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“Ice Cream is Delicious.”: Shared Codes that Emerged through Interactions in Two ESL Academic Writing Classrooms

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Abstract

This study examines utterances—either words, phrases, or sentences—that instructors initiate and students later appropriate for their own purposes and interests in different sequential contexts. We name these utterances *shared codes* because they occur repeatedly in classroom interactions and gradually take on meanings unique to class members. Simply put, they serve as codes, or *keys*, for unlocking the interactional history (but not necessarily for explaining the original meaning). Such shared codes were employed for making humor and building relationships. Indeed, students’ use of the codes seems to exhibit learner agency in selecting and appropriating utterances. We examined classroom interactions of two English as a second language (ESL) courses, taught by two instructors in university-based English-language programs in the U.S. Following Cameron and Deignan (2006), this study analyzes interactional contexts where shared codes emerge by employing complex dynamic systems theory perspectives. From our corpus of ESL writing classrooms, we selected four utterances that emerged as shared codes by tracking instances longitudinally, visualizing *patterns* among which the codes emerged. We also employed multimodal conversation analysis to illuminate *processes* during which students adapted their teachers’ utterances, thus contributing to those utterances becoming temporarily stable, or in an *attractor state* (Larsen–Freeman, 2017).

Keywords: *Complexity, Emergence, Shared Codes, Classroom Interactions, Learner Agency*

Introduction

In second language (L2) classrooms, teachers and students employ numerous utterances to interact with each other. Most utterances are ephemeral. However, there are certain utterances, including words, phrases, and even sentences, that are repeatedly used, adopted, and appropriated by students and/or teachers for various purposes in the classroom. Such utterances, which we call *shared codes*, seem to gradually start signifying particular meanings among class members as students or instructors adapt the codes in unique interactional

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contexts. They eventually become a code, or *key*, for unlocking the interactional history (i.e., not necessarily for explaining its original meaning). It can be argued that such codes are gradually shared and used among students and teachers for making humor and building relationships.

While such shared codes might be common classroom practice (see an example of shared metaphorical phrases or concepts in Larsen–Freeman, 2010), we know very little about the mechanism and process of how they emerge and are actually employed among students and teachers in L2 classroom interactions. It can be argued that each shared code that emerges from L2 classroom interactions is a small component of a complex dynamic system within the larger system of L2 classroom interactions (e.g., Seedhouse, 2010). This study examines a range of utterances (which include words, phrases, and sentences) that instructors initially use and that students later appropriate for their own purposes and interests in different interactional contexts, thus becoming *shared codes* among class members in two English as a second language (ESL) classrooms. The examination of such shared codes can reveal *learner agency* (e.g., Larsen–Freeman, 2019) in selecting and adapting specific words, phrases, or sentences.

The research context is two ESL classrooms, where academic writing is taught in the intensive English-language programs at a U.S. university. Employing complex dynamic systems theory (CDST) as a theoretical framework, we consider four CDST concepts—“emergence,” “nonlinearity,” “attractor state,” and “adaptation”—for analyzing classroom interactions to demonstrate the *complexity* of shared codes that emerge in and through classroom interactions during a semester (6 weeks) (e.g., Larsen–Freeman & Cameron, 2008). As for research implications, we discuss the analytical power of CDST for examining L2 classroom interactions by integrating different data (e.g., quantitative, qualitative) meaningfully (see Hiver & Al-Hoorie, 2016). We also provide pedagogical implications regarding how seemingly ‘insignificant’ elements of everyday L2 classroom practice, like teachers’ utterances, unexpectedly contribute to creating shared codes and developing students’ classroom interactional competence (Walsh, 2011) in participating in classroom interactions as members who can appropriately adapt shared codes for their own purposes and interests.

The Emergent Nature of L2 Classroom Interactions: “Shared Codes” as an Element of a Complex System

We first briefly explicate principles of complex dynamic systems theory (CDST) in relation to language and L2 learning/development (e.g., Larsen–Freeman & Cameron, 2008). We then review studies that applied CDST (and/or usage-based theory, which conceptually aligns with CDST) to L2 classroom discourse and conceptualize L2 classroom interactions as a complex dynamic system (e.g., Seedhouse, 2010). Such conceptualizations enable us to view L2 classroom interactions as the dynamic, complex interaction of multiple systems at various levels and time scales. Finally, we discuss empirical studies related to our focus for analysis and explain possible pragmatic functions of shared codes.

CDST Perspectives and L2 Learning and Development

In the field of second language acquisition, L2 learning and development has often been conceived of as a linear process with predictable patterns (“cause and effect”). However, researchers (e.g., Larsen–Freeman & Cameron, 2008) have urged us to rethink static,

predictable, and reductive views of L2 learning and development in favor of more dynamic, relational, and holistic viewpoints, suggesting CDST as a *metatheory* for better explaining the complex, unpredictable nature of L2 learning and development. In this section, we briefly explicate four concepts from CDST—“emergence,” “nonlinearity,” “attractor state,” and “adaptation” because they are most relevant for examining our analytical foci (i.e., shared codes).

First, the term *emergence* underscores the complex, dynamic interactions and interrelationships among different components within and beyond systems. According to Larsen–Freeman (2017), certain patterns of a system (e.g., L2 development) *emerge* as a result of internal interactions of various system components and external interactions with other systems. For instance, when it comes to students’ L2 learning and development in the classroom, numerous components (e.g., teachers’ L2 use, classroom environment) interact with one another in a complex manner, leading to unpredictable developmental outcomes for L2 learners.

Closely related to emergence, *nonlinearity* means that the effect is disproportionate to the cause. In other words, changes in a system do not often follow a linear process with predictable patterns (e.g., “cause and effect”) (Larsen–Freeman, 2017). For example, when examining learners’ grammatical development, even if all learners receive the same instruction, it does not necessarily mean that they acquire grammatical knowledge in the same manner or that their development will follow a linear progression. In fact, L2 development results from the complex interactions of numerous factors.

The third term, *attractor state*, denotes a relatively stable, preferred condition. According to Larsen–Freeman (2017), as complex systems change, certain patterns emerge, leading to an *attractor state*. Even though this is a somewhat stable state, it is always subject to change.

Finally, the notion of *adaptation* involves the process in which an attractor state emerges. Larsen–Freeman and Cameron (2008) defined *adaptation* as “(t)he process in which a system adjusts itself in response to changes in its environment” (p. 33). In other words, while systems are always in a state of change, various elements within a system (e.g., learners, teachers) *adapt* or *adjust* based on the influences of changing internal and external factors.

In sum, CDST as a metatheory provides alternative perspectives of language and L2 learning/development by viewing L2 development in a dynamic, complex, and holistic manner. As Blommaert (2013) argued, complexity can offer “freedom to imagine” (p. 10), which allows us to study the complexity of L2 development without reducing it to individual constituents and components.

The Complex, Emergent Nature of L2 Learning and Classroom Interactions from CDST and Usage-based Linguistics Perspectives

CDST views regarding language and L2 learning/development have a shared perspective with *emergentism*, which includes usage-based linguistics theory. Usage-based researchers (e.g., Ellis, 1998) share the view that language learning or development depends on speakers’ exposure to L2 in use and that language *emerges* when speakers create linguistic constructions from recurring patterns. Furthermore, from usage-based linguistic perspectives, learners’ cognitive processes are influenced by various usage events; thus cognitive-psychological and social elements are intricately interconnected (e.g., Eskildsen, 2009, 2012). The usage-based

approach is compatible with CDST, as both theories propose that linguistic, contextual, environmental, and learner factors interact with each other, resulting in *nonlinear* development (Roehr-Brackin, 2015).

