

MALL in the wild: Learners' designs for scaffolding vocabulary learning trajectories

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Abstract. This study aims to inform the design of mobile apps for vocabulary learning. Learning vocabulary involves developing, connecting, and sustaining various types of knowledge and skills. Learners do not typically acquire these all at once, but rather over the course of distinct episodes of activity. Yet, little is known about learning experience designs that help learners connect these episodes, which often make use of different socio-technical resources, and are distributed over time, and across settings. We use participatory design to explore how mobile apps might help learners enact episodes of learning activity and connect these in effective vocabulary learning trajectories. In order to stimulate design thinking, six adult language learners used an app for self-directed vocabulary learning in authentic conditions for from six weeks to six months. Then, in a post-study workshop, participants developed new designs for scaffolding self-directed vocabulary learning trajectories, grounded in reflection on their own experiences.

Keywords: vocabulary, MALL, learning design, seamless learning, self-directed learning.

1. Introduction

This study aims to inform the design of apps for vocabulary learning. Learning vocabulary involves developing, connecting and sustaining various kinds of knowledge (e.g. knowledge about meanings, form, usage, collocations, etc.) and

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productive and receptive skills (Nation, 2001). Learners typically acquire this knowledge and these skills by engaging in various activities distributed over distinct episodes.

Yet, despite much interest in promoting distributed practice, particularly through flashcard type apps, little is known about how designs for learning help learners to enact and connect a wider variety of activities that typically, and perhaps critically for durability and transfer, are distributed over time and across varied physical and social settings. Hence, the question we aim to address through design research is: How might mobile apps help learners to enact and connect incidental and deliberate learning activities in sustained and effective vocabulary learning trajectories?

We use the concept of trajectories to focus designers' attention on: 1) the challenges of designing engaging learning experiences that “draw together multiple technologies, interfaces, physical artifacts and people into complex structures that extend across space and time” (Benford, Giannachi, Koleva, & Rodden, 2009, p. 709); and 2) theory-based conjecture about “how learning in a specific context and for a specific concept will develop over time under the influence of instruction” (Reimann, 2013, p. 45). That is to say, designs should act on what is known about how people learn at micro and macro timescales and attend to the complexities of delivering engaging coherent experiences, employing varied activities and resources, across episodes and settings.

Technology can facilitate many activities that contribute to vocabulary learning. For example:

- Tasks and vocabulary can be made more meaningful by adapting to individual learners' interests, competences, current activity, and physical and social settings.
- Exposure can be increased by embedding target language in learners' day-to-day L1 interactions.
- Noticing and processing can be encouraged, for example, through automated highlighting, glossing, and inserting questions about target vocabulary in texts.
- Spaced review, look-up, retrieval, testing, generative use, etc. can be prompted through SMS/messaging, system notifications, and flashcards.

- Games and social media can provide motivation and opportunities for practice.
- Formation of rich associations can be promoted through reception and production of multimedia.
- Learners can look up vocabulary, capture, share, and access help, anywhere, anytime.

For examples of the activities above, see [Underwood \(2014\)](#).

Because mobile devices are very often to hand, they provide opportunities to help learners connect such activities across episodes and settings. Yet, most apps do not make it easy to integrate activities. Designs also often fail to exploit connections between life, “what learners happen to come across”, and learning ([Kukulska-Hulme, 2013](#), p. 2). There are only a few studies that describe designs for seamless vocabulary learning ([Wong, 2013](#)) and features that may help learners connect incidental and deliberate learning activities ([Gaved et al., 2013](#)). However, individuals interpret designs in their own ways and often do not exploit opportunities as designers envisage ([Stockwell & Hubbard, 2013](#)).

How can we accommodate diverse interpretations of learning designs? At design time, we address this by involving learners in design and by using a learner-centred model of context ([Luckin, 2010](#)). This model suggests learners' enact learning trajectories under the influence of their changing motivations and access to knowledge, skills, social, technological, and physical resources. Designs and collaborators can influence learners' motivations and change access to resources. At use time, we aim to support meta-design ([Fischer, 2013](#)) by enabling learners to reconfigure designs to support their own goals and make use of their preferred resources. Previously, we developed miLexicon, an app that aims to prompt learners to collect, investigate, and share observations of new vocabulary and provides easy access to a learner's preferred social and technology resources ([Underwood, Luckin, & Winters, 2012](#)).

2. Method

We used miLexicon as a technology probe ([Balaam, 2013](#)) in order to give participants a vocabulary of authentic experiences to draw on in a subsequent design workshop (see [Figure 1](#)). This paper focuses on the design workshop outcomes. However, we briefly summarise participants' prior use of miLexicon.

