

The Design and Effects of Online Contextual Student-Generated Questions for English Grammar Learning

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Abstract: While academicians and practitioners both come to realize the positive effects of student-generated questions on learning and the importance of contextual learning for the teaching and learning of English grammar, the approach of combining the two is yet to be explored. In this study, a contextual student-generated question task is designed by providing a context for students to base their question-generation activities on. To examine the effect of the devised approach on student learning of English grammar and task performance, a quasi-experimental research study was conducted in two sections of a university English course ($N = 95$). The results of analysis of covariance showed that the group with and without a given context for question-generation activities did not differ in grammar learning performance, but the results of analysis of variance found the students in the experimental group (i.e., contextual student-generated questions) outperformed those in the comparison group (i.e., student-generated questions) in task performance in both fluency and flexibility dimensions.

Keywords: Contextual learning, English grammar teaching and learning, online learning activity, student-generate questions, task performance

1. Introduction

1.1 The Importance and Challenges of Learning English in Taiwan

English has been announced as the official language in many countries around the world, and the importance of learning English is widely recognized (Abbas, Pervaiz & Arshad, 2018; Bahadir, 2020). Used as a medium for communication in government organizations and business incorporations, issues surrounding the teaching and learning of English, including low learning motivation and the widening of competency disparity have caught attention from both teaching practitioners and researchers (Nunan, 2003; Rao, 2019; Ricento, 2012; Sayer, 2015).

With the prevailing popularity in English, different measures to elevate student English proficiency has been proposed. For example, nearly all universities in Taiwan have set graduation requirements on English proficiency for both undergraduates and graduates (Wu & Wu, 2010). That is, university students need to obtain qualification on English proficiency from accredited organizations in order to get their diplomas no matter whether they are English majors or not. However, Pan and Newfields (2012) noted that mandated rules on English proficiency for university students had “minimal washback” effect on students. Moreover, according to the report released by the Educational Testing Service (ETS) in 2021, Taiwanese test-takers ranked 41 out of the 49 participating countries in 2020. With the current problems on English learning as mentioned above, findings effective ways to improve English teaching and learning in Taiwan would be pertinent.

1.2 The Importance of English Grammar and its Instruction and Learning

Grammar has been recognized as one of the fundamental components in learning a language, and it is “a necessary framework in a language system” (Zhou, 2018). Despite the fact that vocabulary tends to be the basic element, grammar plays a crucial role in functioning as distributor to locate those basic elements in the correct place in a sentence. Khan and Akhtar (2017) pointed out that English grammar is

the core in learning English, and Halliday (1985) noted that languages could not be acquired without studying grammar.

Grammar refers to a set of rules governing the formation of sentences in the target language, including the composition of clauses with the combined usage of phrases and words (Zhou, 2018), and it involves many aspects of language, including phonology, morphology, syntax, semantics, and pragmatics in the fields of linguistics (Zhou, 2018). That is, when students are communicating with others, they use grammar and other related elements in the language to form sentences in order to achieve the purpose of communication. In light of this, grammar serves as the application of linguistic knowledge to differentiate the right from the wrong usage of linguistic patterns and structures.

English grammar instruction has caught attention from many teaching practitioners and researchers in English as a Second Language (ESL) and English as a Foreign Language (EFL) fields, and different teaching approaches have been proposed to enhance learning of English grammar (Ji, 2018; Khan & Akhtar, 2017; Zhou, 2018). The use of grammar translation method, which refers to using direct translation between students' native language and the targeted language, has been used for decades to develop English grammar proficiency (Mart, 2013; Prator & Celce-Murcia, 1979). The effect of drill-and-practice, suggesting repetition on grammar exercises, was used for students to compose grammatically correct sentences in the targeted language (Güvenir, 1992). While these two methods have been proven to be effective, the problems regarding rote memorization and disregard of actual language use resonate with objectivists who stress the importance of authenticity in language learning (Fang, Nunes, & Bruijin, 2012) and scholars in functional schools highlighting the communicative function of languages instead of forms and memorized rules (Feng, 2013). That is, English grammar instruction embedded in context is called for by providing language learners with authentic ways to use the target language to develop their English proficiency (Celce-Murcia, 2007).

