Toward a Process-Centered Account of Literate Activity in the Classroom

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This paper presents an approach to conceptualizing classroom activities that views teachers, students, and classroom objects as participating in continuous, cyclical processes of "reengaging" and "disengaging." As an illustration, six episodes in a U.S. preschool classroom of a teacher, nine 4- to 5-year-olds, and a box (which held objects related to a featured letter of the week) were analyzed through a relational-process lens. The box, classroom members, and objects that children brought from home moved through cycles of coming together and moving apart physically and attentionally. Furthermore, these processes metaphorically pulled in other activities across time and space.

Key words: early literacy; process; classroom practice; artifacts; relational theory

Many learning theories, like those that arise from constructivism (Liu & Matthews, 2005) and information processing (David et al., 2004), assume a separation between learner and environment and focus on entities acting on one another. Sociocultural theories (Rogoff, 2003), embodiment theories (Overton, 2008), and actor-network theory (Akrich & Latour, 1992; Law, 1987), alternatively, blur the divisions between the individual and the world "outside" of the individual and highlight relatedness as an inherent, central aspect to understanding learning and development. However, some of these approaches have been criticized for not sufficiently explaining how activities unfold over time (e.g., Barab et al., 2004; Kaptelinin & Nardi, 2006). For any process-oriented perspective, Boons and colleagues (2014) assert, "what requires explanation is thus not why *things* change, but why some lineages of events keep happening in the same way. Thus, a fundamental question that follows from this ontological position is how more or less stable entities emerge, develop, and dissolve" (p. 342, italics added). This question fits well with notions of culture as "flowing patterns" of acting and meaning making endorsed by Adams and Markus (2004). Centering process and relationships in accounts of learning and human activity also refocuses a Western overemphasis on static entities in theories of learning and theories of being more generally (Bang, 2020).

In this paper, I offer a process-oriented framework for understanding classroom activity that expands and refines other approaches to understanding activity in educational settings that privilege relational-processes theories (e.g., Roth, 2016). Data from a study of a preschool teacher and her students participating in repeated encounters with a "letter box" will help illustrate this framework. The letter box was a box in which children placed objects from home. Children were supposed to bring objects whose names started with the letter of the week, and the teacher and students discussed the letter in relation to the objects on a weekly basis.

Taking a process-oriented ontological stance

The main premise of this paper is that we should shift from thinking about how people and things interact in activity to thinking about processes that unfold over different scales of time. In other words, one can view people, tools, rules, and so on as manifestations of processes and manifestations of changes in how processes relate to one

another. These basic ideas regarding process are expressed in both Western and non-Western animist traditions. Below, I demonstrate how this perspective applies to a classroom literacy activity after presenting a more general theoretical framework.

Movement and change are key features of Indigenous animist thought around the world (Ingold, 2006). Ingold (2006) posits, "The movement of life is specifically of becoming rather than being, of renewal along a path rather than displacement in space" (p. 15). Similarly, in Ramose's (2007) pan-African-centered philosophy, existence always involves movement and change, as he states that "motion is the fundamental mode of be-ing of every being" (p. 126) and that "being cannot be outside of motion nor can it be without motion" (p. 126). Hopi (Whorf, 1956) and Anishinaabe (Gross, 2014) worldviews in the Americas also shift focus away from static objects to dynamic events, or "eventing," to use Whorf's term (1956, p. 147). The British philosopher Whitehead (1978) echoes these ideas in his thesis that "the actual world is a process, and that the process is the becoming of actual entities" (p. 22). For Whitehead, *concrescence* creates what he called "actual entities" or "actual occasions," which are impermanent outcomes of converging forces. Deleuze and Guattari's assemblage theory (1987) similarly emphasizes temporary and repeated convergences. In sum, ontologies around the world support the idea that people and things are manifestations of actions and events.