Figure 1. miLexicon Android app/technology probe



Six adult language learners, with expertise in technology-enhanced learning, used miLexicon to support self-directed vocabulary learning on borrowed phones. Usage varied greatly (see Table 1), likely reflecting: competence (e.g. CEFR B2, C2); exposure (e.g. living in target language culture, or not); motivations (e.g. for work, as a hobby); changing circumstances (e.g. on holiday, working); and whether the phone was used with a personal SIM card. The length of the study gave ample opportunity to initiate and pursue (or not) a number of genuinely motivated vocabulary learning trajectories. However, log and interview data suggest that although most participants occasionally reviewed the words they added, they rarely used miLexicon to help develop knowledge beyond initial capture and inquiries into meaning.

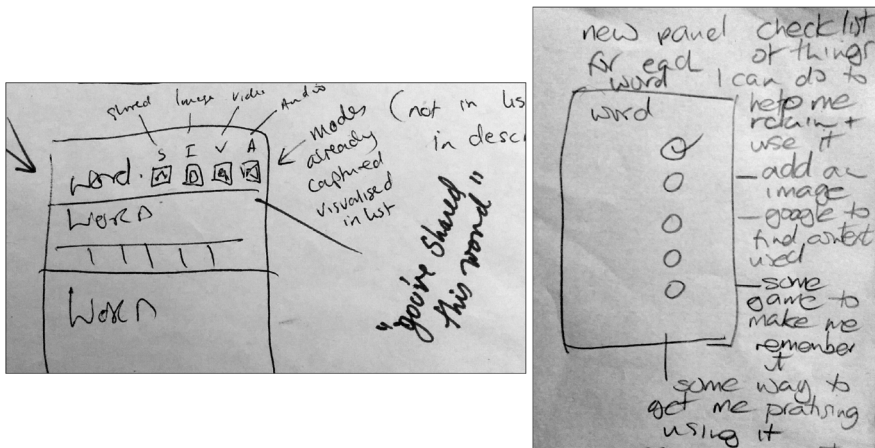
Table 1. Overview of participants' usage of miLexicon prior to design workshop

Participant ID	SIM card	Approx. target language/s competence	Located in target language culture	Weeks with phone (approx.)	Days miLexicon used (approx.)	Number of items added	Number of items added per day used (approx.)
A	Own	A2 C1	No For 1 week	9	19	83	4
B	Own	B2	For 3 weeks	16	37	82	2
C	Lent	C2	Yes	15	15	19	1
D	Lent	C2	Yes	6	9	9	1
E	Own	C1	Yes	20	135	1520	11
F	Lent	C1	Yes	6	12	53	4

In the design workshop, participants shared their experiences and then worked in pairs or individually to sketch ideas. Facilitators prompted for explanation of sketches. Audio recordings and sketches (see examples in Figure 2) were analysed to identify design ideas. These were labelled in terms of activities supported and then sorted into categories.

3. Designs and discussion

Figure 2. Sketches of designs for: 1) suggesting things to do with vocabulary items; 2) helping learners see what they have done, or not done, with any item; and 3) prioritising items to work on



Three categories encompass design ideas generated at the workshop:

- Ways to help learners capture new language easily (e.g. for speech, always on audio recording; for text, OCR capture and contextual 'send to vocab app' menu items).
- Ways to help learners manage learning (e.g. word frequency information; visualisation of what has been done; enhanced filtering, search, and prioritisation of vocabulary lists).
- Ways to help learners learn (e.g. prompts with suggested activities, and for spaced practice; automated adaptive testing and hints; motivators through gamification and social interaction, for example, shared word challenges and word collection leaderboards).

There was also a persistent theme; the occasional need to push learners to act, in particular to follow up initiated vocabulary-learning trajectories. One suggestion was to use temporally and spatially distributed reminders. However, such persuasive messaging should be: 1) adaptive - nudging learners to act only when behaviour is not meeting objectives; and 2) adaptable - allowing learners to easily set objectives and the ways they are nudged to match their changing goals, preferences, and circumstances.

4. Conclusions

Evidently, initial design ideas generated in a workshop are not complete. Rather, we use them as stimuli for further design work. One idea in particular, coupled with the concept of designing for end-user re-design (Fischer, 2013), offers an interesting way to help learners design and enact their own vocabulary learning trajectories:

- Provide a checklist of activities that can help learners practice and develop vocabulary knowledge.
- Allow learners and teachers to customise and share this list and the activities.
- For each vocabulary item track and visualise which activities have been completed.
- Use adaptive spaced prompting to push learners to follow up initiated vocabulary-learning trajectories and suggest activities.

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