Part IV

Second language learning and learners
Introduction

Although there is a long history of second and foreign language teaching methods – Kelly’s (1969) historical overview goes back to 500 BC – the focus on the cognitive learning processes involved in language acquisition is much more recent. This is because the field of cognitive psychology only emerged in the mid-twentieth century, with a shift away from the view of learning as conditioned behaviour to one focused on the complex mental operations involved in learning, such as memory and attention (Smith, 2001). The field of linguistics contributed to the development of this cognitive perspective: Chomsky’s ideas on mental representations of language (1957) and his critique of behaviourist accounts of language (1959) are key moments in the ‘cognitive revolution’ (Gardner, 1986/1998; Miller, 2003).

The new discipline of second language acquisition (SLA) emerged at about the same time. It broadened the scope of inquiry from the language itself and how to teach it to include the learner’s knowledge and use of the second language (L2). This new perspective viewed errors not simply as bad habits but rather as revealing how the L2 was represented and accessed (Corder, 1967; Selinker, 1972). The contributions from cognitive psychology have increasingly influenced our understanding of how language is perceived, processed, stored and retrieved for use. Within SLA, this has meant moving beyond borrowing concepts from cognitive psychology to the elaboration of sophisticated research methodologies and theoretical constructs. And as more of the research is now conducted in classrooms, in addition to the more controlled laboratory environments, there are clear implications for teaching.

We adopt the broad definition of cognition proposed by DeKeyser and Juffs (2005: 437): knowledge, how it is acquired and how it is accessed in performance. This clearly encompasses many phenomena; however, we will focus on those with particular relevance for classroom L2 learning (we use the terms ‘acquisition’ and ‘learning’ interchangeably in this chapter).

Current critical issues

We begin by describing five issues relevant to teaching and learning that have been well-researched and about which some level of consensus has been reached.
Implicit and explicit learning and explicit and implicit knowledge

One central issue is the extent to which language can be learned implicitly (i.e. without intention to learn or awareness of learning) and the extent to which language knowledge itself may be implicit (i.e. not easily accessible for conscious reflection). If learners can ‘pick up’ language without being aware of doing so, then pedagogy can focus on other, perhaps more interesting and motivating aspects, such as meaningful interaction using the L2. Implicit knowledge (which is likely to result from implicit learning) is also thought to be more readily available under communicative pressure and more durable than explicit knowledge (more likely to result from explicit learning).¹

Pioneering research into implicit learning by cognitive psychologists demonstrated that humans are sensitive to patterns in meaningless strings of letters (Reber, 1996) and that language regularities can be induced by a computer network that is not given any predetermined rules or meaning (summarised in Mitchell et al., 2012). Most directly relevant for language teaching is recent research that looks at the extent to which humans can learn language phenomena implicitly. Studies increasingly use more sophisticated methods, including evidence about brain activation (Morgan-Short et al., 2015), to help document that participants are not aware of learning the targeted feature of language during training or following it; the resulting knowledge that they demonstrate is found to be implicit (e.g. Rebuschat and Williams, 2012).

Classroom-based research comparing the effectiveness of teaching approaches that draw learners’ attention to aspects of the language (promoting intentional and explicit learning) with those that do not (promoting incidental learning, which could be explicit or implicit) (Norris and Ortega, 2000; Spada and Tomita, 2010²) has most convincingly demonstrated that intentionally and explicitly orienting students’ attention to features of the language tends to lead to larger learning gains than instruction that hopes to do so incidentally and/or implicitly. However, capturing the learning of implicit knowledge has proven challenging: the measures of learning used (judgments of linguistic acceptability, for example) often favour the use of explicit knowledge (Doughty, 2004). A better understanding of the characteristics of linguistic forms that may be learned with minimum teacher guidance would allow for more efficient use of class time. We currently know more about features that are good candidates for instruction (see discussion below on redundancy and L1-influence, for example), but the increased availability of longitudinal L2 student production corpora holds great promise for highlighting problematic and less problematic aspects of language across a variety of classroom contexts (e.g. Hasko, 2013; Thewissen, 2013).

