

Understanding participation in CALL vocabulary tasks through complexity theory

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Abstract. This study explored participation by Japanese university English as a Foreign Language (EFL) learners in Computer Assisted Language Learning/Mobile Assisted Language Learning (CALL/MALL) vocabulary tasks through the lens of Complexity Theory (CT). CT, which studies how complex systems are influenced by changes in interconnected variables (Larsen-Freeman & Cameron, 2008), has been advocated as an approach that aligns well with Second Language Acquisition (SLA) and CALL research (Godwin-Jones, 2019). In this study, CT was applied to action research involving learners using smartphones to create game-based vocabulary quizzes. It aimed to understand how the context, personal attributes, and in-class interactions affected participation and learning outcomes. The results show the variability and nonlinearity of learners' language development, the importance of initial conditions, and the vital role of teacher input. It also demonstrated that there are various ways to successfully complete a task, so viewing tasks as dynamic systems may be a fruitful approach.

Keywords: CALL, MALL complexity theory, EFL.

1. Introduction

This paper considers participation in technology-enhanced vocabulary tasks through the lens of CT. The array of technology-enabled opportunities for informal language development demands new approaches to understanding participation in today's learning environments. As Larsen-Freeman (2018) notes, just as

“learners will be more able to pursue differentiated language goals [...] language teachers and researchers will also need to [...] seek to understand

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the way in which our increasingly technology-supported, participatory, multilingual, and global culture is redefining how, when, and why languages are learned and used” (pp. 65-66).

How should this understanding best be sought? Several researchers have highlighted the shortcomings of quantitative research designs for this task (e.g. Barab, 2005; Becker & Sturm, 2018; Levy & Moore, 2018). Alternatively, CT has been proposed as an approach that aligns well with SLA and CALL research (Godwin-Jones, 2019). CT recognises the open dynamism of systems and nonlinearity of development. Applied to CALL, it can reveal much about learners, from divergent *initial conditions*, the details of the starting state of a system, to the moment-by-moment behaviours that affect their variable progress. CT can also uncover the dynamic interactions between learners, teachers, technologies, and environments that influence participation and learning trajectories.

This study examined participation by Japanese university EFL learners in CALL/MALL vocabulary tasks. It explored the creation by learners of two game-based vocabulary quizzes on the Kahoot! app. It was hoped that the processes involved in writing the quiz questions and creating the quizzes would help participants learn the selected vocabulary items.

A CT approach was adopted to help understand how the context, learners’ personal attributes, autonomous technology use, and in-class interactions influenced individual participation and task outcomes.

2. Method

Participants were Japanese L1 users, aged 18-19 years – Test of English for International Communication (TOEIC) average 357; Common European Framework of Reference (CEFR) A2 –, taking a first-year English writing course at a Japanese university. Mixed methods, including repeated vocabulary tests to measure longitudinal change, observation, and a questionnaire were used to gain a better understanding of participation in the tasks and learning outcomes. As discussed, the tasks involved learners working in small groups to create two Kahoot! quizzes for selected vocabulary items.

Learners completed a 35-item pre-test, post-test, and delayed post-test in class over 16 weeks. The identical items were used, being reordered each time. The test was in multiple-choice format with each question providing the item, an exemplar

sentence, and four answer choices for the closest meaning of the item, as in the following example:

- DAMP: The ground was **damp** after the rain: (1) hard; (2) dry; (3) wet, or (4) sand.

The least well-known items from the pre-test were chosen for the learner-created quiz tasks. Each task had three steps:

- write a set of multiple-choice gap fill questions for the items;
- use the questions to create a Kahoot! Quiz; and
- share the completed Kahoot! quiz with the teacher.

Close observation of learners while they were creating the quizzes revealed how they performed the task and how they interacted with each other, the teacher, and the technology. In groups, the learners collaboratively created and shared two short quizzes on the Kahoot! app using their smartphones. After this, the vocabulary post-test and delayed post-test were done. A questionnaire was then conducted to collect data about the learners' initial conditions and their experiences creating the quizzes.

3. Results and discussion

3.1. Quantitative results

The vocabulary test group mean scores showed a gradual though statistically insignificant increase: 27.33 out of 35 (pre-test), 27.75 (post-test), 30 (delayed post-test). Individual scores also mostly increased, although three learners demonstrated an uneven trajectory, scoring a lower score in the post-test before attaining their highest scores in the delayed post-test – an indicator of the nonlinear nature of development.

There was an improvement from the pre-test to the final test for all items in the learner-created quizzes. Despite this, there was another indication of how language development will stall or regress at different points in time. For example, whereas nine learners chose the incorrect meaning for *aisle* in the pre-test, this improved to one incorrect answer in the post-test, before regressing to five incorrect answers in the delayed post-test four weeks later.

3.2. Observations

Learners spent most time learning the meanings of words and creating sentences for their quizzes. Translation was the first strategy adopted in this process. At the initial question-writing stage, without prompting many learners used their smartphones to access Weblilo, Siri, and other web resources to learn translated word meanings. In CT, this default use of translation can be understood as an *attractor*, a mode of behaviour that a system (i.e. the learner) ‘prefers’. Not all attractors are beneficial to development however, and while translation is an understandable attractor for a learner with limited second language vocabulary, there is a risk that language development could stall if its attraction remains strong. Larsen-Freeman and Cameron (2008, p. 51) use the analogy of a steep-sided well to describe how a system with a very strong attractor may get stuck at the bottom of the well and be unable to ‘escape’ its current state.

Input into the system from the teacher was also influential. The teacher had to assist all groups with various issues including misunderstanding instructions, misuse of words (e.g. learners often used the incorrect word form or misunderstood a word’s meaning), and understanding how to use the Kahoot! site.

Another interesting observation was the varying ways that groups divided the work. Some groups worked collaboratively on one word and question at a time. Other groups divided the words from the outset and wrote the questions individually, before coming together to create the quiz on one person’s smartphone. Some learners also interacted across group boundaries, especially to help each other use Kahoot!. This variability and fluidity illustrates that tasks can be viewed as dynamic systems. Viewing tasks in this way rather than the static view of the task as a frame allows learners more freedom to choose how they will engage with the task and the affordances available to them. This should prove more motivating to learners as well as providing them the opportunity to develop according to their individual initial conditions such as aptitudes, proficiencies, and learning preferences.

3.3. Questionnaire

One part of the questionnaire collected data related to the initial conditions of learners. For example, the average TOEIC score of 357 indicated their proficiency level. Learners stated they studied outside of class no more than 2 hours a day, with eight learners reporting that they studied one hour or less. In addition, only two learners took English lessons outside of university.

The most common language learning activities learners did on their smartphones were reading, listening, vocabulary study, dictionary use, and playing games. While most learners reported using language learning apps, four learners responded that they did not use apps at all. This variability helps explain why some learners appeared more adept than others using their smartphones as a language resource and for creating the Kahoot! quizzes.

Learner responses about the difficulties creating the quizzes also revealed the importance of initial conditions. The two most cited difficulties were related to language proficiency (“I didn’t know the meaning of the words”, and “Writing an example sentence”).

4. Conclusions

Applying CT to understanding learner participation in CALL tasks and learning outcomes revealed useful insights. The interconnected variables of initial conditions; attractors such as translation, and the input of the teacher and web resources, affected learner participation in the tasks. The uneven trajectory in the test results demonstrated the nonlinearity of language development and the need to research it over time. Given the options that technology is making available for language development within and beyond the classroom, it appears crucial to use approaches to researching and teaching that account for and engage with this reality. CT should prove extremely useful for this task.

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