The functional approach developed by Michael Halliday in 1960s has provided insights on the application of English grammar instruction based on its nature of scholastic development of understanding the communicative function of learning English within the context (Feng, 2013). That is, with more focus on the actual usage and pragmatic functions of learning English grammar within contexts and more clues on the grammar usage of the language (e.g., settings, participants, and tasks, each of which exerts significant influences on language use) (Schegloff, Jefferson, & Sacks, 1977) rather than the forms of language itself, English grammar instruction with the functional approach would provide students with more opportunities to recognize the linguistic features and to develop communicative competence in English (Feng, 2013; Macken-Horarik, Sandiford, & Unsworth, 2015).

1.3 Student-generated Question Task and Its Benefits for Learning

Student-generated Questions (SGQ) refers to the teaching and learning strategy in which students generate questions and corresponding answers on the study topic so as to demonstrate their level of understanding and knowledge (i.e., the assessment of learning approach) while also can be used as the assessment for learning approach (Yu, 2021a). That is, SGQ can serve as a way for meaningful learning (Chin, 2002), and several advantages on learning have been found, including confirming one's understanding of the learning material, resolving the misconnects, and filling knowledge gaps (Chin, 2002; Juan, 2021; Offerdahl & Montplaisir, 2014). In the process of completing SGQ tasks, several learning strategies are involved, such as reviewing learning content, finding key concepts, and transforming existing knowledge to forming new schema (Bangert-Drowns, Herley & Willkinson, 2004; Chin, 2002).

Previous research has recognized that the use of SGQ promotes student reading comprehension, academic achievement, task performance, and affective engagement (Chin, 2002; Foster, 2011; Juan, 2021; Khaki, 2014; Mays, Yeh & Chen, 2020; Offerdahl & Montplaisir, 2014). For example, the application of SGQ in math class was found to be effective in enhancing student curiosity and interest in learning due to the autonomous nature of SGQ tasks (Foster, 2011). Also, students were found to pay more attention to the quality of their SGQ, and their ability to generate questions gradually improved (Stoyanova, 2005). Moreover, elementary school students' English reading comprehension was found to be significantly improved via SGQ tasks, and increased engagement and interest in learning English were documented (Mays, Yeh & Chen, 2020). SGQ was also used as a reading strategy for students to further enhance English reading comprehension (Khaki, 2014).

Despite its generally attested evidence in various subject matters, when applying the SGQ strategy to English grammar instruction, it may lead to the formation of so-called ‘linguistic laboratory sentences’ or ‘meaningless sentences.’ As shared by Doctor and Coltheart (1980) — I have blue time, although the constructed sentence is with correct grammar structures, it has limited or ambiguous meaning. Such utterances have caused concerns among scholars of functional schools (Karlsson, 1990). Productions of such sentences were also observed by the authors in past studies when engaging students in generating questions with a focus on tenses in English grammar class, for instance “He is studying English now.” Despite that technically speaking, this sentence contains correct usage of present progressive form of English grammar, but there is an absent referent in a decontextualized usage of pronouns.

As reflected, when students are asked to generate questions on the targeted English grammar in absence of given contexts (i.e., the approach currently adopted frequently for SGQ), they mainly construct their questions without the need to refer to the given situational information; thus, the pragmatic functions of languages may be ignored. Noting that contexts and the pragmatic functions of languages are significant for communicative purposes, and that SGQ tasks reflecting the functional approach to English grammar learning are still under-developed, this study aims towards designing such an approach and context for SGQ for grammar learning and examining its effects.

1.4 Contextual Learning

In light of the concerns regarding decontextualized learning environments for language learners, contextual learning has received increasingly attention and, in essence, it refers to the design of learning tasks in which learners do the tasks in context. It not only enables learners to acquire knowledge in natural/re-enacted settings, but also makes the learning experience more relevant and meaningful (Ampa, Basri & Andriani, 2013; Surya, Putri & Mukhtar, 2017). Through the process, students construct their knowledge in the setting, link the materials to the experienced context, and make their own sense of references to the learning tasks and materials (Ampa, Basri & Andriani, 2013; Surya, Putri & Mukhtar, 2017).

