

LEARNING LANGUAGES THROUGH AUGMENTED REALITY

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What if your glasses could teach you a foreign language simply by looking at the objects around you? Imagine glancing at an everyday object and instantly seeing its foreign name floating above it, along with a little memory trick to make it stick. This is precisely what ARText, the system explored in this article, makes possible.

To achieve this, the authors have built on a well-established memory technique: the keyword method. The principle is simple but powerful. To learn a foreign word, you find a word in your own language that sounds similar, and then you create a vivid mental image connecting the two. The Japanese word for 'postcard', for instance, is 'hagaki', which sounds like 'hug a key'. Picture a hand hugging a key on a postcard, and the word becomes far harder to forget. This works because the brain processes verbal and visual information through separate, complementary channels: engaging both at once strengthens retention.

Learning vocabulary in context, by labelling real objects in one's environment for example, has also been shown to improve retention and motivation. Augmented Reality (AR) is a natural fit for this: by overlaying digital content onto physical objects, it anchors vocabulary to the real world, making it more meaningful and memorable than learning from a screen. ARText combines both approaches, using a headset to annotate real-world objects with their foreign-language names, keywords, and AI-generated images of the associations.

This last element is new. Until recently, externalising a personalised mental image, turning it into an actual picture, was practically impossible. AI image generators like DALL-E from OpenAI have changed that. A user can now describe their own association in words, generate four image options in real time, and select the one that best matches their mental picture. This personalised mode is contrasted in the study with a predefined mode, in which expert-designed associations and images are provided directly, with no

effort required from the learner. The central question is straightforward: which works better?

The answer is surprising. Despite everything research suggests about the benefits of personalisation, the predefined mode wins, across every single measure. Participants recalled significantly more words immediately after the session, and a week later the gap remained just as wide. The predefined condition was also three times faster and required significantly less mental effort. A majority of participants explicitly preferred it.

Why? The authors point to cognitive overload. Inventing a meaningful association from scratch, generating images, and selecting the best one demands considerable mental energy, energy that is then unavailable for actually learning the word. The predefined associations, by contrast, require just enough engagement to be effective, without exhausting the learner in the process.

This does not mean personalisation should be abandoned. The authors recommend a progressive approach: start with expert-designed associations to build confidence and efficiency, then gradually introduce personalisation as learners become more comfortable with the system. And the potential applications go well beyond language learning: the same method could, for instance, be used to learn anatomical terms in a real clinical environment.

Technology and artificial intelligence are not just tools for productivity. As this study shows, they can also support learning in concrete and practical ways. By combining augmented reality, memory techniques, and AI-generated images, systems like ARText may help transform everyday environments into interactive learning spaces.