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Active learning in emergency remote introductory linguistics: Successes and challenges

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Abstract. This paper describes a set of flipped learning materials that I created for emergency remote teaching of introductory linguistics. My goals were to create a set of asynchronous materials that would scaffold student progress through a syntax unit, require active engagement in the material, and enable students to receive incremental formative feedback. Assessment of formative and summative student progress in the unit demonstrates that these materials were as effective at supporting student learning as face-to-face pedagogical methods. The discussion touches on additional issues related to pedagogy of care that were overlooked.

Keywords. active learning; introductory linguistics; syntax; emergency remote teaching

1. Introduction. Whether a class meets online or face-to-face, it is always a challenge to create innovative and engaging materials that will allow students to monitor their own progress through a unit and to hold them accountable for completing the work (Angelo & Cross 1993, Felder & Brent 2009, Bean 2011). Creating these materials in an unfamiliar modality and on the cusp of a global crisis adds a layer of drama to the task, and this is the situation I found myself in in as my institution (and the world) turned to emergency remote teaching (ERT) during the early stages of the COVID-19 pandemic.

As we moved online in March of 2020, my introductory linguistics course was just about to begin a unit on syntax. Before the shift, which happened for us after an extended spring break, we had already established a foundation for the unit by reviewing lexical categories and exploring the ideas of constituency and grammaticality. However, the bulk of the unit, in which students would practice drawing progressively more challenging trees as our set of phrase structure rules expanded, was still ahead of us.

To accommodate students who would not have reliable internet access when classes resumed, and allow all of the students time and mental space to adjust to their new situations (see Karakaya 2021 on humanizing pedagogy during ERT), I chose to make the ERT version of this course asynchronous, with optional synchronous check-in sessions during our regularly scheduled class times. As I created the asynchronous version of this syntax unit, my goals were to create materials in which concepts and skills were **scaffolded**, students would be required to **engage actively** in the learning process, and they would receive individual incremental **formative feedback** to help them gauge their own progress.

Scaffolding refers to the process of providing instructional support as novice learners make progress toward a goal (Wood, Bruner & Ross 1976). This pedagogical approach is intertwined with Vygotsky's zone of proximal development, which describes the distance between what a novice can accomplish on their own and what they can accomplish with the aid of an expert guide (McLeod 2019). In effect, scaffolding supports learning by narrowing the problem space for the learner, allowing them to focus only on those concepts or skills that are relevant for the task at hand, and presenting them with progressively more complicated problems as they make

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progress toward their goal. Scaffolding may come into play at the level of course design, when instructors design assessments that build skills that students will need to successfully compete a final project (Wiggins & McTighe 2005, Caruana 2012). On a smaller scale, instructors in typical face-to-face courses may present information to students incrementally throughout the semester and check knowledge at key points before moving on. Procedural, conceptual, strategic, and metacognitive scaffolding have also been shown to effectively support student learning in online environments (Jumaat & Tasir 2014).

Active learning refers to things that students in a course do to support their own learning that go beyond relatively passive behaviors like taking notes as they watch and/or listen to lectures (Felder & Brent 2009). When engaging in active learning, students might talk or write about what they have learned, relate it to other information, apply discipline-specific modes of thinking to solve problems, create arguments to justify their decisions, or reflect on the learning process itself (Bean 2011). Activities of this sort can be used with students of any level to promote active construction of knowledge, critical thinking, meta-awareness, and respect for a diversity of perspectives, and studies have shown that students who engage in active learning are more motivated to learn and learn more (Gibbs & Simpson 2004, Prince 2004, Eison 2010). Moreover, this student-centered approach can play a critical role in the scaffolding of knowledge because it provides students with incremental formative feedback that allows them to gauge their own progress (Freeman et al. 2007).