In the past decade, many studies on the use of contextual learning have been conducted. For example, the results from an experiment involving high school students learning math in a contextual environment showed that students’ problem-solving ability and self-confidence on math were significantly improved (Surya, Putri, & Mukhtar, 2017). The findings from Saragih and Surya’s study (2017) also supported contextual learning as an effective way for elementary students’ learning of math in terms of learning outcomes and task performance. Ampa, Basri, and Andriani (2013) found that English learners benefited a lot from the implementation of contextual learning tasks due to the participants’ actively finding out important information embedded in the learning context, processing information for authentic communication, and relating the learning materials to the current learning environment.

As can be expected, contextual learning would engage students in mobilizing various learning strategies, such as analyzing the context, identifying key features, contextualizing the learning materials, integrating their knowledge into the context, designing and developing their ways of solving problems, and evaluating and validating their answers. These activated processes are similar to those involved during SGQ tasks, and both tasks provide students with opportunities to actively seek potential solutions to the problems. It’s just that contextual learning emphasizes the presence of contexts for learners whereas SGQ does not necessarily demand such provision.

1.5 The Purposes and Research Questions of This Study

In order to help students develop knowledge and skills on English grammar in a meaningful way, issues regarding how to direct learners’ attention to the pragmatic functions of learning English grammar within contexts when applying SGQ as a teaching and learning strategy warrant investigation. For this, the provision of a context for SGQ tasks is devised, hereby referred to as the contextual student-generated questions approach (cSGQ). cSGQ denotes the design of SGQ tasks in which students are asked to generate questions on any targeted topic (e.g., grammar, unit, main ideas, etc.) in

accordance to a given context. That is, the information embedded in the questions generated by the students should be congruent with the scenario presented in the given context.

During the process of cSGQ for English grammar, students not only utilize the targeted grammar for the formation of questions, but also would notice the pragmatic clues and communicative functions of languages. In other words, when students generate questions, they need to fulfill the requirements of the SGQ task and be aware of whether the generated questions echo the scenario setting so that they can actually use the targeted grammar to achieve the pragmatic purpose of communication.

In short, the cSGQ task is designed to endow students with chances to generate questions on the assigned topic with reference to a given context, through which students can be directed to the pragmatic functions of English learning. Nonetheless, the question regarding whether providing a context for SGQ leads to positive learning effects awaits to be empirically tested. Two research questions are examined in this study:

RQ#1 Do students engaged in cSGQ have better English grammar learning performance than those engaged in SGQ?

RQ#2 Do students engaged in cSGQ have better SGQ task performance than those engaged in SGQ?

2. Method

2.1 *The Participants, Study Context and Study Materials*

Sophomore students from two sections of a required basic English course at a university in southern Taiwan ($N = 95$) participated in the study. Their English proficiency was B1 according to the Common European Framework of Reference for Languages: Learning, Teaching, Assessment (CEFR). All participants did not have previous experience in SGQ before the study; yet, they all possessed the computer ability needed to engage in the online learning activity.

The textbook for the course was selected by the language center of the participating university. The selected topic for the SGQ learning activity were tenses and subjunctive moods. Nine tenses in English grammar and three subjunctive moods were taught in the class, and the participants were asked to generate questions on these as an in-class learning activity.

2.2 *The Research Method, Experimental Treatment Groups and Study Procedures*

A quasi-experimental research design was adopted for this study to investigate the effects of cSGQ on promoting student learning of grammatical rules covered in class and SGQ task performance. Two treatment groups were set up — the comparison group (i.e., the SGQ group) ($N = 28$) and the experimental group (i.e., cSGQ group) ($N = 67$).

Before the experiment, the students in the two groups individually took a pretest to evaluate their knowledge on the two targeted English grammar, tenses and subjunctive moods. The study consisted of six weeks, with three weeks devoted to each of the two targeted grammar, respectively. On the first two of the three designated weeks, instruction was given on the grammar for 100 minutes in total and on the following week, the participants were asked to generate three multiple-choice questions with answers on the grammar covered in the previous two weeks in the adopted online system in 50 minutes in class. By design, the first SGQ task was on tenses, and the second SGQ task was on subjunctive moods. Also, the students in both groups were provided with the main idea procedural prompt to facilitate the process of SGQ.