Many empirical investigations of learners' L2 development (e.g., morphosyntax, writing) have been conducted through usage-based linguistics and/or CDST approaches (e.g., Eskildsen, 2012; Larsen-Freeman, 2006; Yu & Lowie, 2019). These studies often take longitudinal case study approaches, illustrating individual learners' complex, nonlinear L2 development. For example, Roehr-Brackin (2015) examined the long-term L2 development of an adult learner and explicated the three interconnected systems—learner as an individual (e.g., language aptitude), learning environment (e.g., tutor input), and L2 developmental system (e.g., accuracy of language use)—that move toward a new attractor state (i.e., target-like L2 speech).

Similarly, employing usage-based linguistics perspectives, Eskildsen (2012) examined two ESL learners' English negation constructions with longitudinal approaches, demonstrating each learner's unpredictable acquisition order as influenced by the significance of local, contextual factors. Eskildsen underscored that local use of specific linguistic forms and long-term learning are intertwined, and he called for in-depth investigations of how locally contextualized interactions influence learners' grammatical development. Our study aligns with Eskildsen's work, examining both the dynamics between interacting *patterns* (i.e., macrosystem) involving various systems that contribute to the emergence of shared codes and the local classroom interactional *contexts* (i.e., microsystem) where the codes emerge and develop.

Notably, Seedhouse (2010) was the first scholar to connect L2 classroom discourse with CDST, arguing that L2 classroom interactions exhibit characteristics of a complex adaptive system. Specifically, L2 classroom interactions entail not only unique, systematic patterns like turn-taking (e.g., Initiation-Response-Evaluation) but also exhibit the unpredictable, nonlinear nature of classroom interactions that result from the constant interaction of various (sub)systems (e.g., students, learning materials). For example, our focus of analysis—shared codes—might exhibit *similar* characteristics (e.g., pragmatic functions), but each shared code might develop in distinctive ways (e.g., frequency). In short, CDST can be a powerful analytical lens for studying L2 classroom interactions as a system and for examining both systematicity and variability of L2 classroom interactions.

Despite CDST's potential strength, only a handful of studies (e.g., Matsumoto, 2019; Smith & King, 2017) have illustrated L2 classroom interactions through CDST approaches. Smith and King examined how *wait time* (the silent pause after a teacher elicits student responses) functions in classroom discourse, finding that it does not necessarily lead to the development of the quantity and quality of students' verbal contributions. The researchers offered more complex, holistic views regarding the system and functions of wait time. In a similar vein, Matsumoto (2019) investigated the roles of language learning and teaching materials in multilingual classroom interactions in a U.S. university from CDST perspectives, demonstrating the nonlinear, unpredictable nature of classroom interactions in general and the complex, dynamic characteristics related to materials use in particular.

In sum, empirical studies have illustrated the complexity of L2 learners' linguistic development in depth and often longitudinally by employing usage-based linguistics and/or CDST approaches. The field is still in the early stages of analyzing the complexity of L2

classroom interactions from CDST perspectives, however; thus, this study contributes to this under-researched topic.

Shared Codes that Emerge through Learners' Adaptation and Functions of Shared Codes in L2 Classrooms

By employing different theoretical and analytical frameworks, previous research examined recurring interactional resources or utterances in classroom interactions. For example, researchers (e.g., Waring, 2012) examined L2 learners' construction of *voices* through recycling particular phrases by integrating Bakhtin's (1981) notions like *appropriation* and *double voicing*. Nevertheless, these studies did not discuss how learners' appropriation of words, phrases, and sentences *develop over time* and how those appropriated utterances become part of the social dialect of L2 classroom—in other words, somewhat stabilized and *shared* linguistic forms or *codes*.

On the other hand, several researchers (Cameron & Deignan, 2006; Cekaite & Aronsson, 2004) examined the emergent processes by which L2 learners and teachers co-construct a sense of community through *recurrent, repetitive use* of classroom interactional resources. Analyzing Swedish immersion classrooms, Cekaite and Aronsson (2004) found two types of *recycling* (intertextual play and role appropriation, or *iteration* from CDST perspectives) related to jokes for constructing classroom amusement and building a sense of community. Importantly, the researchers' findings shed light on classroom interactions as a form of *community building* rather than as simply didactic interactions.

Furthermore, Cameron and Deignan (2006) investigated the recurrent use of interactional resources (metaphorical expressions or *metaphoremes*) that emerged in classroom interactions through CDST perspectives. They argued that metaphoremes coalesce “linguistic, semantic, affective, and pragmatic forces into attractor states in the discourse system” (p. 671), enabling classroom discourse to be relatively stable patterns of use with possibilities for variation and flexibility. For instance, the metaphoreme “lollipop trees” goes through a series of appropriations and iterations (“look like a lollipop”) by different members until it stabilizes over time in the system of classroom discourse. The emergence of metaphoremes in classroom interactions offers implications for L2 learning because for students to comprehend and co-construct metaphoremes, they should grasp the linguistic, conceptual, and pragmatic functions of L2, which requires diverse knowledge or competence.

In fact, the aforementioned studies provide meaningful pedagogical implications for L2 teaching and learning. They both show that the recycling and metaphoremes that emerge in classroom interactions not only reflect learners' linguistic and interactional competencies but also contribute to constructing the discourse shared by the classroom community. To develop instructional guidance for leveraging shared codes for L2 learning, we need more research that systematically examines microlevel cases of emergent “shared codes” in L2 classroom interactions. Furthermore, it is critical to demonstrate the developmental processes of shared codes *holistically* instead of investigating only certain aspects of shared codes.

Therefore, this study provides both an analysis of general patterns among shared codes through visual representation and a sequential analysis of a particular code that illustrates local sequential contexts where the code was appropriated and negotiated among interlocutors. Our research questions are as follows: (a) Did any *patterns* of shared codes (time spans, frequencies,

and participants who adapt codes) emerge in the two ESL classrooms?; and (b) How do students locally negotiate norms of shared codes with instructors and other classmates in specific sequential contexts?

Data and Methodology

Participants and Data Collection

This study is part of a larger research project that has investigated multimodal communicative practice in L2 classrooms, including instructor and student use of gestures. The data was collected from two ESL writing classrooms in the English language programs at a US university. In both classes, students came from diverse linguistic and sociocultural backgrounds, and all participants agreed to participate in this study voluntarily. The research team observed and video-recorded all class sessions of the two courses throughout six weeks (Monday to Thursday) in 2017 and 2018. The primary data for this study include approximately 47 hours of video-recordings in total (24 hours from Mr. Ngo's sessions and 23 hours from Mr. Kosek's sessions) and ethnographic notes from participant observations. Furthermore, we also conducted stimulated-recall interviews with the two instructors and focal students to gain their insider perspectives related to our interests (e.g., students' and instructors' gesture use). However, we do not report the interview data here since our focus at the time of data collection was not on "shared codes."

Meaningful Integration of Different Types of Data for Analyzing Shared Codes from CDST Perspectives

This study analyzes two types of data related to classroom interactions—general patterns of shared codes (visual representations) and specific, local sequential analysis—to illustrate the complex nature of each shared code that emerged from two ESL classrooms by incorporating complex dynamic systems theory perspectives (e.g., Larsen–Freeman & Cameron, 2008). Our interest in shared codes first emerged from our regular observations and ethnographic notes, when specific utterances initiated by the teachers seemed to be taken up and used *repeatedly* among their students in classroom interactions. Using ethnographic notes as supporting data to identify possible shared codes, we began by manually tracking instances of shared codes by watching all video-recorded data of the two classrooms.

Through this initial process, we identified four focal utterances taken up by students in different interactional contexts after their instructors initially used them. The major criterion for the selection was whether utterances (either words, phrases, or sentences) are actually appropriated by at least some students. Another related issue is whether utterances can be used for various pragmatic functions, including constructing humor. We identified 123 instances of the shared codes in total, noted interactional contexts where each code emerged and was employed by interlocutors, and attempted to find general patterns of the emergence of shared codes by visualization (graphs). We then closely examined each code's *pattern* in terms of (a) the time span within which it emerged (e.g., a short period like 2 weeks, a longer period like 5–6 weeks), (b) the frequency of its occurrence (e.g., nine times), and (c) the interlocutors who used the codes (e.g., instructors, students).