A process-oriented view of people (and other organisms)

Instead of viewing people as entities with traits that change over time, a process-oriented approach views people as "human becomings" (Ingold, 2013), or manifestations of emerging and shifting forces. In Whiteheadian terms, people consist of multiple, coordinated occasions, which are distinct but inextricably tied to other occasions (Brown & Stenner, 2009). Such a view of human beings has implications for how we conceptualize development. A process-oriented view helps us focus on "conditions associated with the process of becoming" (Overton, 2015, p. 46) and examine how various contexts and resources help or hinder that process. It is important to keep in mind in this endeavour that human "becomings" do not arise as separate, bounded entities (Brown & Stenner, 2009). The pathways or trajectories of "individuals" connect always to those of other organisms and things across time and space.

A process-oriented view of artifacts

Whereas change over the lifespan is central to accounts of development, the notion that artifacts change and are in a constant state of becoming is typically deemphasized. Yet according to process archeologists (e.g., Alberti et al., 2011; Gosden & Malafouris, 2015), artifacts that we think of as unchanging entities change continually in terms of their physical features, their purpose, and how they relate to other things. A vase, for example, is in a continual state of becoming as it moves from a lump of clay in the hands of its maker to a form that affords containment to perhaps being reused to fulfill some purpose in human activity (Gosden & Malafouris, 2015).

The process of becoming operates on smaller timescales as well. Scollon (2001) provides an example of a crayon changing its nature as a mediating artifact over the history of a person's life. In his case study, the crayon's relationship to people constantly shifted depending on whether it was involved in a child's drawing practices, labelling practices (e.g., identifying the colour of the crayon) involving adults, practices tied to politeness and social interaction (also involving adults), and so on. Something as simple as a crayon then has a history based on its creation and adaptation over ontogenetic and intergenerational time.

Viewing artifacts as "occurrences in space and time" (Gosden & Malafouris, 2015) is consistent with actor-network theory (Akrich & Latour, 1992; Law, 1987) and with animist and neoanimist viewpoints (Hornborg, 2006; Marenko,

2014; Strathern, 1988), which also avoid the tendency to see artifacts as static or passive entities. Eglash and colleagues (2020) note that around the world, "Indigenous communities have long held robust, functional concepts and practices for understanding and utilizing collaborative engagements between human and nonhuman material and semiotic agencies" (p. 1335). Animistic stances among non-Indigenous cultural groups may be increasing in terms of treating nonhuman, technological artifacts as communicative agents as more people interact with phones, computers, and other "smart" devices (Marenko, 2014). It may not be that users explicitly believe these objects are alive, but they still treat them that way (Hornborg, 2006). In some situations, belief systems, like Shinto-based "techno-animism" (Jensen & Blok, 2014), are more explicit. The issue of agency is central to animist conceptions of how people and things are intertwined in relational processes as well (Rosiek et al., 2020).

The relational core of process-oriented theories

A process-oriented view that highlights relationships helps to avoid reifying "community" as an aspect of an activity system or thinking about communities of practice (Lave & Wenger, 1991) as entities that people (and tools) enter and leave. Instead, this approach suggests that community making should be the focus, and we should think of people and artifacts continuously creating and renewing community. Follett (1919) captures this idea succinctly in her statement that "community is a *creative* process. It is creative because it is a process of integrating" (p. 576, italics added).

Relational processes are also key to understanding the nature of artifacts and to understanding how artifacts fit into human activity. Neoanimist principles warn against framing artifact agency as properties of the tools themselves (Marenko, 2014), which is markedly different from Kaptelinin and Nardi's (2012) views of agentic properties of different types of objects. In seeing artifacts as manifestations of ever-changing processes, Strathern (1998) writes, we "learn what they do in relation to what we do, how they respond to our behavior, how they act towards us, what their situational and emergent behavior (rather than their constitutive matter) is" (p. 78). This idea echoes that of artifacts as nonhuman actors in actor-network theory (Akrich & Latour, 1992).