The main difference between the two groups was that the participants in the cSGQ group were given an additional descriptive scenario (as the context) to generate questions with answers. That is, while the participants in both groups were asked to generate questions on each of the two targeted grammar in two separate occasions, and the questions generated by both groups of participants should reflect the main points of tenses and subjunctive moods, respectively, for the participants in the cSGQ group the information involved in the generated questions should be congruent to the given context (see the top right side of Figure 1).

At the end of the experiment, the participants in both groups individually took the same test on the grammar covered in instruction.

2.3 The Online Learning System

Two online learning systems developed by the research team led by the corresponding author were adopted for the SGQ activities in this study — QuARKS (Yu, 2009) and Testlet (Yu, 2021b).

QuARKS was used for the participants of the SGQ group, and the left of Figure 1 showed a screenshot of the major fields for the SGQ activity in QuARKS. Alternatively, Testlet was used by the participants in the cSGQ group, and the right of Figure 1 showed the online space for the cSGQ activity. As shown, both systems have similar functions in terms of question-generation (consisting of question-stem, four options, one correct answer, and the annotation). However, a given context above the question-generation field is only provided for the cSGQ group in Testlet (the top portion of the right of Figure 1).

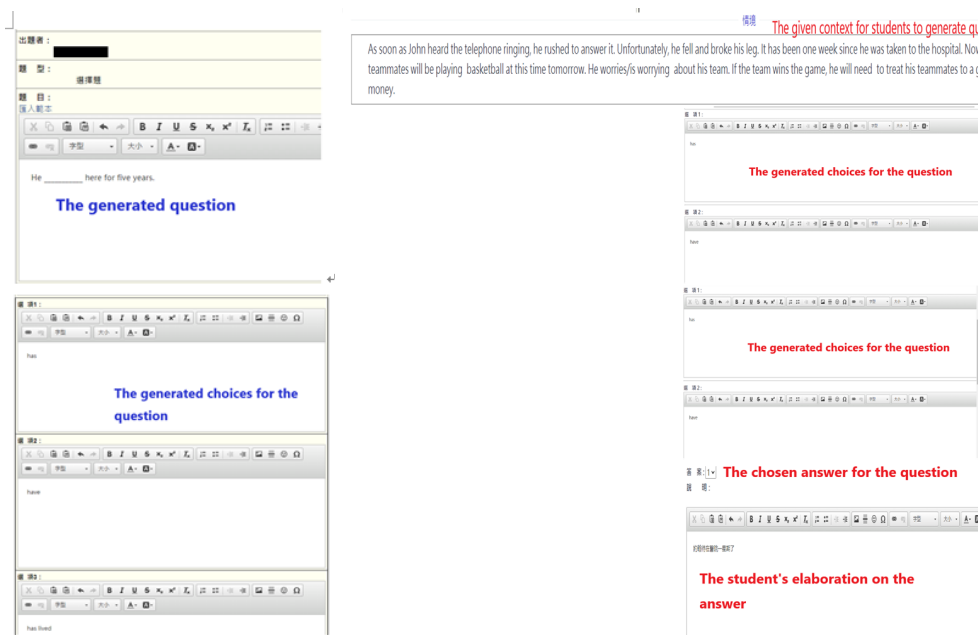


Figure 1. A screenshot of the online multiple-choice question-generation space for the SGQ group on QuARKS (left) and for the cSGQ group on Testlet (right)

Additionally, the participants in both groups were given the same set of procedural prompts containing the main ideas (i.e., the targeted grammar) (see Figure 2) to facilitate the SGQ tasks. Explicitly, the participants could access and review the important concepts regarding the targeted grammar simply by clicking on the build-in review button throughout the question-generation process, to be directed to the webpage illustrating essential information, important concepts, and examples.