As for analyzing qualitative data, we employed conversation analysis (CA) (e.g., Sacks, Schegloff, & Jefferson, 1974), particularly multimodal conversation analysis (e.g., Mondada,

2014) (see Appendix for our transcription notation system), illuminating *local* processes in which students appropriate or adapt their teachers' utterances for their own purposes and interests. Furthermore, CA can exhibit significant moments when certain phrases achieve an *attractor state* (e.g., Larsen–Freeman, 2017). In short, by employing CA, we shed light on complex, local contexts where shared codes emerge and when learner agency or actions become visible, information that general patterns based on numbers (i.e., frequency of occurrence) cannot sufficiently capture.

This study integrates different types of data to meaningfully demonstrate each shared code that emerges from a complex system of classroom interactions. It adheres to Hiver and Al-Hoorie's (2016) claim that CDST can provide the analytical power to examine L2 development, more specifically, to analyze the complexity of L2 classroom interaction. CDST calls for data and analytical methods appropriate for demonstrating the complexity of L2 development or related phenomena by examining the *relationship* among different types of data. As the notion of “dynamic ensemble” (Hiver & Al-Hoorie, p. 744) implies, different types of data (general patterns by numbers and sequential analysis) can illuminate the complex interactions of the macro-system and micro-structure levels regarding the developmental processes of shared codes.

Analyzing Both “Patterns” and “Processes” of Shared Codes that Emerged in Two Classroom Interactions

The analysis is divided into two sections. First, we show the general *patterns* of four shared codes in the macrosystem of classroom interaction. The following section then examines the microsystem, or the local, detailed *process* of the emergence of one shared code (“ice cream is delicious”) as an example, illuminating students' and instructors' *actions* involving selecting and appropriating the code for their own purposes and interests.

The Visualization of Patterns of Four Shared Codes from Two Classrooms

We focus on the four shared codes: “Google it” (or “Google”) and “have a date with Canvas” from Mr. Kosek's class; “George” and “Ice cream is delicious” (or “ice cream”) from Mr. Ngo's class. Mr. Kosek used the expressions “Google it” and “have a date with Canvas” on several occasions when introducing activities and/or explaining assignments. Mr. Ngo employed “George” (the name of his grandson) to show his photo or to make jokes, while he used “ice cream (is delicious)” when he needed a sample sentence for writing. It is important to note that the overall usage of these codes is predominantly by instructors rather than by students. Yet, the status of *shared codes* cannot be achieved without at least some student uptake and adaptation of these utterances.

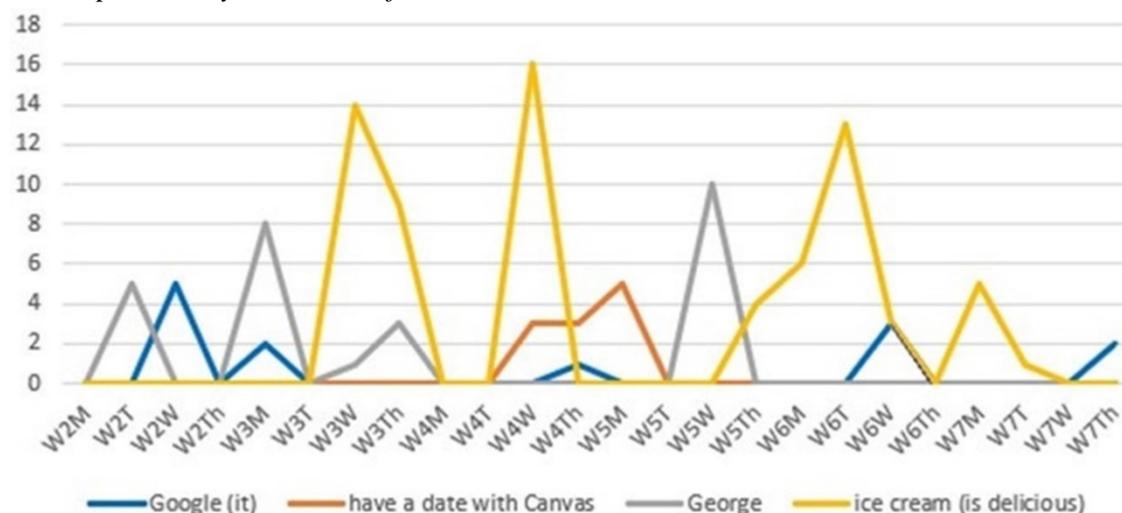
It is important to note that our attempt to visualize data of shared codes is *exploratory*, with the goal of eliciting *systematicity* by identifying *patterns* concerning frequency, span of usage, and participants. Ellis and Larsen–Freeman (2006) discussed that systematic regularities emerge from experiences of exemplary instances and that development often occurs in *nonlinear* and *disproportionate* patterns. Learners might notice frequently occurring utterances (words, phrases, or sentences) in recurrent usage, adapt and integrate those utterances into their repertoires, and employ the utterances for their own purposes (Larsen–Freeman, 2018).

Visualizations help us see general trends regarding how the four shared codes in this study emerged and gradually developed in classroom interactions over 6 weeks.

In this section, we discuss possible patterns of shared codes by using three graphs that highlight certain aspects of the codes. Figure 1 illustrates *how long* each code circulated in classroom discourse (time span). Figure 2 shows *how many times* each code appeared in classroom discourse (frequency). Lastly, Figure 3 demonstrates *who* used each code (users). With Figure 1, we aim to display general patterns of distributions of each code in the two classrooms, exhibiting (a) when those codes first appeared; (b) how often they appeared each day; and (c) when they ceased to appear.

Figure 1

Time Span: Daily Instances of Four Codes

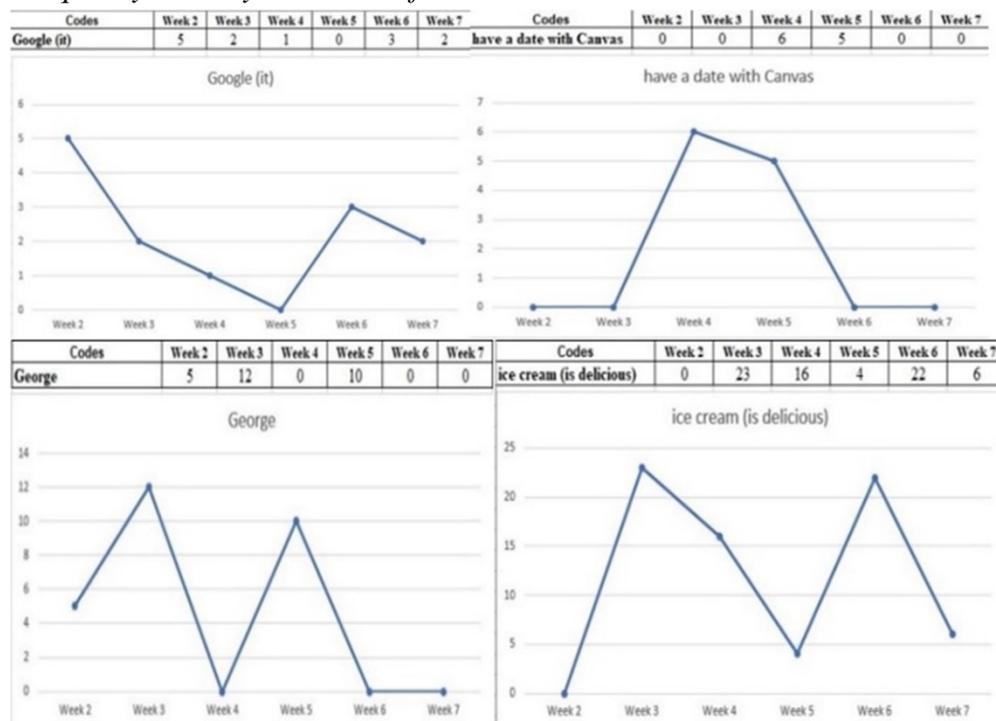


For example, “Google it” (from Mr. Kosek’s class) first appeared on Wednesday during the second week (W2) and continued to be used until Thursday during the seventh week (W7), a relatively long-lasting code. In a similar vein, “George” and “Ice cream is delicious” (from Mr. Ngo’s class) are relatively long-lasting. Specifically, “George” and “Ice cream is delicious” appeared during the second week (W2) and the third week (W3), respectively, and then continued to emerge until the fifth week (W5) and the seventh week (W7), respectively. In contrast, “Have a date with Canvas” (from Mr. Kosek’s class) only lasted for a short period. It first appeared on Wednesday during the fourth week (W4) and reappeared only until Monday during the fifth week (W5). In short, over the 6-week course “Google it”, “George”, and “Ice cream is delicious” last for 3 to 4 weeks, a relatively long span, while “have a date with Canvas” lasts only 5 days.