Formative feedback is feedback that students receive at an early stage in a learning process with the goal of monitoring and improving progress (Angelo & Cross 1993, Boston 2002, Nilson 2010). It is often provided on low-stakes assessments like paper drafts, class discussions, or in-class clicker quizzes. Both students and instructors can benefit from this kind of feedback: Students gain an awareness of the gaps between their current understanding and what is expected of them and of areas they should focus on for improvement. Instructors, in turn, can use it to make adjustments to the support they are providing. Regular formative assessment encourages steady work habits and professional practices like revision, self-evaluation, and self-regulation (Nicol & Macfarlane-Dick 2006, Nilson 2010, 2013), and because it promotes a growth mindset, it may be especially useful for students who are struggling (Boston 2002).

Scaffolding in syntax is critical, because quite often when students do not grasp basic concepts or skills, more complex problem-solving is out of their reach. For example, if students do not have a basic grasp of constituency or how to represent it in tree diagrams, they will not be able to expand a set of phrase structure rules to account for more complex sentences. And while active learning (with accompanying formative feedback) is a common practice in many problem-based introductory linguistics courses, ERT in Spring 2020 presented the additional challenges of holding students accountable for engaging in active learning on their own time rather than in the classroom, and while under the added pressures of the global pandemic. In Section 2, I describe the way the syntax unit is usually structured in the face-to-face version of my introductory linguistics course, and the changes that I made for ERT.

2. Course design. Introduction to the Study of Language is a 100-level linguistics course that provides a broad survey of various subfields of linguistics for non-majors. It fulfills a General Education requirement in Social & Historical Studies and enrolls a variety of students interested in language, including those who plan to major in linguistics, various languages, or speech and hearing sciences. The course meets for 15 weeks. Enrollment is capped at 120 students but is usually about half that number. Before Spring 2020, I had taught some face-to-face (f2f) version

of this course 14 times, with and without the support of graduate (TAs) and undergraduate (UTAs) teaching assistants.

When this course moved online after Week 9 in Spring 2020, we were just beginning the syntax unit. In this 2-week unit, students:

- learn the relationship between phrase structure rules and grammaticality
- use phrase structure rules to draw syntactic trees
- adjust the phrase structure rules in the face of new data
- make connections to related topics: productivity, ambiguity, typological variation

In typical semesters, including Spring and Fall 2019, the faculty instructor introduces relevant concepts and skills for this unit during twice-weekly 50-minute lectures and creates opportunities for students to try out skills on their own before the answers are demonstrated. During smaller weekly 50-minute discussion sections, TAs review concepts and skills, introduce new phrase structure rules, and provide formative feedback as needed to students as they practice tree drawing. UTAs assist with in-class activities and provide peer mentoring. The unit ends with a homework assignment that provides a summative assessment of learning. In Spring 2019 there were 38 students enrolled in the course, 1 TA, and 2 UTAs; in Fall 2019 there were 54 students enrolled in the course, 2 TAs, and 2 UTAs.

In Spring 2020, the course was designed to have a lower enrollment: there were 19 students enrolled, no TAs, and 1 UTA. There were no discussion sections; instead students met with the faculty instructor twice a week for 70-minute interactive lectures. For ERT, I essentially flipped the course: for the syntax unit, creating seven brief videos (55 minutes total) that introduced concepts and skills and five low-stakes quizzes that asked students to submit photos of trees they had drawn.[1] Students engaged with the materials asynchronously, and I held optional office hours during scheduled class times. To scaffold the material in the unit and hold students accountable for engaging actively with it, I interleaved these videos and quizzes in our learning management system (Canvas) so that they had to watch a video before gaining access to the associated quiz, and then earn some minimum score on the quiz before gaining access to the next video. I hand-graded each quiz within a few hours of submission so that students got individualized feedback as they progressed through the unit, and they could retake quizzes until they achieved the threshold score. At the end of each of the two weeks of the unit, I removed the gating restrictions from that week's videos to allow students who hadn't completed the quizzes to access the materials. The unit ended with the same summative homework assignment used in f2f semesters.

The course was also offered remotely in Fall 2020: in that semester there were 58 students enrolled, 2 TAs, and 2 UTAs (3 of these students had already stopped participating in the course by the time of the syntax unit and are excluded from this analysis). For that version of the course, I used the same flipped asynchronous materials for the syntax unit, but students also met with TAs once a week for required 50-minute synchronous discussion sections that provided opportunities for review, problem solving, and formative feedback.