導引清單		
語言	導引	導引範例：按鈕
1 中文	現在簡單式 現在簡單式主要用來表達某個動作為真、過去為真，且未來也是真的；亦即，事實、習慣、真理。	Light travels faster than sound. He gets up at 6.00 every day.
2 中文	過去簡單式 過去簡單式用於表達在過去發生的事情或動作。 常見過去式的時間副詞: yesterday, last night, three days ago 等。	Mr. Wilson passed away last night. She finished the report half an hour ago.
3 中文	未來簡單式 未來簡單式表達的是未來的動作或狀態。 公式: will + 原V 或 be going to + 原V。	Annie will get married in June. Annie is going to get married this June.
4 中文	現在/過去/未來 進行式 進行式用於表達某個時間點下，某個動作正在進行。 範疇在於 be動詞的時態。	It's raining outside right now. Joe's leaving for Japan next Monday. She was studying at 3:30 yesterday afternoon. I will be sleeping when you come back. We were talking about him when he came in. We will be talking our midterm at this time tomorrow.
5 中文	現在完成式 (have/has + p.p) 現在完成式用於表達從過去到現在，某個動作已經完成。 現在完成式的六個特徵: (1) since + 一點點 (2) for + 一段時間 (3) already 用於肯定句 (4) yet 用於否定/疑問 (5) ever 曾經 (6) never 從未	Mr. Tanaka has lived in Taiwan for ten years. I have eaten nothing since yesterday. I have already done my report.
6 中文	過去完成式 (had + p.p) 過去完成式，用於表達比過去還要之前的一個時態。 過去完成式一定要和過去式一起使用。	He found the book which he had lost. I didn't go with them because I had broken my leg. When I arrived at the train station, the train had left.
7 中文	未來完成式 (will have + p.p) 未來完成式，用於未來的時間點，某個動作將會完成。	I will have finished the job when you get back. He will have lived in Taiwan for six months by the end of this year.

Figure 2. A screenshot of the main ideas of the targeted grammar for the participants' reference throughout the question-generation process

2.4 Measurement Instruments

The test to assess the learning performance of the two targeted English grammar consists of 50 multiple-choice questions on tenses and subjunctive moods (with 25 questions covering each grammar) ranging from A1 to B1 levels of English proficiency based on CEFR. The test was constructed by the first author, who has taught college English for a number of years. To ensure expert validity, the test was reviewed by two experienced English instructors who have also taught English at the same university before its use in the study.

SGQ task performance was assessed by criteria with operational definitions. The criteria developed by Yu and Wu (2013) was adopted and adapted to fit the current subject domain and purpose of this study. Explicitly, each of the questions generated by the participants was evaluated by two sets of criteria assessing the fluency and flexibility indices, respectively. Explicitly, the criteria of the fluency index include: (a) the accuracy of formats, punctuation marks, spelling, and grammar of the generated question, and the answer for the generated questions, and (b) the completeness of the questions, including four options with one correct answer and an explanation. Alternatively, the criteria of the flexibility index focus on the interconnectedness of the key concepts and main ideas covered in the generated questions. As such, the generated questions were analyzed regarding whether the question contain: (a) the core concept of the targeted grammar, (b) related English grammar, (c) previously taught English grammars, or (d) English grammars which haven't been taught in this course.

3. Results

3.1 English Grammar Learning

The analysis of covariance (ANCOVA) was performed, using the participants' pre-test scores on English grammar as the covariate to exclude its pre-existing impact on English grammar learning. Before proceeding, the assumption that the regression coefficients between the two groups was homogeneous (Keppel & Wickens, 2004) was tested and met, $F = 3.832, p = .055$. As shown in Table 1, the ANCOVA result found that the variance between the two group does not reach the level of significance, $F = 3.345, p = .072$. In other words, the learning performance of the participants between the cSGQ and SGQ groups on the two targeted English grammar, tenses and subjunctive moods, was not significantly different.

Table 1. *Descriptive Statistics and the ANCOVA Result of Grammar Learning Performance.*

Group		Mean (s.d.) ⁺	Adjusted Mean	<i>F</i>	<i>p</i>
cSGQ group (<i>N</i> =67)	Pre-test	31.95 (9.14)	38.48	3.345	.072
	Post-test	38.91 (9.67)			
SGQ group (<i>N</i> =28)	Pre-test	30 (9.3)	42.24		
	Post-test	41.15 (10.39)			

⁺ s.d.: standard deviation

3.2 SGQ Task Performance

In total, 530 questions were generated by both treatment groups during the two SGQ tasks. The analysis of variance (ANOVA) was performed to examine the participants' SGQ task performance between the two groups. As shown in Table 2, the results found that the participants in the cSGQ group outperformed those in the SGQ group for both the fluency index, $F = 10.482$, $p = .002$ and the flexibility index, $F = 12.848$, $p = .00$.