Next, Figure 2 demonstrates the frequency of each code, which includes usage by both instructors and students. It is important to reiterate that teachers’ use of these codes is significantly more frequent than students’ usage (see also Figure 3); yet the very nature of *shared* codes emerges when students begin adopting those codes. Figure 2 demonstrates the trajectory of each code’s occurrence in number per week during the 6 weeks. Pay attention to the *shape* of each curve. The similarities and differences in curve shapes might indicate the patterns of how each code emerged and developed.

Figure 2

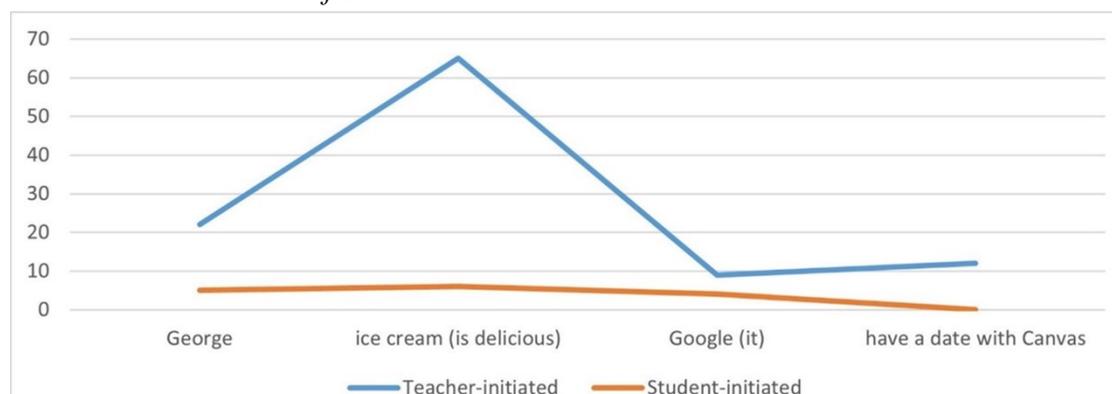
Frequency: Weekly Instances of Four Codes



The shapes of “George” and “Ice cream is delicious” from Mr. Ngo’s classroom (bottom two graphs) look similar. Both appear to exhibit an M-shape, representing a steep increase when they first appear, a decrease the following week, another increase, and then a final decrease. In other words, these codes seem to have two peaks during the process of developing as shared codes. It is intriguing to observe that the first peaks of both codes happen during the third week. We cannot say for certain why, of course, but it might relate to Mr. Ngo’s efforts to build relationships with students by employing these codes that involve topics that he is personally interested in.

In contrast, the shapes of “Google it” and “have a date with Canvas” from Mr. Kosek’s class are distinctive. The slope of “Google it” moves irregularly in a zigzag shape since the number of appearances steadily decreased after its first appearance in the second week, then increased during the sixth week, and slightly decreased during the seventh week. On the other hand, the curve of “Have a date with Canvas” takes an irregular quadrilateral shape since the slope sharply increased during the fourth week, slightly dropped during the fifth week, and then sharply decreased. Yet, it is important to acknowledge here that we can draw no conclusions about systematic patterns of how shared codes develop by examining these shapes. Also, the shapes or patterns of shared codes might look different if we examine classroom data for a longer span.

Lastly, we shift our attention to who employs the shared codes. Figure 3 demonstrates the number of instances of codes by teachers and students, focusing on who initiated each code.

Figure 3*Code Users: Instances of Teacher- and Student-initiated Use*

As Figure 3 clearly illustrates, the general trend among all the codes is that *teacher-initiated* use is much higher than student-initiated use. Nevertheless, student initiation is critical in making the teacher-initiated utterances *shared*. For example, students employed “Ice cream is delicious” a total of six times. The first time a student usage appeared was on Wednesday of the third week, which was also the day that Mr. Ngo first introduced it. On that day, the teacher employed it as an example of making arguments, and then he invited students to complete a sentence after saying, “According to Ngo.” In response, a student completed the sentence by saying, “Ice cream is delicious,” possibly to display his understanding and participation. Notably, “have a date with Canvas” is distinctive in that we did not identify any student-initiated cases in classroom interaction. However, we consider this to be a unique case because Mr. Kosek introduced to the class (on Thursday of Week 3) a student’s use of this code in an email that the student sent to Mr. Kosek.

In contrast to the very limited student-initiated usage, the higher number of teacher-initiated uses can be attributed to the fact that the classroom interactions were managed by instructors. This finding supports the presence of the commonly found sequential pattern of the classroom discourse: teacher initiation–learner response–teacher feedback (IRF; e.g., Sinclair & Coulthard, 1975). However, it is worth acknowledging that while this figure reveals the high frequency of teacher-initiated uses, it does not illustrate at *what moments* teachers used shared codes in classroom interactions and how particular students appropriated the codes for their own interests and purposes in particular contexts. Such contextual factors and interlocutors’ actions involve the actual development of shared codes. Thus, we closely analyze those critical elements and actions in the sequential analysis section below.

In fact, we might find possible patterns in the use of each code when taking into consideration interactional contexts by incorporating ethnographic information (observation notes). As the Douglas Fir Group (2016) discussed, the development of dynamic interactional repertoires can be observed through learners’ life-world experiences, which are context-specific. For example, Mr. Ngo often initiated “George” in *transitional moments* when changing topics or activities. Similarly, Mr. Kosek tended to employ “have a date with Canvas” when discussing homework at the end or the beginning of his class. For “Ice cream is delicious,” Mr. Ngo employed this shared code as *academic content*, namely, as an example phrase when introducing and discussing writing skills and components. Finally, Mr. Kosek

used “Google it” during activities when students needed to search for resources through the internet.

In sum, we sought systematicity in the emergence of shared codes by examining three aspects: time span, frequency, and users. There seem to be no linear processes or clearly observable patterns of how each shared code emerged and developed. Although it is possible that patterns would emerge if classroom environments and observational conditions (e.g., longer/shorter duration of class observation) were different, it seems clear from the visualizations that the nature of the emergence of shared codes is complex and unpredictable, involving multiple factors interacting in L2 classroom discourse. In other words, each code emerges and develops unpredictably like a living system within classrooms. As Larsen–Freeman and Cameron (2008) argued, a dynamic system (classroom interaction) creates variations in response to constant changes in its local environment.

To further examine the complexity and unpredictability of the emergence of shared codes, we next employ sequential analysis of interactional moments when shared codes emerged and developed by students and instructor(s). Sequential analysis can extend our understanding of L2 teachers’ and learners’ *adaptive* actions related to shared codes and complement possible shortcomings of the general pattern analysis. In other words, visual representation of the patterns of the four shared codes cannot capture (a) how particular students selected and integrated a shared code for their own purposes and interests (involving *learner agency*) and (b) how teachers oriented to and employed shared codes by recognizing diverse social functions and potential meanings of shared codes.