Practice and automatisation of explicit knowledge

A group of theories, broadly known as information processing theories, purports that some learning begins with explicit knowledge; that is, some awareness of the phenomenon to be learnt. One could be aware that yes/no questions in English contain ‘do + subject + lexical verb’; that his and her refer to the possessor, not only to the possessed entity; or the position the tongue needs to adopt to pronounce th. With practice, this declarative knowledge (i.e. learners can talk about it) can be drawn upon to produce and comprehend language with increasing speed and accuracy (DeKeyser, 2007a). During this proceduralisation stage, some researchers argue that processes such as ‘chunking’ combine separate representations of knowledge in the brain to generate new, more holistic, representations. The learning can then move into a stage of automatisation, characterised by fast access and stable performance (whether target-like or not). At this point, knowledge may become context-dependent and skill specific, and thus not easily
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Which aspects of language learning and teaching have been researched from this point of view? It is claimed that grammar-based approaches are underpinned by this learning theory: the provision of grammatical rules is followed by opportunities to practise those rules in comprehension and production with feedback, in increasingly less controlled settings (DeKeyser, 1997; Sanz and Morgan-Short, 2004). Some research has found correlations between learners’ ability to articulate knowledge about language with their ability to use that knowledge in specific tests or with their general proficiency (Roehr, 2007), although clear, linear relations between declarative knowledge and more automatized use of that knowledge are not consistent (Marsden and Chen, 2011). Several studies have focused on how practice improves fluency (e.g. de Jong and Perfetti, 2011). Others have provided learners with input that repeatedly makes particular features of the language essential for understanding the intended message, thus giving learners practice in connecting forms to a particular meaning or function (e.g. verb inflections to convey tense and number, Marsden, 2006, or morphosyntax to convey subject/object assignment; see VanPatten, 2004, for an overview). Another operationalization of practice encourages learners to articulate declarative knowledge whilst working with other learners or with the teacher (‘languaging’, Swain, 2005). Here the idea is to help learners establish reliable knowledge and begin to proceduralize it. A great deal of research has examined the provision of different types of corrective feedback in response to learners’ inaccuracies during production (Lyster et al., 2013; see also Mackey, Park and Tagarelli, this volume). The assumption is that learners establish some conscious representation (declarative knowledge) of ‘what went wrong’ and/or ‘the language that should be used to communicate better’. The nature of learners’ declarative knowledge, how it changes over time and the usefulness of different types of practice can be influenced by factors such as the language phenomena (e.g. morphosyntax, vocabulary/figurative language, phonology, pragmatics) and learner characteristics (e.g. age, proficiency, learning style) (R. Ellis, 2002; N. Ellis, 2005). We explore some of the teaching implications in later sections of this chapter.

Roles of working memory and attention

Working memory (WM) is the notion that we have a memory system that both holds information for a short time and simultaneously allows processes to be done with that information. Measurements of learners’ WM capacity are increasingly considered as a proxy for language learning aptitude; that is, a stable, possibly innate, set of characteristics (such as the ability to analyse patterns in an unknown language or recall streams of sound) which may facilitate language learning (see also MacIntyre, Gergersen and Clément, this volume). Cognitive psychologists have proposed various components of WM, each fulfilling different functions (see Wen et al., 2015, for research into WM and SLA).

How does WM serve language learning during the processing of new language? It is thought that it helps learners to retain information about the sounds or visual forms of language whilst it is being assimilated into comprehension. A processing (‘executive control’) component allows learners to connect temporarily stored information with previously stored information. Language examples include linking to stored concepts such as ‘pastness’ or ‘plurality’ or co-indexing one part of the input with another (e.g. -s verb inflection with a third person singular subject). WM is also believed to control where learners direct their perceptual attention, influencing what is temporarily stored or rehearsed. Learners with higher WM capacity may be more likely to notice features in the input, as they have more attentional resources to simultaneously extract meaning and attend to form (Sagarra, 2008; Révész, 2012). Some cognitive models of WM
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include both a conscious dimension where learners are aware of controlling their attention and an automatic dimension where learners are unaware of how their attentional resources are being controlled (Cowan, 2011). WM capacity may be most beneficial when some level of awareness about the language is required, but it may have less of a role where learning or processing is largely implicit (Roehr, 2008; Roberts, 2012; Williams, 2012).

