal contexts.

To manage the rapidly diversifying uses of mobile technologies in terms of both hardware and software, practitioners intending to use MALL in their teaching may wish to critically reflect on the repertoire of possibilities and its potential for learning and teaching vis-a-vis the cost involved in ensuring learners have equal access to the proposed learning materials; to examine how contextual learning may be facilitated in view of learners’ needs and communicative habits; to consider the likely social and emotional effects of each communicative genre available to learners; to think about the physical environments in which specific mobile devices are likely to be used by learners; to take advantage of already existing networks and online communities; to explore possibilities for immersion and flow; and to be prepared for unexpected learning outcomes and social side-effects (cf. Kukulska-Hulme et al. 2005).

5.4 Web 2.0: blogs, wikis, social networking

By the end of the first decade of the 21st century, highly interactive Web 2.0 applications such as (macro- and micro-)blogs, wikis and social networking tools are no longer
“emerging” technologies (cf. Lamy and Hampel 2007). They have become largely normalized as everyday communication and data exchange platforms. However, their potential for SLA has only begun to be explored, especially with respect to the “new opportunities and incentives [they entail] for personal writing” and the “reading-to-write culture”, which “challenge[s] [...] language teachers [...] to extend students’ Internet world beyond their first language, to leverage participation in the read-write Web as a learning opportunity for language self-development, and to find means to link informal and recreational writing with formal and academic writing” (Godwin-Jones 2008b: 7).

Blood (2002: 12) defines blogs as “website[s] that [are] up-dated frequently, with new material posted at the top of the page”. Whilst macro-blogs are non-restrictive in the size and layout of posts, so-called micro-blogs such as Twitter and status updates in Facebook only allow a certain number of characters per post, thus leading to specific stylistic and abbreviative adaptations. Two-way communication is enabled by comment and reply functionalities, which, however, preserve a certain communicative hierarchy, which puts the initiator of a communicative strand, who can delete any undesired posts or block individual users, at a social advantage. Wikis, by contrast, are websites designed in such a way as to give users quasi-equal edit and share rights, thus constituting the most democratic type of collaborative website. Social networking sites, such as Facebook, Bebo and LinkedIn, finally, may be circumscribed as sophisticated, multimedia and multifunctional communication and file-exchange fora. They include chat, email, wall posting and status updating functionalities and enable intensive identity management through a combination of self- and other-representation, enriched by communal and individual applications such as online games, quote and proverb feeds and playful personality surveys.

The CMCL potential of the above technologies for instruction-based and classroom-external language learning is considerable. Ward (2004: 3) sees the “un-charted creative potential” of collaborative online platforms in their “ability to accommodate multiple authors”. With respect to wikis in particular, Lund and Smørdal (2006) highlight possibilities for collective knowledge building and for including instructors in student-centred activities. As Pinkman (2005) warns, positive effects on the development of learner autonomy, independence and empowerment can only be expected given careful planning and integration with other curricular activities.

5.5 Virtual environments
The earliest Internet-based virtual environments, commonly referred to as Multi-User Dungeons (“MUDs”) or Multiple Object-Oriented Environments (“MOOs”), were text-based and therefore similar in discursive structure to chat but with some very distinctive properties. Both MUDs and MOOs operate on the basis of text (commands and conversational turns) entered by users, and whilst MUDs specialise in roleplay and socialising, MOOs integrate databases of objects that users can create, manipulate, share and use. MOOs require users to construct mental images of spatial metaphors used in the text-based descriptions (such as a virtual living room, where users can “hang out” and chat about any non-private issues), and these spatial metaphors, or allegories, can easily take on the form of typical resource and learning environments such as virtual universities, libraries, and classrooms. By the same token, objects in a learning MOO might include virtual projectors, notes and recording devices (Peterson 2004: 40-44). Regarding CMCL, the idea of social and spatial immersion, as well as imagined ownership and emotional involvement, have been found to bear particular learning potential: “building rooms in the MOO is not just a pretend exercise, which students hand in and then forget. Instead, their rooms become part of the environment that the students construct and use for their language learning” (von der Emde et al. 2001: 215).