Sequential Analysis of “Ice cream is delicious”: Using a Shared Code as a Humor Resource

To illustrate the unique, complex nature of how shared codes emerge and are negotiated among students and their instructor, we analyze a sequence in which one code, “Ice cream is delicious”, from Mr. Ngo’s classroom, is employed in classroom interaction. We selected the sequence involving this code for analysis because (a) it displays how students and the instructor negotiate various meanings and functions of this code and (b) it exhibits the attractor state of the *shared* code (more stable and yet with the potential to expand its meanings and functions) among the students and instructor.

The excerpt below illustrates the moments when Mr. Ngo (TEA) reintroduces the sentence “According to Ngo, ice cream is delicious,” which he uses to explain how to cite sources in academic writing. This occurrence took place near the end of the semester (Monday of Week 7, see Figure 4). One female student, Lucia (LUC), says, “according to” *before* Mr. Ngo says and whispers the rest of the sentence (“ice cream is delicious”) to her classmate when her teacher says, “According to Ngo”. This indicates that Lucia is able to *predict*, based on their interactional history, what her teacher will say next. It seems that this sentence has been oriented to as—and achieved the state of—a *shared code* in the class.

Before the sequence, Mr. Ngo announced that many students missed citations in their written assignments. He introduced an example sentence, asking his students where that information can come from (e.g., websites). In the beginning, he attempts to look for an example sentence that contains sources and arguments. His searching becomes visible through pauses, elongation, and gaze shifts, as shown below.

Figure 4

When the Shared Code “Ice Cream is Delicious” Appears



Excerpt: “\$ I told you, \$”

1 TEA: you +↑↑must sa::y,
 +^{fig5}shifts GZ back to BB while facing body to it



Fig. 5

2 (0.8)

3 LUC +\$according to:+[:,\$
 luc +^{fig6}GZ in YIN's direction
 yin +^{fig6}shifts GZ to LUC while smiling



Fig. 6

4 TEA: [+according
 tea +touches BB with RH while GZ at BB

- 5 +to:::,
 tea +begins writing "According to" on BB while facing BB----(L10)
 yuk +^{fig7}shifts GZ to LUC's direction
 rik +^{fig7}shifts GZ to LUC's direction



Fig. 7

- 6 LUC: +^o(one another?)^o
 luc +^{fig8}whispers with body facing and GZ at MAR----(L7)



Fig. 8

- 7 TEA: +>you have +two choices,< (.)
 mar +^{fig9}shifts GZ to LUC with smile



Fig. 9

- 8 <+according (0.8) to:::,>
 luc +^{fig10}shifts GZ back to front
 mar +^{fig10}shifts GZ back to front with smile
 yuk +^{fig11}shifts GZ back to TEA
 rik +^{fig11}shifts GZ back to TEA



Fig. 10



Fig. 11

- 9 S?: hhhh,=

- 10 TEA =and then, +Whatever,
 tea +draws line on BB after "according to"

- 11 +the website?
 tea +points at space above line with GZ at SS at his right

- 12 **+the president?**
 tea +beats at same place while facing at SS in front
- 13 **+my mothe:r? +(0.6)**
 tea +beats at same place while facing at SS in front
 tea +points in PS direction while facing at SS
 with smile
- 14 **+something,**
 tea: +keeps pointing at PS with GZ at BB with smile
- 15 **uh, or- +or u:h,**
 tea +picks BB eraser with RH while facing BB
- 16 **+if it's an Author?**
 tea +erases line on BB while facing BB
- 17 **it's a +LAST Name +on- on-ly, (.)**
 tea +quickly shifts GZ to SS while erasing line
 tea +shifts GZ back to BB
- 18 **+according to Ngo,**
 tea +begins writing "Ngo" on BB while facing BB
- 19 **+(1.8)**
 +^{fig12}keeps writing it on BB while facing it

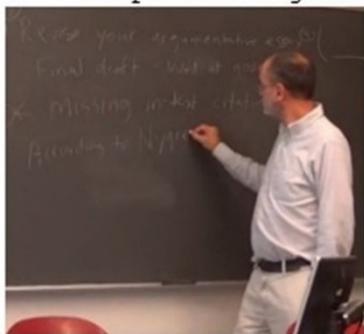


Fig. 12

- 20 LUC: +°\$ice +cream is +delicious.\$°
 luc +whispers
 luc +shifts GZ to MAR
 luc +^{fig13}points in TEA's direction with RHIF----(L22)



Fig. 13

- 21 **(0.5)**

22 MAR: +hhh↑
wei +^{fig14}smiles while facing in front



Fig. 14

23 LUC: +haha [haha
luc +^{fig15}retracts pointing while leaning back
mar +^{fig15}shifts GZ to LUC with smile



Fig. 15

24 TEA: [u:h,
25 +ice cream is +delicious.=
tea +keeps writing on BB while facing body to BB----(L31)
luc +^{fig16}pokes at MAR with LHIF while GZ at MAR



Fig. 16

26 WEI: = [+ha [h↑
 mar +fig17 faces LUC while GZ at her with smile

27 LUC: [+haha↑
 luc +fig17 points in TEA's direction with LHIF while GZ at MAR



Fig. 17

28 +\$I +told you,\$
 luc +holds pointing while GZ at MAR
 yin +fig18 starts laughing hard
 sss +fig18,19 begins smiling
 mar +fig18 points at LUC while smiling

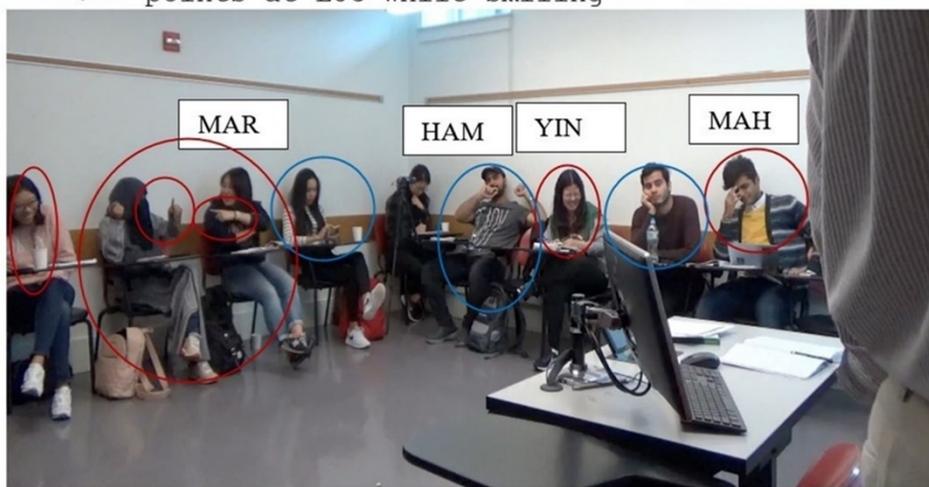


Fig. 18



Fig. 19

29 SSS: hahahaha (.)

30 TEA: +I told you so many times,=
 +keeps writing sentence on BB while facing body to it

31 SSS: =hahaHAHAHAHA=

Mr. Ngo starts, “you ↑↑must sa: :y,” while turning to the blackboard (see Figure 5). His embodied shift projects his next action—writing on the blackboard. His turn is followed by silence lasting 0.8 seconds, which creates an interactional space for self-nomination from the students, or an opportunity for them to complete the teacher's utterance. In other words, Mr. Ngo's utterance (“you ↑↑must sa: :y,”) followed by silence serves as a *designedly incomplete utterance* (DIU, Koshik, 2002), inviting students to complete his utterance for pedagogical purposes. Lucia takes the next turn, saying “according to: :,” with a smile voice while gazing toward Ying (YIN) (see Figure 6). This turn might indicate that Lucia *anticipates* what comes next, following the teacher's DIU. Ying also orients to Lucia, displayed by her gaze at Lucia with a smile (Figure 6), and her smile seems to display her affiliation with Lucia. Overlapped with Lucia, Mr. Ngo utters “according”, which aligns with Lucia's utterance. Then, he continues with, “to: :,” which also aligns with Lucia. Simultaneously, Yuka (YUK) and Rika (RIK), who sit on the right side of the classroom, shift their gazes toward Lucia (see Figure 7), displaying their orientation to her. In line 6, Lucia whispers something to Mariko, sitting next to her. Simultaneously, Lucia's body is facing Mariko while she gazes at her (see Figure 8). Lucia's embodied actions, particularly whispering, seem to display solidarity or a bond with Mariko. These two female students' (re)actions or involvement related to Mr. Ngo's re-introduction of this sentence (“According to Ngo, ice cream is delicious.”) containing a shared code become more visible later.