The notion of WM could be considered in pedagogy in several ways. Instruction can be designed to place lower demands on the functions of WM (Gathercole and Alloway, 2008). For example, because WM effects may be mediated by factors such as topic familiarity (Leeser, 2007), providing thematically linked content or task-based sequences may enhance students’ opportunities to make connections between form and meaning. Activities can manipulate where and when attention is directed, so that low proficiency learners, for example, are not expected to both comprehend an utterance and notice key new grammar features simultaneously (VanPatten, 2004; Sagarra, 2008; Marsden, Altmann, and St. Claire, 2013). Measures of WM may predict which learners may be more likely to learn languages faster or to a higher level under different conditions. Finally, although WM has largely been considered as a relatively fixed trait that increases with maturity and reaches a stable capacity in early adolescence, there is increasing interest in whether some components can be improved with training (Holmes et al., 2009; Klingberg, 2010). If this proves to be so, teachers may consider practice tasks to help students become more effective learners.

**Characteristics of the input influencing learning**

A central question in SLA is why some features of language are more difficult to learn than others. To explain this, cognitive perspectives assign a large role to the characteristics of the input itself, i.e. the frequency, saliency, distribution and redundancy of language features. How frequently a feature is encountered is thought to determine fairly reliably how easily something is learnt, particularly the lexicon, though findings vary on the optimum number of exposures for learning a particular vocabulary item (Edwards and Collins, 2013). Critically, however, the relationship between frequency and learning morphosyntax is not linear. For example, highly frequent items such as *a/the* and third person *-s* (Bybee and Hopper, 2001) can be learnt relatively late, and native-like mastery of usage is not reliable even amongst proficient L2 speakers. Saliency is how prominent the feature is, whether it is at the start of a sentence, stressed, multi-syllabic or bounded to a word (e.g. *-s*), and may influence how likely particular learners’ attention will be drawn to it. Similarly, however, saliency cannot fully account for why some aspects of language are more quickly learnt than others. For example, a word final *-s* has several functions – indicating plurality, third person present singular, possessive, contracted be auxiliary. All these functions are not learned simultaneously despite the form being physically the same. Other characteristics of the input must be at play.

One such characteristic is how the form is distributed in the input and the effect this has on how communicatively useful (or, conversely, how redundant) it is. Features of language tend to co-occur and convey the same or similar functions. For example, lexical items such as temporal adverbs are often associated with conveying tense (e.g. *last year, next year*) or aspect (e.g. *whilst, every day*), and so are frequently distributed with morphosyntax such a *-ed, am + ing, was + ing*. If one of the co-occurring features is more salient (i.e. *last year versus – ed*) and/or has an equivalent in the L1, then this may reduce the likelihood that the learner attends to the other feature. Assuming attention is helpful for learning, the less attended features may not be learnt easily or quickly (Sagara and Ellis, 2013). Forms may also occur in constrained contexts that do not provide key cues for learning. For example, *his/her* in classroom speech occurs mainly with inanimate objects (e.g. *her sweater*) rather than with gendered objects that demonstrate a key
characteristic of the forms in English: possessives agree with the possessor, not the object (e.g. She called her father) (Collins et al., 2009).

**Making form-meaning connections**

Directing attention to the function and distribution of features in the input in age- and learner-appropriate ways offers a promising way of helping classroom learners establish connections between morphosyntax and its meanings and functions. Making features of the input essential to task completion (Loschky and Bley-Vroman, 1993) addresses the problems of low salience and redundancy discussed above. A simple example is providing the -ed inflection in a sentence without a temporal adverb and asking learners to decide whether the event occurred in the past or is ongoing, and juxtaposing this with sentences in which the -ed is absent (Marsden and Chen, 2011). Giving visual response options (a picture of a completed action versus an ongoing action) connects features to a ‘meaning’ or ‘concept’; providing aural exemplars further promotes the perception of the relevant phonemes. Note the difference between this and the more typical textbook practice activities, such as gap fills, which ask learners first to attend to the very cue that they over-rely on (e.g. yesterday) and then to match a form (e.g. Yesterday, I ___ the TV (watch)).

