

A Diagnostic Approach to Improving the Pedagogical Effectiveness of Tutorial CALL Materials

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Abstract. Teachers and students alike would benefit from self-access materials to free up lesson time for activities requiring live face-to-face interaction, but such materials must first undergo thorough testing and evaluation of their pedagogical effectiveness. The present study is part of an ongoing project to develop a series of self-paced, interactive online modules on the use of grammatical voice. Previous acceptability judgment data showed these materials to be effective for improving performance on sentences with animate subjects but largely ineffective or even detrimental in cases with inanimate ones. Thus, 10 returning participants were individually recorded re-attempting the same acceptability judgments, this time stimulated by structured interview questions to probe decision-making processes and thereby permit step-by-step analysis of conceptual understanding. The findings included common failure to grasp the role of personification in permitting false agentive subjects in English, conflation of the use of inanimate subjects with passive voice, and unawareness of relationships between grammatical case-marking and thematic relations.

Keywords: pedagogy-driven design, language pedagogy, content-based instruction.

1. Introduction

Attainment of the advanced language proficiency necessary for academic and professional use generally requires many more hours of study than most programs can provide in the classroom (Lyddon, 2011). Exacerbating this problem are seemingly insurmountable difficulties such as the teaching of grammatical voice (Hinkel, 2002; Master, 1991; Owen, 1993). On this latter issue, Johnson and Lyddon (in preparation) have found promising signs of success with a concept-based approach to instruction, as advocated by Negueruela (2003). However, as the implementation of their face-to-face lessons takes three entire 90-minute class periods, Lyddon (2012a, 2012b) has experimented with an online alternative, only to find mixed results in learner outcomes,

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including inferior performance on acceptability judgments involving sentences with inanimate subjects and active verbs. Thus, the current study represents a post-use evaluation as part of a pedagogy-based approach to tutorial CALL development (Colpaert, 2006) in order to not only explain the previous findings but to inform the next iteration of the instructional design.

2. Method

2.1. Procedures

The data were collected in a two-hour, one-on-one session with each of 10 participants over a period of four weeks in the spring of 2012 at a computer science university in northern Japan. The 10 participants were a representative sample of the 31 who had participated in the immediately prior pilot study (Lyddon, 2012a).

Although each data collection session was conducted face to face, with the exception of paper-based mark sheets, all interactions between the participants and the researcher were mediated by a shared laptop computer and recorded using Camtasia Studio® screen capture software. Each session began with a self-paced, 10-frame Adobe® Director® movie giving a summary review of the three learning modules from the pilot study (i.e., on agency, animacy, and transitivity). Each participant then took a self-paced version of the otherwise identical pre-posttest acceptability judgment task (i.e., five randomized permutations of a single sentence for each of six regular verbs: analyze, damage, design, discuss, occur, and study). The researcher then revisited each item with the participant, asking whether the sentence appeared active or passive and recording the answer without comment.

Next, the researcher began a bilingual interview focused on a slide presentation featuring a systematic rearrangement of the same items as for the acceptability judgment task. First, the items were grouped alphabetically by verb, with the exception of ‘occur’, the only pure intransitive, which came last. Within each group, they were then ordered according to apparent conceptual difficulty: animate subjects with active transitive verbs (AAT), animate subjects with passive transitive verbs (APT), inanimate subjects with active intransitive verbs (IAI), inanimate subjects with passive verbs (IP), inanimate subjects with active transitive verbs (IAT).

The interview protocol proceeded with the researcher first showing the participant an isolated verb in its dictionary form and asking a short series of questions about its perceived properties. The participant was then shown the five permutations of the same sentence for the given verb in the order indicated above (i.e., AAT, APT, IAI, IP, IAT). For each sentence, a standard sequence of probe questions was used to elicit the participant’s considerations in making an acceptability decision. Finally, the participant re-took the same self-paced version of the acceptability judgment task from the start of the session.

2.2. Results

With only 10 participants, this study was underpowered to find statistical significance for any but the largest of effect sizes. Nevertheless, paired-samples comparisons between the scores on the original pretest ($M = 23.1, SD = 3.04$) and those on the delayed posttest given just after the review ($M = 23.8, SD = 3.12$) were similar to those on the original posttest ($M = 24.2, SD = 2.90$), showing gains of .36 and .34 standard deviational units, respectively. In other words, the nominal decrease on the delayed posttest with respect to the original posttest was not important.

On revisiting each posttest item to identify it as either active or passive, 7 out of 10 participants named all 30 correctly. Of the items the other three participants missed, nearly 95% (17 out of 18) involved inanimate subjects with active verbs, two thirds of which were intransitive. Incorrect responses were observed for all verbs but ‘analyze’, with ‘study’ also posing no problem for the IAT sentences.