From line 7, Mr. Ngo starts, “>you have two choices, < (.)”, to explain how to introduce sources. During this utterance, Lucia maintains her gaze on Mariko while Mariko also shifts her gaze to Lucia with a smile (see Figure 9). Here, they achieve mutual gaze. Then, Mr. Ngo utters, “according to: :,” at a very slow pace (plus a long pause between “according” and “to: :,”), adding an emphasis and possibly trying to get students' attention. His turn works effectively, evidenced by students' (re)actions; Lucia and Mariko shift their gazes to the front (see Figure 10). Similarly, Yuka and Rika, who had been gazing at Lucia, also shifted their gazes to their teacher (see Figure 11).

In lines 10-17, Mr. Ngo discusses various types of sources that can come after the phrase (“according to”). He starts, “and then, whatever,” When saying “whatever,” he draws a line in the blank space to the right side of “according to” on the blackboard, visually illustrating the space for filling in for candidate sources (see Hazel & Mortensen, 2019 for a discussion of designed incomplete objects for elicitation) and inviting students to fill in with possible sources. Mr. Ngo then begins listing candidates (“the website?” in line 11, “the president?” in line 12, “my mothe:r?” in line 13), consistently using rising intonation at the end. Simultaneously, he points at and *taps* the space above the line while providing the sources, which appears to encourage the students to pay attention to the specific place (where the sources should be inserted) and *invite* students to suggest other candidates. After Mr. Ngo says, “my mothe:r?”, there is a 0.6-second silence during which he points in the direction of the projection screen while smiling at the students. Then, he says, “something,” while holding his pointing gesture. The silence along with “something,”—which serves as a temporal placeholder—might serve as an invitation for students to contribute to other candidates.

From line 15, Mr. Ngo begins to nominate another source, prefaced by a conjunction, “or-”. He starts with, “uh, or- or u:h,” which displays hesitation by repetition and cut-off.

Simultaneously, he picks up the blackboard eraser. Mr. Ngo then says, “if it’s an Author?” while erasing the line on the blackboard, preparing to write something in the space. And then, Mr. Ngo further adds, “it’s a LAST Name on- on-ly, (.)” while shifting gaze to students and then back to the blackboard.

From line 18, Mr. Ngo begins by providing an example sentence. He says, “according to Ngo,”. Simultaneously, he starts writing his last name (“Ngo”) in the space where the line was previously written while facing the blackboard. After that, there is a long silence (1.8 seconds) during which Mr. Ngo keeps writing his name (see Figure 12). Then, Lucia utters, “ice cream is delicious.” with a hint of smile in soft voice. She seems to *whisper* this utterance and shifts her gaze to Mariko, making it *hearable* only among a small group of people rather than the whole class. Furthermore, while saying “delicious.”, Lucia points in Mr. Ngo’s direction with a right finger while maintaining her gaze on Mariko (see Figure 13). With her utterance and embodied actions, it appears that Lucia displays her knowledge of what the teacher usually says as she designedly completes his turn: “ice cream is delicious” after “according to Ngo,”. She achieves this by making eye contact with particular classmates (e.g., Mariko) and by whispering, and in turn, Lucia and those other peers display affiliation through smiling, laughing, and eye contact. In other words, the utterance “ice cream is delicious” is *shared*, turn by turn, by the members of the class, as indicated by various verbal and nonverbal cues. Through this very process, the utterance achieves an attractor state, or a *shared code*, among a particular group of students. Furthermore, it is intriguing how Lucia’s action (filling in the teacher’s next utterance with a smile voice) arises in a similar sequential context when Mr. Ngo is facing the blackboard (see line 3 when Lucia says “according to: :” with smile voice after the teacher’s DIU).

Followed by silence, Mariko briefly laughs (hhh-) (see Figure 14), which displays her uptake of Lucia’s attempt at humor with “ice cream is delicious.” and her interpretation of the utterance as *laughable*. Simultaneously, Wei (who sits next to Lucia) also smiles, which displays her recognition and interpretation of Lucia’s turn as *laughable* (Figure 14). And then, Lucia starts to laugh (“haha haha”) while retracting her pointing at Mr. Ngo and leaning backward (see Figure 15). In particular, Lucia’s retraction of her pointing demonstrates that she has achieved an interactional goal (signaling her humorous intent to her classmates), displayed by her classmates’ embodied (re)actions (e.g., Mariko’s laughing). While Lucia is laughing, Mariko shifts her gaze to Lucia while smiling, which shows her orientation to and alignment with Lucia (Figure 15).

Partially overlapped with Lucia’s laughter, Mr. Ngo completes his turn as he utters, “Ice cream is delicious.” (line 25), signaled by the falling intonation at the end, and continues writing the sentence on the blackboard (see Figure 16). This turn again confirms the *shared nature* of the utterance not just among the students but also the teacher. It is interesting that during Mr. Ngo’s utterance, Lucia pokes at Mariko’s arm while gazing at her (Figure 16). Lucia’s embodied actions seem to be an attempt to gain Mariko’s attention. Latched with Mr. Ngo, Wei immediately starts laughing (see Figure 17), which displays her understanding of the match between Mr. Ngo’s and Lucia’s utterances and her treatment of that match as funny. While Wei is laughing, Mariko is facing Lucia and gazing at her with a smile (Figure 17), probably because Lucia pokes at her. While maintaining her gaze at Mariko, Lucia also starts

laughing while pointing in the teacher's direction (line 27, Figure 17). Then, Lucia utters, “I told you,” with a smiling voice while maintaining her pointing and gazing at Mariko. This utterance *echoes* and makes an explicit connection with Lucia’s previous utterance, “Ice cream is delicious.” Lucia’s utterance (“I told you,”) here seems to be targeted at Mariko (“you”), (indicated by her gaze at Mariko, see Figure 18), reminding Mariko that Lucia had whispered it before Mr. Ngo uttered it. In other words, Lucia makes her higher *epistemic* stance (Heritage, 2012) explicit. During Lucia’s utterance, Mariko starts pointing at Lucia with a smile (Figure 18), which possibly demonstrates her understanding of and agreement with Lucia.

In fact, Lucia’s utterance (“I told you,”) appears to serve as a *punch line*, eliciting many students’ laughter and/or smile. For instance, Ying (sitting on the left side of the classroom) starts laughing hard while Alvan (sitting on the right side) also begins smiling (see Figures 18 and 19). And then in line 29, several students also start laughing. Nevertheless, not all of the students laugh together; the ones involved in the co-laughing are mostly female (e.g., Ying, Mariko), as seen in Figures 18 and 19. Several students are displaying their reactions to Lucia by laughing/smiling (including wry smiles/laughing), thus making affiliative moves, while others are exhibiting diverse reactions and orientations, engaging in different activities, such as looking at their smartphones and laptops, choosing not to laugh or smile, or trying to get the teacher’s attention. Matsumoto, Lee, and Kim (2021) demonstrated a similar interactional phenomenon related to laughing and humorous moments in L2 classrooms, illustrating how individual parties might distinctively orient to humor and engage in different activities in humorous sequences. Furthermore, it can be argued that the differences in students’ reactions by laughing or smiling (or not laughing or smiling) depend on diverse factors—including their proximity to Lucia in the classroom, the visibility and audibility of Lucia’s utterances, Lucia’s orientation through her body posture, gaze, and gesture (which affects who is included in Lucia’s humor), and other classmates’ orientation to Lucia—which are all complex and dynamic within a classroom interactional system.