**Key areas of dispute and debate**

The debates over different cognitive accounts of L2 learning have often involved dichotomies (e.g. deductive versus inductive or intentional versus incidental learning). However, as the field has matured, there is less emphasis on showing the superior explanatory power of one side of a dichotomy and more on determining the relative contribution of key factors. In this section, we highlight three areas of debate: one related to language knowledge and two to language use.

**Influence of previously learned languages**

Although the phenomenon of L1 knowledge influencing L2 learning is in itself relatively uncontroversial, there is debate concerning the magnitude and nature of the effect, including its possibly diminished role among multilingual speakers. Current research is focused on understanding how prior language learning experiences may block or facilitate learners’ attention to particular features of the L2 (Sagarra and Ellis, 2013) or influence how learners use relevant cues (such as word order or verb inflections) for interpreting subjects and objects (MacWhinney, 2012).

A fundamental question is how much of L2 learning can be explained by developmental processes common to learners from different L1 backgrounds and how much can be attributed to the particular L1. Some researchers argue that regardless of the L1, SLA relies heavily on using lexical items and/or semantic-pragmatic ‘guessing’ skills to get meaning (Clashen and Felser, 2006; Bley-Vroman, 2009; VanPatten, 2012). In addition, processes such as simplification and overgeneralisation can result in developmental trajectories that are similar across learners and across L2s (and can also resemble L1 development). An oft-cited example is learners’ use of pre-verbal negation (I no like). This would not be surprising among Spanish learners, who have such a structure in their L1, but it has also been observed among learners whose L1 does not, including Swedish (Hyltenstam, 1977) and German (summarised in R. Ellis, 2008). Similar patterns within L2s and across different L1s have been observed for other features, including tense-aspect and word order (Ortega, 2009). L1 knowledge can, however, affect the rate at which learners progress to more advanced use of a complex feature. Spanish speakers may take longer to go beyond the pre-verbal negation stage in English than speakers whose L1s have post-verbal...
negation (Schumann, 1979). French speakers’ acquisition of the inversion stages of questions in English may be slowed down by their reluctance to apply subject-auxiliary inversion to questions involving noun subjects (Is the dog hungry?), which is disallowed in French (Spada and Lightbown, 1999). They have also been shown to take longer to master the simple past than Japanese learners, needing to sort out the differences between the English present perfect and the French passé composé (similar in form but only partially similar in meaning) (Collins, 2004). L1 influence does not appear to result in substantial alterations to the route of development, but there is increased interest in documenting deviations from observed patterns across different L1 groups (e.g. Luk and Shirai, 2009).

An additional issue for teachers to bear in mind is that many students in L2 classrooms arrive already knowing two or more languages. There is considerable discussion of the factors that determine how the languages of multilingual speakers may influence the learning of a new language (either positively or negatively), including recency of use/learning, proficiency and degree of similarity between the target language and a known language (typology) (Jarvis and Pavlenko, 2008; Falk and Bardel, 2010). Indeed, the L1 may be less influential than other known L2s, as learners operate in a ‘foreign language’ mode, activating other L2s while suppressing knowledge of their L1 (De Angelis, 2007).

**Benefits of comprehension and production practice**

While all accounts of L2 learning recognise the importance of exposure to language (input) for acquisition, there is much less consensus on the role of using the language (output). A number of teaching approaches during the 1970s and ’80s prioritised comprehension over production, on the assumption that input is a key factor driving acquisition. There is classroom research supporting this view, especially for early stages of learning (e.g. Lightbown et al., 2002). There are also techniques, such as the structured input described earlier, that provide practice at interpreting language features. VanPatten (2012) has argued that input processing practice is necessary for establishing new knowledge of particular features and should therefore precede production practice.