Viewed from an interactionist point of view, MUDs and MOOs provide opportunities for socio-affective exchanges and quasi-anonymous role-playing activities (Lamy and Hampel 2007: 125-126), which “may not only prompt learners to experiment with unfamiliar structures, but [...] may likewise stimulate them to explore (and exploit) the connotations of the language they are using and encountering in more depth than in a traditional classroom or non-extendable chatroom” (Kötter 2003: 150). This may happen via tandem learning, self and other repair, and the metalinguistic exploration and evaluation of learners’ and expert users’ responses to the creation and labelling of individual objects in the self-created metaphorical environment. Furthermore, virtual environments allow learners to interact critically with interlocutors from different cultures and to negotiate openly conflict and misunderstandings derived from cultural differences observed in virtual environments (Schneider and von der Emde 2006).

The first decade of the 21st century saw a productive co-development of the open-source read/write Web and radical improvements in 3D graphics programming, improving bandwidths, CPU capacity, storage space and graphics processing, which boosted the development of graphical, 3D virtual environments (“GVEs”). Among the most popular GVEs at the time of writing are Massively Multiplayer Online Role-Playing Games.
“MMORPGs”) such as *World of Warcraft* and socially, creatively, commercially and educationally oriented Multi-User Virtual Environments (“MUVEs”) such as *Second Life* (SL). An overview of interactional and collaborative learning in *World of Warcraft* is offered by Childress and Braswell (2006), and Sykes et al. (2008) explore the potential of so-called synthetic immersive environments (visually rendered environments that combine virtual gameplay with actual-world learning objectives) for interlanguage pragmatic development.

SL allows its so-called residents to “create the world of [their] choice replete with gizmos and widgets that do things (like play recordings and slide shows [...]), [and their] avatar[s] can defy gravity and fly at will. [They] can teleport from place to place, world to world, and you [they] ride all manner of conveyances if available” (Stevens 2006). Users can customize their avatars (in-world representations) almost infinitely, thus experimenting with alternative representations of self and the resulting social interactions with other learners and expert users of the target language.

Like the GVE’s *Active Worlds* and *Quest Atlantis* (Peterson 2006; Zheng et al. 2005), SL has been used for language learning. Previous research into MUVE-based CMCL has established that it enables tandem learners to carry out and negotiate diverse tasks in the target language, which involved transactional communication and interactional strategies, and it was found that “the use of avatars facilitated learner interaction management during real time computer-mediated communication” (Stevens 2006, cf. Peterson 2006). SL currently hosts a plethora of SLA places and groups, which are either remediations of offline SLA institutions or SL-specific sites and call out for close ethnographic, conversation and (multimodal) discourse analytical examination (Ensslin 2010). For an examination of implications of SL-based SLA for resource provision in academic libraries, see Hundsberger (2009).

### 6. Corpora and SLA

In this section, we explore how the interaction with electronic corpora can augment language learning. We understand a corpus as a digitized collection of texts that have been collected and documented according to pre-established demands and specifications. These texts, whether spoken, written, or signed in one or several language varieties can be accompanied by metadata and linguistic annotation.

We distinguish three ways in which language learners can be involved with corpora. First, they can provide data for a learner corpus (see Whong and Wright, this volume),
second, learners can use corpora directly within and outside the classroom, and third, they can use materials that are based on corpora.

6.1 Language learner corpora

Granger (2002: 7) writes that learner corpora are “electronic collections of authentic FL/SL textual data assembled according to explicit design criteria for a particular SLA/FLT purpose”. Regarding “explicit design”, Belz and Vyatkina (2005a: 5) add that “the majority of learner corpora consist of (argumentative) written essays, often produced under experimental conditions”. In order to illustrate learner corpora, we will examine ICLE, the International Corpus of Learner English; FALKO, the Error-Annnotated Learner Corpus of German; and Telekorp, a bilingual computer-mediated communication corpus of learners of German and English.

The ICLE project consists of essays of over 3 million words “of EFL writing from learners representing 16 mother tongue backgrounds (Bulgarian, Chinese, Czech, Dutch, Finnish, French, German, Italian, Japanese, Norwegian, Polish, Russian, Spanish, Swedish, Turkish and Tswana)” (Faculté de philosophie, arts et letters 2010: n.p.). All participant learners are university students and their essays are to be argumentative rather than “[d]escriptive, narrative or technical” (Granger 2009: n.p.).