After the students’ co-laughter, Mr. Ngo takes a turn, saying, “I told you so many times,” (line 30) as he continues writing on the blackboard with his back toward the class. Notably, the first part of Mr. Ngo’s utterance is exactly the same as Lucia’s, indicating that Mr. Ngo probably could hear Lucia and *echo* and *adapt* her utterance. Not just echoing and adapting Lucia’s voice, his utterance also seems to entail a sense of escalation and exaggeration by adding, “so many times,”. Here Mr. Ngo seems to strengthen his claim by adding the exaggerated tone and seeming to poke fun of his own utterance. In fact, Mr. Ngo’s utterance, “I told you so many times,” induces a humorous effect; latched with the teacher’s utterance, several (but not all) students begin co-laughing. This turn shows that the students who laugh are orienting to and interpreting Mr. Ngo’s utterance as *laughable*.

It is noteworthy that with line 30, Mr. Ngo makes it explicit (“I told you so many times,”) that he had *already* introduced the sentence “According to Ngo, ice cream is delicious” *multiple times*. This turn clearly evokes the interactional history and the contexts in which the utterance emerged previously in the class. The observable evidence of this interactional history suggests that students and teachers use the utterance as a shared resource or *code* for participating in classroom interactions. We argue that particular

utterances—once they achieve a state of shared code—become interactional resources to engage in humor for building relations and to teach academic content efficiently without explanation from a scratch. Furthermore, Lucia’s whispering and her orientation to particular peers—those classmates’ affiliation with her—possibly contributed to strengthening the shared nature of this code and expanding its potential meanings. Without this close, sequential examination of local interactional contexts, such dynamic employment and enactment of particular codes among particular class members remain invisible.

Discussion

This study attempts to examine both the general patterns of how shared codes (either words, phrases, or sentences) emerged in two ESL classrooms and the local processes of the shared codes were employed by students and teachers for their own purposes and interests *in situ*. In the first section, we attempt to identify the possible systematicity of four shared codes in an exploratory manner, focusing on three aspects (i.e., time span, frequency, and users) and visualizing the patterns among these aspects. In the second section, we conduct multimodal conversation analysis, examining in-depth the complex, local interactional contexts that affect and involve the *negotiation* of interactional norms related to a single shared code. Each code might serve diverse functions, including making humor and serving as an example in academic instruction. Each code might also exhibit a different developmental *state* along a continuum from the initial state of negotiating the possible meaning of a shared code to the more stable attractor state. Putting these two components of analyses together, we can illuminate the complex, ongoing employment and enactment of shared codes within L2 classroom discourse.

Regarding the first question, “Are there any patterns of shared codes (time spans, frequencies, and participants who adapt codes) that emerged in the two ESL classrooms?”, the visualization of the four shared codes showed at least *a few patterns* of development. Namely, two codes from Mr. Ngo’s classroom seem to have a similar curve shape with two peaks in the developmental process (M-shape). Yet, we should consider this finding with the caveat that it is based on a very small data sample. Furthermore, the teacher-initiated cases of shared codes are much higher than student-initiated ones, which indicates the commonly observed sequential pattern (i.e., teacher-initiated interactions) in classroom discourse.

To address the second research question, “How do students locally negotiate norms of shared codes with instructors and other classmates in a specific sequential context?,” we conducted multimodal conversation analysis. Our analysis illustrates how students and their instructor constantly appropriate and *renegotiate* ways of employing the shared code (“Ice cream is delicious”) even though this code seems to have achieved an attractor state by the final week. Furthermore, the analysis highlights the significance of students’ use of nonverbal interactional resources (e.g., gaze exchanges, smiles, and laughter) and exhibits that students and instructor employ the shared code as a resource for humor (relational building) and for learning. More specifically, the shared code “Ice cream is delicious” was amplified in terms of its *shared* nature through students’ anticipation regarding what their teacher would say and humor co-construction among students and the teacher by using the code together. What seems crucial is that shared codes are constantly subject to negotiation depending on how *students* appropriate them.

Besides functions of shared codes (e.g., building relations among class members), numerous *micro factors* within L2 classroom interactions appear to contribute to the unpredictability of shared code emergence. Such factors possibly include situational, conditional elements (e.g., one student's absence from a class session), physical, spatial settings in the classroom (e.g., proximity to a student who employs a code), teaching materials, and activities in which students and instructor(s) engage. In the excerpt, for instance, the spatial component (proximity to Lucia) affects whether classmates can hear the shared code and join the humor sequences. Therefore, it seems to be critical to consider many factors, including contextual factors, materiality, spatiality, and learner agency, in classroom interactions when analyzing the emergent process of shared codes. Although this study is exploratory and qualitative, it has some research and pedagogical implications.

Research Implications

This study demonstrates that our analytical focus, *shared codes*, is an empirical matter that warrants further investigation. We argue that shared codes are potentially an integral part of interactional phenomena that are conducive to L2 teaching and learning in the classroom. Through visualization and multimodal conversation analysis, this study attempts to illustrate the at times predictable but also variable nature of shared codes by illustrating the local processes by which they are negotiated in classroom interactions. Furthermore, investigating the local processes in which shared codes are co-constructed by various members of L2 classrooms can shed light on those students' L2 developmental trajectory, including the use of L2 for various functions (e.g., making humor).

This study suggests the value of CDST concepts as an analytical lens for research in L2 learning/development and L2 classroom discourse. The theoretical approach enables us to view L2 learning, in general, and L2 classroom interactions, in particular, as a complex, dynamic system (e.g., Larsen-Freeman, 2017). Specifically, this study showcases that certain patterns related to shared codes (e.g., certain codes seem to achieve an attractor state by the end of the semester) *emerge* as a result of internal interactions of various system components and external interactions with other systems. This finding aligns with the CDST viewpoint as it conceptualizes language and L2 development as *emergent* rather than as pre-existing. The notion of *emergence* can be applied when analyzing L2 classroom discourse.

Furthermore, this study is inspired by Eskildsen's (2012) work, which has been an innovative way of researching classroom discourse in a complex, dynamic manner. Following a longitudinal approach, we closely examined and tracked classroom discourse through classroom observation and examination of video data for 6 weeks. We also found an in-depth examination of locally contextualized interactions to be crucial. By adopting both macro and micro perspectives, we get a glimpse into systematicity and variability of L2 development and L2 classroom discourse.

Lastly, the topic of shared codes, particularly the possible patterns of emergence, needs further exploration in terms of quantity (e.g., more longitudinal data collection) and quality. For instance, researchers should investigate this topic in diverse classroom contexts, including different subjects (e.g., math), teachers (e.g., novice, experienced), and genders. In addition, it might be more manageable and effective to narrow the focus to particular types of shared codes,

for instance, either words, phrases, or sentences only. Lastly, more research on the pragmatic functions of shared codes is necessary.

Pedagogical Implications

It is imperative that L2 teachers recognize that any utterances that emerge in the classroom are potentially meaningful interactional and pedagogical resources *if* the participants orient to them. While teachers' class utterances might typically be outside the purview of the planned curriculum, our study reveals that teachers should not see phenomena related to shared codes as 'insignificant' elements of L2 classroom practices. Instead, we argue that shared codes can achieve an *attractor state*, becoming a shared *resource* for negotiating understanding and for learning academic content in the classroom. Thus, we consider that such repeated and intentional use of shared codes might contribute to students' engagement in classroom interactions and L2 development.

Nevertheless, this does not mean that teachers can completely control the emergence of shared codes. Even though teachers might initially introduce an utterance, it is up to the class to recognize and negotiate its possible meaning, which is the process by which it becomes "shared." In other words, L2 teachers should provide space where students can experiment with such codes and negotiate meanings with their teacher(s) and classmates in classroom interactions. This highlights the importance of allowing students to exercise their learner agency (Larsen–Freeman, 2019). It can be argued that the development of shared codes is possible when students exercise their agency and when the teacher allows them room to do so. We find that this *reflexive* relationship and dialogic practice are the hallmark of the emergence of shared codes and the development of L2 pragmatic competence.