This secondary and delayed role for output in acquisition has also been challenged. One argument is that production helps learners test hypotheses about the target language and to notice and repair gaps in their knowledge (Izumi, 2002; Toth, 2006), especially when teachers can set up conditions that successfully encourage learners to attend to the most appropriate language forms for conveying intended meanings (Swain’s (1995) ‘pushed output’). A related argument, deriving from skill acquisition theory, is the importance of matching practice type (e.g. speaking practice) to targeted skill (e.g. oral production): according to this view, comprehension practice alone does not enhance production, especially beyond the initial stages of learning (de Jong, 2005; DeKeyser, 2007b).

What does the research contribute to the debate? In a meta-analysis of 35 studies, Shintani et al. (2013) found that both comprehension and output-based practice were effective at developing both receptive and productive knowledge, underscoring an observation DeKeyser (2007b: 294) made that speaks directly to teachers: “The question is not so much whether comprehension and production skills both have to be practiced but what constitutes good comprehension practice and good production practice, and how there can be cross-fertilization between the two.”

**Contributions of formulaic language and exemplars to learning**

Instruction usually includes a number of phrases which are practised and used as fixed, routinised formulae. These can be defined as “multimorphemic sequences which go well beyond learners’
grammatical competence” (Myles, 2004: 139), ranging from *How are you?* and *Put it down* to the idiomatic *by and large*. There is general consensus that such formulae aid fluency by allowing fast access to language which does not require effortful online computation and that they enable L2 speakers to participate in conversational exchanges, thereby creating opportunities for interaction, input, and practice. However, beyond these benefits, there is debate over the role that formulae play in actual learning.

One idea is that interlanguage development depends on first memorising and then unpacking and analyzing formulae. Myles et al. (1999) found that learners who had a good store of formulae in L2 French (e.g. *comment te t'appelles? what's your name?*) tended to go on to use related syntax (e.g. interrogatives) creatively in target-like ways. Myles (2004) proposes that learners move from an initial lexical-functional representation of whole formulae to establish syntactic representations of the component parts of these multi-word units and, critically, of the verb. Other researchers ascribe a more limited role, emphasising the preponderance of such formulae which remain unanalysed, unless the communicative need arises (Wray, 2002). An example could be using *What's your name?* when in fact *What's HIS name?* is required. Wray argues that memorised chunks can reduce processing load but they can in turn reduce expressive flexibility and accuracy. The challenge for the classroom emerging from both these lines of work is determining how to help learners store and break down some of these chunks at appropriate moments in their development.

Another perspective is that highly frequent constructions (e.g. *She put the X on the Y*) serve as prototypes – representative of a verb argument structure (e.g. *S V O PREP O*) that learners use as a frame, or template, into which other lexical items can slot (N. Ellis et al., 2014; see also Robinson and Ellis, 2008). This view has focused on documenting how prototypicality operates both in input and learners’ output with particular lexical items in specific constructions. Research exploring the role of type frequency (a reliable characteristic of prototypicality) on classroom learning suggests that, in the initial stages, it may facilitate the detection of some patterns such as word order in questions (McDonough and Kim, 2009) but be less helpful with complex constructions such as English ditransitives (e.g. *Sarah gave Simon her old computer*) (Year and Gordon, 2009). For the latter, more explicit guidance may be required. Identifying appropriate prototypical structures is complex, requiring corpus-based and computer simulations, but this research could provide guidance for materials writers in creating practice opportunities that include modifications to authentic input that are biased towards such structures. This would complement the unmodified language samples that teachers often provide for students, which inevitably contain a wider range of lexical and functional distributions of particular constructions.

**Implications and challenges for ELT practice and practitioners**

In addition to the implications for language teaching already identified, we elaborate here upon two broader aspects of pedagogy as informed by cognitive perspectives.