The FALKO corpus, which is modeled on the ICLE, consists of a sub-corpus of expert users of German and various sub-corpora of learners of German with different language backgrounds. Whereas the experimental conditions of the design of the corpus are quite liberal in ICLE, FALKO does not permit participants to use paper-based or electronic language tools (e.g. dictionaries, grammar references, and spellcheckers); it took ICLE’s suggested essay questions and made four of them compulsory. Participants also provide their own metadata through a questionnaire, and their level of German is determined by doing a C-test: a cloze test where participants are rated on the CEFR (Common European Framework of Reference for Languages) scale (e.g. A1 through C2). ICLE and FALKO not only share corpus design principles, but they also share the same methods of data analysis. Following Granger’s (1996) contrastive interlanguage analysis (CIA), they “compare[s] learner data with native speaker data (L2 vs. L1) or compare[s] different types of learner data (L2 vs. L2)” (Granger 2008: 267). One application of CIA in FALKO is to look at over- and underuse of lexical and grammatical items across the different learners’ language backgrounds compared to the expert users of German control group (Zeldes et al. 2008; Lüdeling and Authors 2009-
The Telekorp corpus relies on a different data collection design. The corpus consists of computer-mediated communication genres, including both synchronic texts (chat) and asynchronic texts (messages). Student participants did not perform under experiment conditions; rather, 64 US and 87 German university students had to communicate in English and German with each other in a classroom setting. The “transatlantic telecollaborative interactions consisted of a variety of tasks centred on the mutual reading/viewing of parallel texts” (Belz and Vyatkina 2005a: 5). Telekorp is longitudinal, including language production of over eight weeks. Belz and Vyatkina (2005a, 2005b) avoided doing a “slash and burn” (Dörnyei 2003: 90) by not only collecting corpus data from their language learners, but also by providing them with feedback on their performance. This leads us to our second approach to language learners and corpora, namely learners using corpora.

6.2 Learners using corpora

Whereas the previous section shows that learner input can be compiled into a learner corpus to be used by academics, another way for learners to interact with corpora is data-driven learning (DLL), a term coined by Johns (1986, 1990). Johns (2002: 108) states that his “approach was rather to confront the learner as directly as possible with the data, and to make the learner a linguistic researcher”. This usually entails using corpora and KWIC (key word in context) concordances (in handout format or electronically) in a language classroom (O’Keefe et al. 2007). Johns (2002), for instance, includes a cloze test activity of nouns that learners have to correctly identify through an alphabetical list of ten items. For each noun, there are five KWIC concordances in which the item has been removed. For accessible instructions on using corpora and especially concordances with learners, Tribble and Jones (1997) provide basic information, tables, and figures to illustrate their materials.

Another corpus activity is for learners to find out the semantic meaning and function of a word. Möllering (2004) compiled KWIC concordances of German modal particles and turned them into worksheets, inviting learners to notice the various uses of the German “ja” (“yes”) in their different contexts (see Möllering 2004: 238-243). Belz and Vyatkina (2005a: 4) criticize Möllering’s (2004) approach for not giving learners “the opportunity to see how their own uses differ from those of expert users”. In their own research, the authors (Belz and Vyatkina 2005a, 2005b) asked their own US student participants to go through the Telekorp
corpus to which they contributed and examine the usage of modal particles as produced by the expert users of German and by themselves.

Not every language tutor needs to compile their corpus for classroom teaching, however, and Reppen (2010) provides a few suggestions on how to use online general language corpora with learners. Activities consist of a mixture of reading key words in context (KWIC) concordances to determine the meaning and use of different words or word clusters and/or determining frequencies, especially if the search item shows a difference in usage depending on the registers of corpus texts (e.g. spoken, fiction, magazine) as in the Corpus of Contemporary American English, COCA (Davis 2008-2010).

6.3 Learners using corpus-based materials

O’Keefe et al. (2007: xi, emphasis ours) observe that “corpus information, in recent years, seems to be becoming de rigeur as the basis of the compilation of major reference grammars, and, more and more, as the major feature of coursebooks”. A good case study of textbook materials is McCarthy et al. (2005), where the syllabus has been influenced by using data from the Cambridge International Corpus. The aim of such a textbook is to teach “authentic and useful” North American English (McCarthy et al. 2005: iv). In conversations, for instance, the textbook shows a horizontal bar chart indicating that the phrase “I’m” is more common than “I am” (McCarthy et al. 2005: 5). At a later stage (McCarthy et al. 2005: 39), the textbook explains the discourse marker well and states that, in conversation, it is “one of the top 50 words”.