The probe later revealed not only confusion of the passive with the use of inanimate subjects but also initial conflation of passive voice with past tense. It also became clear that many students, although they correctly understood the terms for ‘transitive’ and ‘intransitive’ in Japanese, had them backwards in English.

Another finding was that most students seemed unaware of the general need for instrumental case marking in English, accepting sentences like ‘Two main ways analyzed the results’ until given a literal Japanese translation with the explicit nominative case marker ‘ga’ on ‘houhou’ (‘ways’). Those who rejected such sentences focused exclusively on the literal capabilities of inanimate subjects. Consequently, no one correctly identified the acceptable use of the false agentive subject in ‘A previous paper discussed the issue’.

Despite the limited number of participants, a paired-samples t-test at a .05 alpha level comparing the scores on the acceptability judgment task before ($M = 23.8, SD = 3.12$) and after ($M = 27.4, SD = 2.50$) the interview protocol showed a statistically significant increase and a large effect: $t(9) = 2.903, p = .02, d = .92$. Accounting for much of the difference was noticeable improvement on all sentence types for ‘occur’ (Table 1) and all verbs except ‘damage’ for IAT sentences (Table 2).

Table 1. Pre- and post-protocol acceptability judgments on the verb ‘occur’

Sentence Type	Students Answering Correctly (%)	
	Pre	Post
AAT	20	90
APT	80	90
IAI	50	100
IP	60	90
IAT	30	90

Table 2. Pre- and post-protocol acceptability judgments on IAT sentences

Verb	Students Answering Correctly (%)	
	Pre	Post
analyze	50	80
damage	80	70
design	50	80
discuss	70	100
study	70	80

3. Discussion

Despite their re-randomized presentation order, the post-interview acceptability judgment items were the same as those used in the training. As such, although it is doubtful that the learners were able to make the correct judgments on so many seemingly similar sentences based simply on short-term memory, it is also unlikely that the magnitude of improvement would have been so great with a different set of verbs, for the probing procedure made the inadequacy of their lexical knowledge clearly evident. Nevertheless, such remarkable gains on even this small number of verbs suggest several insights from the interview protocol that might be fruitfully implemented in the next stage of the module development.

First, more attention needs to be given to vocabulary, starting with the essential terminology. While one might argue that the teaching of metalinguistic target language is premature or even unnecessary, most of the students who participated in this research, although they were monetarily compensated, chose to do so primarily for the opportunity to interact in English as much as possible. Thus, any initial use of the native language must serve the purpose of scaffold as well as explanatory tool. This part of the instruction will then need to include the difference between past and passive as well as transitive and intransitive and subject and agent. Of course, abstract explanations alone may be difficult to grasp, especially since they often contain additional unfamiliar words. As such, it may be necessary to use examples involving only animate entities (rare in computer science discourse) to illustrate phenomena such as the shifting position of the agent in the process of passivization (e.g., *The cat killed the mouse* vs. *The cat was killed by the mouse*).

Second, additional sensitization to grammatical form is needed. While learners might be excused for confusing the past tense with the past participle, it is clear that they were also ignoring the presence or absence of a preceding copula and the subsequent 'by' when deciding agent and patient roles. As it is easier to notice the presence of something rather than its absence, this training might be achieved through the juxtaposition of similar sentences, which might also serve to reinforce the differences between nominative and instrumental cases (e.g., *A computer simulation studied the effects* vs. *We studied the effects in a computer simulation*).

Finally, confirmation probes should be built into the instruction to guide the learners as they struggle to master the new concepts. For instance, often a participant would correctly identify a verb as transitive but then incorrectly accept a sentence using that verb without a direct object. After simply being asked again about transitivity, however, he or she usually not only quickly spotted the error but also explained it, thus reinforcing conceptual understanding.

4. Conclusions

The findings of the current investigation indicate that a number of factors, including confusion over linguistic terminology, inattention to grammatical forms, and insufficient knowledge of the target verbs, all may have contributed to the mixed results of the previous study. As the interview protocol employed to obtain these data led to unequivocally superior acceptability judgment performance thereafter, key elements from the probing procedure will be incorporated and evaluated in a future iteration of the pedagogical design.

Acknowledgements. I would like to thank the University of Aizu for funding this research and my 10 research participants for providing me with the necessary data.

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Published by Research-publishing.net
Dublin, Ireland; Voillans, France
info@research-publishing.net

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CALL: Using, Learning, Knowing
EUROCALL Conference, Gothenburg, Sweden
22-25 August 2012, Proceedings
Edited by Linda Bradley and Sylvie Thouésny

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ISBN13: 978-1-908416-03-2 (paperback)
Print on demand (lulu.com)

British Library Cataloguing-in-Publication Data.
A cataloguing record for this book is available from the British Library.

Bibliothèque Nationale de France - Dépôt légal: décembre 2012.