In summary, the key difference between f2f and ERT semesters was not in the way the material was scaffolded, expectations about student engagement, or opportunities for formative feedback, but rather in the fact that students were held accountable for engaging actively in the

[1] A list of video topics and quiz prompts can be found here: https://lingscholarlyteaching.wordpress.com/2021/01/03/poster-c2/

process by accessing the flipped materials, managing their time effectively, and achieving a certain threshold of understanding in order to progress through the unit.

3. Assessment of effectiveness. To assess the effectiveness of this ERT approach in helping students learn the material, I looked at patterns of student engagement in with online materials in Spring and Fall 2020 and compared scores on the summative syntax homework assignment in these semesters to those in Spring and Fall 2019 (both f2f). This research was carried out with the approval of the Indiana University Institutional Review Board.

Patterns of student engagement demonstrate that the **ERT materials were effective in getting students to actively engage with material in the syntax unit**. In each of the ERT semesters, all but one student attempted the quizzes (18/19 in Spring 2019; 54/55 in Fall 2019). Moreover, most students were persistently engaged throughout the unit: 95% of the students in each semester attempted at least three of the quizzes, and most attempted all five (74% in Spring 2020; 62% in Fall 2020). Because of this engagement, the faculty instructor was able to provide timely and individualized formative feedback to each student as they worked through the unit. Anecdotally, attendance in office hours also increased over the course of the online module, as students sought out support while engaging in progressively more complex problem solving.

Scores on the syntax unit homework across these semesters demonstrates, moreover, that **students learned the material as effectively in ERT semesters** as they did (on average) in f2f semesters. Figure 1 shows performance on the syntax homework assignment across these two f2f (Spring and Fall 2019) and two ERT (Spring and Fall 2020) semesters.