Using language and diagrams to understand classroom processes

Changing the language, diagrams, metaphors, and other ways of representing classroom activities must be at the centre of any shift toward thinking about relational processes. As Stout (2012) notes, "to become fully process oriented, it is necessary to have a new language to support a collaborative participatory process" (pp. 409–410), although languages that focus on actions and events are not particularly new. Ancient Hebrew stands as an example of a verb-centered language that used nouns and adjectives as modifications of verbs (Bohm, 1980), and Hopi depicts as processes what English depicts as objects (Whorf, 1956). Gross (2014) provides an example of stating that a healer sings a song to cure a patient. An English-speaker might say "a healer sings a healing song" (p. 106), which tells us that the subject (healer) causes healing through application of a song. However, "in the Anishinaabe worldview, as expressed in Anishinaabemowin grammar, [the healer, patient and song] are wrapped together in a healing process like this: healer + song + patient = singing = cure" (Gross, 2014, pp. 107–108). In the Anishinaabe worldview, according to Gross, the healer helps bring in the song as a helper in the healing process; it is not the healer who acts on the song like one object applying force to another.

The subject-verb-object structure of English and many other languages lends itself toward compartmentalizing reality into distinct objects that act on one another (Bohm, 1980; Gross, 2014). Bohm (1980) proposes a new way of using language to avoid this view, suggesting that "instead of saying, 'An observer looks at an object,' we can more appropriately say, 'Observation is going on, in an undivided movement involving those abstractions

customarily called "the human being" and "the object he is looking at"'" (p. 29). A simpler suggestion may be to rely on gerunds (Follett, 1918), which serve as "a reminder of process ontology—exist*ence* is actually a dynamic state of exist*ing*" (Stout, 2012, p. 413, italics added).

There have been recent attempts to change descriptions of what unfolds in classroom activities. Roth (2016) suggests viewing activity in terms of intransitive verbs (e.g., "growing-making") to capture ways in which people and things *become* together. He provides examples of second-graders and tangram shapes growing together in activities involving the creation and understanding of hexagons, emphasizing that these processes are constantly converging, diverging, and reconverging. Although Roth (2016) does not cite Bohm, Gross, or Whorf, he effectively refines and extends their ideas in a classroom setting.

Changing the ways in which we visually and metaphorically represent classroom activity is important as well (de Freitas, 2012; Goulart & Roth, 2006). de Freitas (2012) proposes replacing diagrams (and metaphors) based on boxes (representing separate people and things) and arrows (representing interactions between those entities) with knot diagrams that represent the complex ways in which classroom entities converge and diverge. Along with using the metaphor of a rhizome to capture classroom activity, she recommends:

> Instead of simply tracking the straight linear path between two students or teacher and student and then applying a Euclidean measure of the content exchanged, I suggest that we follow the meandering tangle and conceive of interaction as a genuine mixture. (p. 566)

Similarly, some authors represent legitimate peripheral participation in a community of practice (Lave & Wenger, 1991) with circles, with marginal participation shown along or near the circumferences (e.g., Firth, 2008; Karalis, 2010). Change in communities of practice is not always as simple as moving between marginal and fuller participation, and sometimes actors at the margins become central in other ways (Goulart & Roth, 2006). Goulart and Roth (2006) describe illustrative cases of a kindergartner who sometimes was central to teacher-led activities in the classroom but in other moments moved to the periphery of those activities *while* being central to interactions with his friends.

Below, I offer a new approach to conceptualizing classroom activity that privileges process. The first proposition of this new model involves focusing on verbs, taking my primary inspiration from Bohm's (1980) concept of the *rheomode*, his proposed verb-centered approach to language. Bohm proposed using verbs as roots and adding affixes to convey variations in the processes described by the root. In particular, he suggested using "re-" to convey repeated action, "de-" to convey undoing, "irr-" to convey not doing something properly, and "con-" to convey doing something together. Since the focus in this paper is on engaging (as an alternative to Ingold's "knotting") among students, artifacts, and the teacher (who are themselves all also manifestations of engaging), I will use "engage" as the root verb. Thus, the temporal pathway of engaging could be described with "engaging," "reengaging," "misengaging" (which is less awkward than "irrengaging"), and "disengaging."