McCarthy et al. (2005) might be considered as a flagship textbook in terms of its corpus-based syllabus design. However, O’Keefe et al. (2007: 274) warn that one “must not assume that the profession at large will rush to share its enthusiasm for everything to do with corpora”. Indeed, many textbooks contain sentences or multi-word expressions unattested in corpora (Römer 2004), thus presenting learners with constructed texts.

Corpus linguistics can thus not only be beneficial for SLA in terms of learners providing authentic data on how they produce language. Corpora can also provide a range of authentic and systematically compiled input for learners, be it in the form of using corpora and concordances themselves, or using materials based on corpus evidence.

6.4 The effectiveness of corpora in SLA
Because corpus linguistics is a relatively new user-friendly methodology and/or research discipline, there is an identifiable research gap into the effectiveness (complete with control groups) of using above-mentioned materials in SLA classroom teaching. Boulton (2008: 13) investigated “several hundred papers linking corpora and L2 teaching/learning” and only found 39 studies “which report some kind of evaluation of DDL beyond the researcher’s opinion”. One of those studies (Koosha and Jafarpour: 2006) shows that data-driven learning (DDL) groups performed better than control groups in the learning of collocations of prepositions in English produced by Iranian EFL adult learners. Allan’s (2006) findings also confirm DDL groups outperforming control groups, but also mentions that DDL learners show a greater language awareness. Boulton (2010) even suggests that DDL materials do not have to entail hands-on concordancing on a computer: they can also be useful via the printed medium, either via paper KWIC lines or corpus-informed learning and teaching materials. Of all corpus-informed materials, Boulton (2010: 18) finds the COBUILD Concordance Samplers series, such as Capel (1993), the closest to hands-on DDL: “more data, fewer exercises, less mediation, with more of the responsibility falling on the learner (who may as a result learn more and become more autonomous)”.

However, Boulton (2010) also observes that the corpus research has not been put into DDL teaching practice to the extent predicted by Leech (1997). For one part, some publishers are unaware of DDL; others are unwilling to introduce DDL materials on the conservative market. For another part, teachers may be “hostile to any use of [information and communication technology] or CALL” (Boulton 2010: 3). Boulton (2010: 8) observes that “[h]owever simple the corpus interface, however well DDL is integrated with other functions, however user-friendly the program – the very fact of having to use computers will deter many”. Whether the reasons are market-driven or affective, the number of corpora and their application in learning and teaching are on the rise. Although more theoretical corpus research will be carried out in the future, it is hoped that further research will engage in the effectiveness of corpora in the classroom setting.

7. Concluding thoughts
Clearly, a summative handbook article on as rapidly an expanding area as CALL and CMCL cannot aim to cover all its elements exhaustively. In this chapter, we have therefore sought to present readers with a broad overview of the relatively new (and in some cases very new)
opportunities second language learners have nowadays for increasing the input they receive
and the interaction in which they engage in electronic form, both in instructional settings and
in extra-classroom contexts, thereby also raising the issue of language varieties as attested in
various language corpora, and the deconstruction of native speaker in favor of “expert
speakers”. In a move to integrate recent trends in learner corpus research and its implications
for the SLA classroom, we have also looked at how online and offline corpora and corpus-
analytical tools can sensibly be integrated in the syllabus, thereby raising learner awareness
vis-à-vis the problems inherent in uninformed and uncritical uses of the Web as a resource of
authentic target language material. We have connected these issues to theoretical concerns
relating to the receipt of comprehensible input and primary linguistic data under generative
approaches to L2 acquisition and to interaction-driven and sociocultural approaches that
adopt discourse and conversation analytical frameworks. For issues revolving around CALL-
based assessment, mediation, multimodality, learner-centered curriculum design, oral
language skills development and a more extensive focus on (combined) teaching and research
methodological frameworks within CMCL, we recommend Lewis (2002), Felix (2003),
Lamy and Hampel (2007) and Meskill and Anthony (2010).

Despite the sheer plethora of existing studies into CMCL, there can be no doubt that
considerably more empirical research into all the areas covered in this chapter needs to be
undertaken. Not only are we dealing with a highly dynamic field of research, but the ways in
which recent augmented reality technologies and (playful) social practices have widened the
scope of immersive educational tools and methods leads to the question of how the bridging
of virtual and actual reality (cf. Ensslin and Muse 2011) might impact learner identities and
their communicative needs and expectations.

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