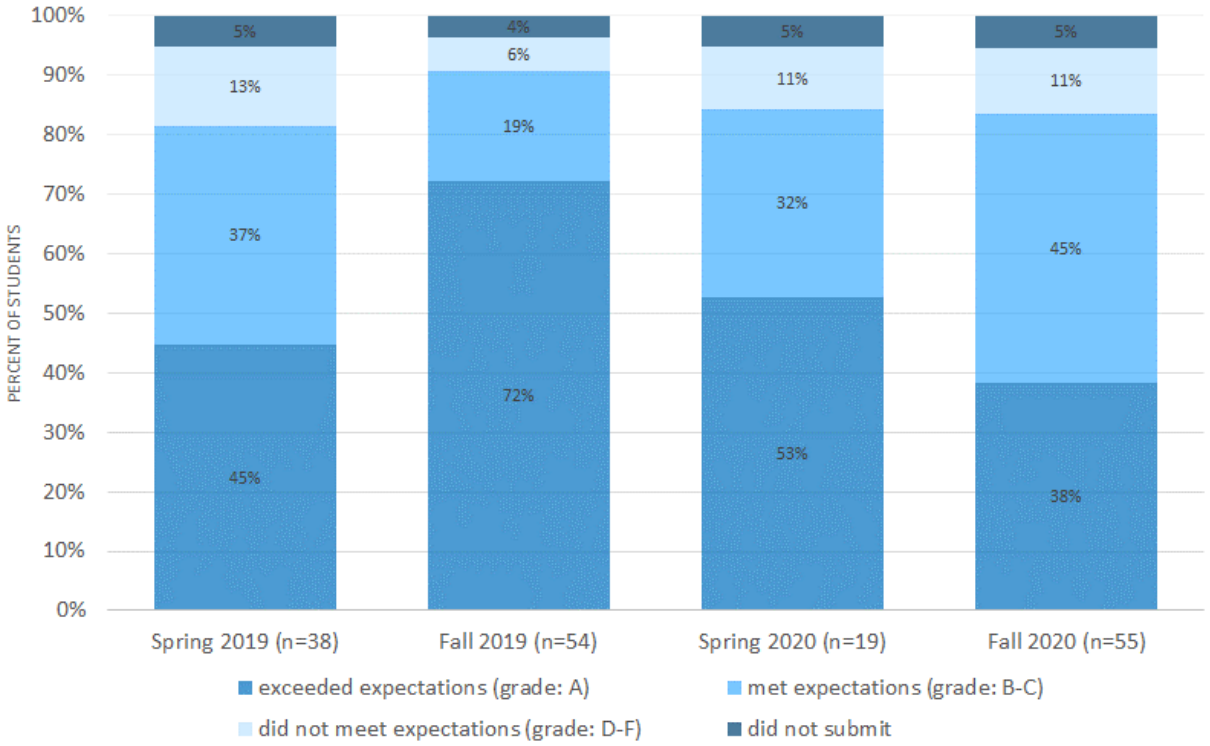

Figure 1. Performance on syntax homework assignment over two f2f (Spring and Fall 2019) and two ERT (Spring and Fall 2020) semesters.

An equivalent percentage of students (about 5%) chose not to submit the assignment across these semesters, and a single-factor ANOVA shows that mean scores on the assignment in f2f and ERT semesters did not differ significantly ($p=0.07$, f2f mean = 89%, ERT mean = 86%).[2]

4. Discussion. In sum, these materials met my pedagogical goals and resulted in both formative and summative successes in student learning. The key differences between these ERT materials and my typical f2f approach were a flipped learning structure and requirements (rather than just opportunities) for active learning. The design of the online syntax unit held students accountable for active engagement, and through assessment of quizzes, the instructional team was able to provide more equitable and timely individual feedback than in f2f semesters. Scores on the syntax homework assignment demonstrate that this approach supported student learning as effectively as f2f methods.

Of course, learning how to draw elegant syntactic trees is just one measure of student success. The following reflection from a student in the Fall 2020 version of this course gives a broader view of the ERT experience from the student perspective:

> Taking this course online has impacted my learning experience, both positively and negatively, this semester. I enjoyed the flexibility to complete the assignments at times that worked for my schedule as well as being able to review the materials multiple times if needed to understand the concepts. However, I did not feel like I had the same level of in depth understanding that I would if I had taken this class in person. I struggled with the feedback component of the homework assignments and some of the unit quizzes, especially during the syntax unit ... I think that had I taken this class in person, I would have been more engaged … and performed better … due to a more thorough understanding that comes from participating and asking questions on the spot in a classroom. Technological difficulties did make some components of this course more difficult and the increased flexibility in completing assignments definitely was a test for my time management skills at times.

This student's experience highlights the fact that student success in ERT situations requires careful attention to self-regulated learning and communication strategies that may differ from demands of f2f courses. In particular, even the most careful scaffolding and timely instructor feedback can leave students feeling isolated, which may lead to burnout and/or attrition, which seem to have been higher than usual during the pandemic (Rimmer, McGuire, Gill 2020, Son, Hegde, Smith, Wang & Sasangohar 2020).

These feelings of isolation can be combatted by being mindful of justice, equity, diversity and inclusion (JEDI) in the classroom: for example, when students feel an emotional connection to a learning environment, they are more motivated to learn and they learn more (Cavanagh, 2016). Progress toward JEDI in the classroom can be made by prioritizing a pedagogy of care (Karakaya, 2021). To work toward this goal, in future iterations of online materials like these it will be important to set up classroom communities in which students can interact with each other and observe each other engaging in the process of learning. It is well known that peer learning is an beneficial aspect of active learning: through group problem-solving, for example, students may come to see different perspectives or collaborate to create new knowledge. But there is also something to be said for the passive benefits that come from learning *among* others: for example,

[2] Mean homework scores from Fall 2019 (92%) are significantly higher than those in other semesters, but these are on the high end of a 5-year trend with a mean of 89%.

by hearing the questions that others ask, students may be able to gauge their own progress toward or gain some meta-awareness of their own emerging understanding of some issue. That is, the community of learners itself is a critical piece of the instructional scaffolding and deserves prioritization in the design of online courses.

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