Table 2. *Descriptive Statistics and the ANOVA Results of SGQ Task Performance*

Criteria	cSGQ group Mean (s.d.) ⁺	SGQ group Mean (s.d.)	<i>F</i>	<i>p</i>
Fluency	4.44 (0.972)	3.71 (1.59)	10.482	.002*
Flexibility	2.24 (0.602)	1.82 (0.635)	12.848	.00*

⁺ s.d.: standard deviation

* $p < .5$

4. Discussion and Conclusions

In the present study, an innovative SGQ task (i.e., cSGQ task), which accentuates contextual learning regarded as relevant and beneficial for language learning was designed. The devised cSGQ task aims to provide learners with opportunities to use English grammar in accordance to a given context in which pragmatic functions and communication competence in English could be practiced. By such a design, language learners are expected to become aware of the pragmatic functions of learning English in context and use English meaningfully in the SGQ process. Better learning performance was expected to result from the cSGQ arrangement. The speculation was based on the notion that combining the functional approach of English grammar instruction with cSGQ tasks by providing students with a given context would allow students to detect minute but vital clues as well as the communicative functions for the use of English grammar.

Although the results of this study found no significant difference in English grammar learning performance between the cSGQ and SGQ groups, the participants in the cSGQ group had better task performance in both fluency and flexibility indexes. As demonstrated in the examples shown in Table 3, being given a context for SGQ, the questions generated by the participants in the cSGQ group appeared to be clear and rational by including important clues and elements regarding both tense and subjunctive moods whereas it is not the case for those generated by the SGQ group. To elaborate, for the examples concerning tenses in Table 3, both generated questions focus on present perfect tense, which refers to a certain action continuing for a period of time since a certain time point. Yet, the student in the SGQ group didn't include the starting time of the described action (i.e., finish) in the sentence while the student in the cSGQ group provided clear indication as to the starting point of time (i.e., since he was taken to the hospital), which is deemed essential for present perfect tense. As for the other example about the subjunctive moods as shown in Table 3, it is clear that the question generated by the student in the SGQ group contained ambiguous information since the referent of the pronoun, you, is unclear, making the generated question grammatically correct but meaningless.

Table 3. *Sample Question Generated by the Treatment Groups on English Grammar*

Targeted grammar	Treatment group	Selected examples from the participants of this study
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Tenses	SGQ	I _____ my homework. (A) have finished (B) has finished (C) have finish (D) has finishing
	cSGQ	It _____ one week since he was taken to the hospital. (A) have been (B) was been (C) has been (D) is been
Subjunctive moods	SGQ	If Alice has money, Louis _____ marry you. (A) would (B) should (C) could (D) will
	cSGQ	If Sam hadn't graduated from university, he _____ a salesman. (A) wouldn't have been (B) would be (C) would has be (D) wouldn't be

Additionally, the content analysis conducted on all questions generated by both treatment groups further revealed that linguistic laboratory sentences were present in 16.27% of the questions generated by the SGQ group whereas only 6.59% of the questions generated by the cSGQ group reflect such a problem. In other words, the absence of the referents of pronouns and ambiguous meaning of the generated questions were more commonly found when the participants were directed to generated questions without being given a context. All in all, the provision of a given context for SGQ seems to be beneficial for directing students to use the target language to communicate in a clearer and more meaningful way.

4.1 The Contributions of the Study

This study has both pedagogical and empirical value. First, a cSGQ task, which combines the functional approach of English grammar instruction with SGQ learning activity while leveraging contextual learning was designed for students to generate questions based on a given context so as to provide opportunities for learners to use the targeted English grammar in a meaning way. Secondly, despite that no significant differences in English grammar learning between the two groups were found, as attested by this study, the cSGQ group had better task performance in both fluency and flexibility indexes.

4.2 Limitations of this Study

Some limitations of using the cSGQ approach are addressed here. First, the current study used multiple-choice questions as the grammar learning assessment tool. As memorization and understanding (rather than analysis, synthesis, creation) of grammar may be targeted more by this type of question, other forms of assessment such as discourse analysis and tasks on pragmatic competence of English grammar may be used to detect and evaluate the effect of cSGQ on learning performance of English grammar.

Moreover, only two SGQ tasks were arranged in the present study. Experiments enabling students to gain experience with the introduced strategy may be needed to reveal the effect of cSGQ on student learning of English grammar on pragmatic competence in English.

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