The second proposition is that engaging occurs in recurring cycles. Children, teachers, and classroom artifacts continually revisit one another over time. The children and tangrams described by Roth (2016) and the class-sharing activity described below occurred together repeatedly. So, the human and nonhuman participants in these activities cycle through engaging or reengaging at the beginning of the cycle of coming together. Then participants may shift between engaging, misengaging, or disengaging as ways of altering or exiting the cycle, respectively. Central to this proposition is a shift away from thinking of activities as unfolding over linear time.

The third proposition is that we can visualize these engaging cycles as bubbles that float in time and space. Whereas de Freitas (2012) proposes using static, two-dimensional knot diagrams, one should imagine dynamic

representations of cycles that look like soap bubbles that can attach to one another, split from one another, and so on. Overlapping or combining bubbles refer to connections between different bubbles. Conversations, people, objects, and memories can serve as processes that draw the bubbles together (see Lemke, 2000, regarding the role of artifacts in tying together activities over time). For example, a child talking about a family vacation to explain a souvenir brought to the class connects a cycle of engaging involving family in a different time and place with the cycle of engaging occurring in the classroom. In addition, one can imagine new bubbles splitting from old ones or smaller bubbles sticking to the surface of larger ones. These correspond to situations in which children or objects shift their participation between different, co-occurring communities of practice (Goulart & Roth, 2006). Educators may implement this relational, process-oriented model to structure classroom activities and reflect on their relationships with their students and objects in the classroom (and beyond) in ways that highlight (a) the ever-changing nature of learners, teachers, and materials, (b) the contextual nature of learning, acting, and knowing, and (c) the cyclical nature of activity in and out of the classroom.

The illustrative case study

The case study described below focused on a literacy-based activity shared between a preschool teacher and her class. This type of activity was chosen to demonstrate the usefulness of the relational-process-oriented view because literacy activities overtly weave together people, events, places, and things. As Brandt and Clinton (2002) note, literacy serves as a "transcontextualizing social agent" (p. 351) which links people spatially and temporally. The activity of interest involved the teacher and children gathering to discuss the contents of a "letter box" (the name of the artifact used by the class). Each week children brought items that started with a different letter of the alphabet.

Participants were a teacher and children in a preschool classroom. The preschool was a small, private, cooperative school in which parents played a predominant role in all facets of running the school (including volunteering in the classroom), and the school was located in an urban centre of approximately 130,000 people in the U.S. Midwest. In this classroom, there were nine children, including four girls and five boys, with a mean age of 57.63 months (SD = 6.25 months; range = 47.64–66.17 months). Two of these children were of Asian descent; one was Latino/a, and six were of European descent. The teacher was a woman of European descent, had taught at the school for several years, and served as the director of the school.

After acquiring approval for the project from the author's university's institutional review board, data collection occurred over a five-week period in the fall of 2012 as part of a study of the classroom in which researchers assessed children's reading skills and observed them in a variety of literacy-related activities. Typically, observations were conducted one day per week for approximately three hours per visit, allowing the researchers (two undergraduate students) to record changes in how children produce and understand written language. Data collection primarily involved videotaping participants as they engaged in different activities involving written language. Researchers produced 26 video-recordings of literacy-related activities, six of which pertained to the letter box activity that is the focus of this paper, along with working on computers, completing worksheets in small groups, and teacher-led book reading with the entire class. Individual recordings began when two or more individuals in close physical proximity started to read, write, or discuss written language together, and recordings ended when less than two participants remained in the activity.

The letter box activity occurred on a weekly basis, and this was one of several types of activities in which the students and teacher engaged together at a carpeted end of the classroom. The teacher sat against a wall and kept the letter box in front of her. The letter box was a painted wooden box with colourful letters (cut from alphabet blocks) decorating the lid. Students sat in a semicircular formation to face the teacher and the box. Each week was

dedicated to a letter of the alphabet, and students brought objects from home to give to the teacher to add to the letter box at the beginning of the day. Students were instructed to bring objects with names that started with the letter of the week. At the beginning of the activity, the class sang the alphabet song until they reached the letter of the week. Then the teacher picked an object from the box and asked the student who had brought it to stand before the class. The class labelled the object and then sometimes described the object or discussed what it meant to them. Then the student put the object away in a cubby in another part of the classroom (to take home after school). This process repeated until the class had labelled all the objects in the letter box.