Lastly, while teachers and students improvise their classroom interactions through the use of shared codes, they can also develop a sense of community through their use of the codes and the humor, laughter, and smiling that can accompany them. We argue that such community building in and through classroom interactions can contribute to students' active participation and overall L2 development. In conclusion, phenomena related to shared codes are worth further exploration since shared codes seem to involve relational work, classroom community building, and students' L2 development.

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References

- Bakhtin, M. M., & Holquist, M. (1981). *The dialogic imagination: Four essays*. University of Texas Press.
- Blommaert, J. (2013). *Ethnography, superdiversity and linguistic landscapes: Chronicles of complexity*. Multilingual Matters.
- Cameron, L., & Deignan, A. (2006). The emergence of metaphor in discourse. *Applied Linguistics*, 27, 671–690. <https://doi.org/10.1093/applin/aml032>
- Cekaite, A., & Aronsson, K. (2004). Repetition and joking in children's second language conversations: Playful recyclings in an immersion classroom. *Discourse Studies*, 6, 373–392. <https://doi.org/10.1177/1461445604044295>
- Ellis, N. C. (1998). Emergentism, connectionism and language learning. *Language Learning*, 48, 631–664. <https://doi.org/10.1111/0023-8333.00063>
- Ellis, N., & Larsen-Freeman, D. (2006). Language emergence: Implications for applied linguistics—introduction to the special issue. *Applied Linguistics*, 27, 558–589. <https://doi.org/10.1093/applin/aml028>
- Eskildsen, S. W. (2009). Constructing another language: Usage-based linguistics in second language acquisition. *Applied Linguistics* 30, 335–357. <https://doi.org/10.1093/applin/aml037>
- Eskildsen, S. W. (2012). L2 negation constructions at work. *Language Learning*, 62, 335–372. <https://doi.org/10.1111/j.1467-9922.2012.00698.x>
- Hazel, S., & Mortensen, K. (2019). Designedly incomplete objects as elicitation tools in classroom interaction. In D. Day & J. Wagner (Eds.), *Objects, bodies and work practice* (pp. 216–249). Multilingual Matters. <https://doi.org/10.21832/9781788924535-012>
- Heritage, J. (2012). The epistemic engine: Sequence organization and territories of knowledge. *Research on Language and Social Interaction*, 45, 30–52. <https://doi.org/10.1080/08351813.2012.646685>
- Hiver, P., & Al-Hoorie, A. H. (2016). A dynamic ensemble for second language research: Putting complexity theory into practice. *The Modern Language Journal*, 100, 741–756. <https://doi.org/10.1111/modl.12347>
- Koshik, I. (2002). Designed incomplete utterances: A pedagogical practice for eliciting knowledge displays in error correction sequences. *Research on Language and Social Interaction*, 35, 277–309. https://doi.org/10.1207/s15327973rlsi3503_2
- Larsen-Freeman, D. (2006). The emergence of complexity, fluency, and accuracy in the oral and written production of five Chinese learners of English. *Applied Linguistics*, 27, 590–619. <https://doi.org/10.1093/applin/aml029>
- Larsen-Freeman, D. (2010). Having and doing: Learning from a complexity theory perspective. In P. Seedhouse, S. Walsh, & C. Jenks (Eds.), *Conceptualizing “learning” in applied linguistics* (pp. 52–68). Palgrave Macmillan. https://doi.org/10.1057/9780230289772_4
- Larsen-Freeman, D. (2017). Complexity theory: The lessons continue. In L. Ortega & Z. Han (Eds.), *Complexity theory and language development: In celebration of Diane Larsen-Freeman* (pp. 11–50). John Benjamins. <https://doi.org/10.1075/llt.48.02lar>
- Larsen-Freeman, D. (2018). Looking ahead: Future directions in, and future research into, second language acquisition. *Foreign Language Annals*, 51, 55–72. <https://doi.org/10.1111/flan.12314>
- Larsen-Freeman, D. (2019). On language learner agency: A complex dynamic systems theory perspective. *The Modern Language Journal*, 103, 61–79. <https://doi.org/10.1111/modl.12536>
- Larsen-Freeman, D., & Cameron, L. (2008). *Complex systems and applied linguistics*. Oxford University Press.
- Matsumoto, Y. (2019). Material moments: Teacher and student use of materials in multilingual writing classroom interactions. *The Modern Language Journal*, 103, 179–204. <https://doi.org/10.1111/modl.12547>
- Matsumoto, Y., Lee, J. J., & Kim, E. (2022). “Laughing moments”: The complex negotiation of laughing acts among students and teachers in an English as a second language classroom. *Classroom Discourse*, 13, 32–63. <https://doi.org/10.1080/19463014.2020.1808494>
- Mondada, L. (2014). The local constitution of multimodal resources for social interaction. *Journal of Pragmatics*, 65, 137–156. <https://doi.org/10.1016/j.pragma.2014.04.004>

- Roehr-Brackin, K. (2015). Long-term development in an instructed adult L2 learner: Usage-based and complexity theory applied. In T. Cadierno & S. W. Eskildsen (Eds.), *Usage-based perspectives on second language learning: Applications of cognitive linguistics* (pp. 181–206). Mouton de Gruyter. <https://doi.org/10.1515/9783110378528-010>
- Sacks, H., Schegloff, E., & Jefferson, G. (1974). A simplest systematics for the organization of turn-taking for conversation. *Language*, 50, 693–735. <https://doi.org/10.2307/412243>
- Seedhouse, P. (2010). Locusts, snowflakes and recasts: Complexity theory and spoken interaction. *Classroom Discourse*, 1, 4–24. <https://doi.org/10.1080/19463011003750624>
- Sinclair, J., & Coulthard, M. (1975). *Towards an analysis of discourse*. Oxford University Press.
- Smith, L., & King, J. (2017). A dynamic systems approach to wait time in the second language classroom. *System*, 68, 1–14. <https://doi.org/10.1016/j.system.2017.05.005>
- The Douglas Fir Group. (2016). A transdisciplinary framework for SLA in a multilingual world. *The Modern Language Journal*, 100, 19–47. <https://doi.org/10.1111/modl.12301>
- Walsh, S. (2011). *Exploring classroom discourse: Language in action*. Routledge.
- Waring, H. Z. (2012). Doing being playful in the second language classroom. *Applied Linguistics*, 34, 191–210. <https://doi.org/10.1093/applin/ams047>
- Yu, H., & Lowie, W. (2019). Dynamic paths of complexity and accuracy in second language speech: A longitudinal case study of Chinese learners. *Applied Linguistics*, 41, 855–877. <https://doi.org/10.1093/applin/amz040>

Appendix

Transcription Conventions

Symbol	Represents
[overlapping utterances
=	latched utterance
(.)	micro pause
(2.0)	timed (e.g., 2-second) pause
:	extended sound or syllable
.	falling intonation
,	continuing intonation
?	rising intonation
!	animated intonation
↑word	shift in rising pitch; double arrows for extreme shifts
-	cut-off
>word<	speech at a pace quicker than the surrounding talk
<word>	speech at a pace slower than the surrounding talk
\$	smile voice
<u>yeah</u>	emphasis
VERY	speech much louder than the surrounding talk
°um°	speech quieter than the surrounding talk
bold	speech or pause (except nonverbal aspects or actions)
+	exact place where action begins in relation to speech
----- (Lx)	action maintained until line X
Fig1	figure number (e.g., figure 1) aligned with the moment of an embodied action
tea	a participant (written in small letters) who does an embodied action at the same time with other participant(s)
GZ	gaze
RH	right hand
LH	left hand
BH	both hands
IF	index finger
PS	projected screen
BB	blackboard
SS	student side (of the classroom)
SSS	multiple students
()	unrecoverable speech