**Time on task**

Parodying advertisements for language learning success in 10 days, Leveen (2014) titled a blog “Learn French in 10 years”, referring to the oft-cited amount of time needed to acquire expertise (Chase and Simon, 1973), sometimes referred to as the 10,000-hour rule (Ericsson et al., 1993). People’s expectations for L2 learning are frequently unrealistic, fuelled by academic and employment goals. Learning mechanisms such as memory, attention, the automatisation of knowledge and the use and breakdown of formulae take much more time than the few hundred
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hours of classroom instruction typically experienced. One crucial challenge is helping students learn how to learn, so that they can engage in effective practice on their own; another is setting attainable goals for the time available. For example, recognising the emergence and not just the mastery of new knowledge as an indicator of progress (Pieninnem, 1998; Håkansson, 2013) (e.g. initial use of present perfect in some contexts versus accurate use in all contexts) has implications for language assessment. It entails tolerance of typical interlanguage behaviour such as backsliding to earlier, less accurate language, and indeed of errors in general (Ågren et al., 2012).

**Reflecting on language and how it works**

One way to promote autonomous learning is to train students to pay attention to language and its patterns through inductive learning activities. Students may be given samples of language containing a target feature and then guided to articulate a pattern or explanation for how it is used. Inductive approaches have been shown to be effective for learning some aspects of language (e.g. Rosa and O’Neill, 1999; Haight et al., 2007), including practice in comprehending structured input in which learners induce a rule from the feedback given (Sanz and Morgan-Short, 2004; Marsden and Chen, 2011). Some textbooks do include an inductive component embedded into meaning-based activities, but the provision of a rule/pattern followed by practice (deductive approach) tends to be more common.

Raising language awareness through reflection on previously learned languages can also enhance learning (Horst et al., 2010; Hall and Cook, 2012; see also Kerr, this volume), helping students identify useful similarities and confront problems that derive from the influence of known languages. The use of cross-linguistic comparisons as a learning tool is not common in published teaching materials; however, recent initiatives include the Downes’ Discovering Language project (Barton et al., 2009; Downes, 2014) and Oxford University Press’ *Clockwise* coursebook series, in which students periodically consider how a feature of English is rendered in their L1.

**Future directions**

A number of under-researched cognitive aspects of language learning have been mentioned above. We propose three additional directions that would further inform decisions on what to teach, when, and how.

**Linking learning conditions to subsequent language use**

The relationship between the conditions under which something is learned and the subsequent use of that knowledge in actual performance is highly relevant to teaching. The concept of *transfer appropriate processing* (TAP), for example, asserts that it is easier to remember something that has been learned if the new situation for use resembles the learning situation (Franks et al., 2000). This suggests benefits for matching instructional learning conditions to students’ goals for language use (Segalowitz and Lightbown, 1999). Thus, if a student aims to use the L2 to interact outside the classroom, TAP predicts advantages for drawing students’ attention to language forms during actual communicative practice rather than in separate grammar lessons (Spada and Lightbown, 2008). A related proposal is that the retrieval and transfer of knowledge to new situations may be more effective if the initial learning phase has some built-in challenges that require additional effort. Bjork (1994) has called these ‘desirable difficulties’. They include varying the way the learning material is presented and practiced (iteration); creating ‘contextual interference’ such as unpredictability during the learning phase; and using testing phases as learning events for
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consolidating knowledge and identifying future needs. Lightbown (2008) and Larsen-Freeman (2013) propose applications of these ideas to L2 learning that merit pedagogical and research consideration.

The role of repetitive practice

Performing the same task more than once can enhance L2 learning, resulting, for example, in the use of more complex forms (Van den Branden, 2007). Fluent, automatic use of language is the result of considerable practice, and repetition clearly plays a role in the process. However, there is surprisingly little classroom research on the types of repetitive practice that may be beneficial to students for learning different aspects of language. There is little theoretical support for the mindless repetition of forms provided by mechanical, structural drills, but some scholars have made the case for ‘mindful repetition’ (N. Ellis, 2002: 177), which can reinforce the link between form and meaning (DeKeyser, 1998). Examples include communicative drills requiring genuine rather than rote responses and the contextualised pattern practice provided by some songs and poems. However, as DeKeyser noted, there are aspects of phonological and morphosyntactic form that are not tied to meaning, the learning of which may be enhanced by mechanical practice. Consider, for example, stress patterns in multi-syllabic words, reductions in complex conditional forms (e.g. If I’d known, I wouldn’t ‘ve gone) and possibly also form-related challenges stemming from L1 influence (e.g. the erroneous use of resumptive pronouns in relative clauses by Arabic learners of English; the under-use of inversion with noun subjects in English questions for French learners).

Manipulating the input

Studies of classroom input to students have demonstrated that some key features of language (such as the simple past) are infrequent and occur in contexts in which it is difficult to notice their form and function (Collins et al., 2009). Skewing the input may help learners to establish useful templates for learning particular morphosyntactic constructions, but this has yet to be established in rigorous classroom studies. The effectiveness of priming learners’ use or perception of particular forms through careful activity design (e.g. giving an interlocutor a script enriched with prepositional datives or advanced question structures) is also promising (Trofimovich and McDonough, 2011), but this research has largely been carried out in laboratory conditions. The role of priming for learning novel morphosyntax and, critically, the kind of knowledge that results, also remain open questions (Marsden, Williams, and Liu, 2013); priming mechanisms may be more effective at consolidating existing knowledge (N. Ellis, 2002).

Concluding comments

In this chapter, we have highlighted insights from research on the cognitive dimensions of language learning that can inform teachers’ practices and expectations. Not all phenomena of interest have been examined in the real world complexity of classrooms, and even those that have are obviously constrained in generalisability by the particular contexts in which they were investigated. One promising avenue for enhancing the generalisability of research and increasing its accessibility for teachers, however, is the digital repository IRIS (Instruments for Research into Second Languages; www.iris-database.org; Marsden et al., 2015). IRIS makes the materials used to collect data for published research, including areas covered by this chapter, freely available. We have also identified aspects of learning that are currently not well understood, as this information
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is equally important when assessing teaching materials, evaluating student progress and interpreting one’s own experiences.

Discussion questions

• Of the different concepts and perspectives on language learning that have been reviewed in this chapter, are there any that are particularly relevant for explaining your own classroom learning or teaching experiences? Provide concrete examples to illustrate the links between theory and experience that you have in mind.
• Consult an ELT course book/series. Categorise the presentation and practice of an aspect of language (grammar, pronunciation, vocabulary, pragmatics etc.) using a set of relevant descriptors from this chapter (e.g. comprehension/production; procedurisation/automatisation; inductive/deductive etc.). How does this categorisation inform the way you would use, adapt or supplement the material?
• Imagine you must identify priority research areas for improving teaching and learning in an ELT context that you are familiar with. Identify some under-researched and/or disputed issues highlighted in this chapter that merit investigation in your chosen context, explaining how these new studies could potentially inform pedagogy and enhance learning.

Related topics

Classroom talk, interaction and collaboration; Dealing with the demands of language testing and assessment; Error, corrective feedback, and repair; Individual differences; Language awareness; Teaching language skills.

Further reading

DeKeyser, R. (ed.) (2007) Practice in a second language: Perspectives from applied linguistics and cognitive psychology. New York: Cambridge. (This volume provides chapter overviews of cognitive dimensions of learning and relates these factors to pedagogy across different classroom settings.)
Ellis, R. and Shintani, N. (2014) Exploring language pedagogy through second language acquisition research. Abingdon: Routledge. (Newcomers to the field may find the practice to theory organisation of this introductory textbook refreshing.)

Notes

1 Defining these terms and measuring these constructs continues to attract debate (Rebuschat, 2013).
2 These are sometimes also referred to as ‘explicit’ and ‘implicit’ instruction but should not be confused with the learning itself. Instructional intentions, learning processes, and outcomes could each have different (and independent) degrees of explicitness.
3 Inductive learning involves the extraction of patterns or rules from examples (similar to discovery learning); deductive learning involves the application of a given rule to examples, thereby engaging learners in practice to consolidate knowledge of the rule.
4 Whether L2 learning is driven by general cognitive mechanisms or the result of language-dedicated functions of the brain is also debated. The latter ‘universal grammar’ (UG) approach is more focused on language knowledge than on the processes that result in the knowledge, so is not treated further here. (For examples of how UG insights may inform L2 teaching, see Whong et al., 2013).
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