Data for this study consisted of six video-recorded episodes of the letter box activity. Three of these recordings captured the entire letter box activity, two recordings were missing a few seconds of the start of the activity, and one was missing the end of the activity (due to researcher error). The recordings lasted between 1 minute, 54 seconds and 4 minutes, 55 seconds (see Table 1). After data collection was complete, I created transcriptions of each episode with (a) utterances made by human participants, (b) changes in the physical and social interactions between human participants (e.g., when a student got up to approach the teacher or another student), and (c) changes in the interactions between artifacts and humans (e.g., when the teacher removed an object from the letter box). I first looked at the transcripts to locate instances in which people and objects changed in relation to one another, then I reviewed the transcripts again to identify utterances or conversations which related to connections between people and things in the classroom and events or places outside of the classroom or in the past. This review was done with the initial intent of looking for patterns regarding relationships and processes. Once I started to think about the cycling bubbles metaphor, I reviewed the transcripts one more time to look for additional instances of "bubbles."

Table 1

Letter Box Episode Characteristics

Date	Duration	Letter	
10/9/12	3:02 (missing end)	D	Dodo stuffed animal, two Doc McStuffins dolls, unidentifiable object with calendar dates on it, dog hat, rubber dinosaur, Darth Vader toy
10/15/12	4:55 (missing start)	E	Photo of the Easter Bunny, three plastic elephants, and two plastic eggs
10/23/12	1:54 (missing start)	F	Feather, fork, plastic frog, hand fan, fingernail polish
10/29/12	3:02	G	Two graters (one is a toy), goldfish-shaped container, goggles, glow-in-the-dark nail polish, giraffe photo in a magazine
11/6/21	3:55	H	Plastic hair, magnet in the shape of the letter, hair brush, plastic hamburger, toy hamster, piece of crumpled paper (with no apparent connection to H)
11/12/21	4:19	I	Ice cubes, ice cream toy, plastic iguana, ice cube mold, ink bottle, Isis's name on paper

Engaging as an unfolding, relational process

The beginning of one of the episodes can serve as an example of how to think of different engaging processes that bring the teacher, letter box, students, and conventional ways of representing the Roman alphabet together. The teacher is sitting on the floor with her back leaning against a wall, and the children are facing her while sitting in a semicircle. Meanwhile the letter box is on the floor in front of the teacher, who tilts it toward the children to make the lid's letters more easily visible. Thus, engaging begins with the teacher, box, and children gathering in this one part of the classroom. The teacher continues as a conduit for engaging by saying, "Are you ready? Okay, Audrey." (All names here are pseudonyms.) The teacher and most of the students begin singing the alphabet song while the teacher points to letters on the box lid. Here the teacher, box, and song are engaging—they are all equally bringing one another closer in relation to the other. One or two of the children are singing slightly different melodies or are signing at different tempos. They are neither causing the entire activity to disengage nor are they removing themselves completely from the activity, so this can be described as misengaging. (Other examples of misengaging occur when the class discusses the letter G and one child, Sean, briefly jumps on another child, Jessica, while she sits, and on the day the class discusses the letter D and a child, Stephen, crawls around the room with the toy dinosaur he brought to class and pretends it is roaring in front of some of his peers.)

The class repeats the song but stops at the letter E this time, allowing the song to unknot from the activity. Then the teacher sets the box down and opens the lid. A child says, "E today!" and the teacher responds, "E today." Another child says, "F today," perhaps attempting to engage a different activity (see more on this phenomenon below). However, the teacher continues, "There's the E. Can you make it?" There is a laminated sheet of paper with capital and lowercase e (in plain script) attached to the inside of the box lid. The teacher removes that sheet and holds it up facing the students. The teacher continues to guide the engaging process by asking, "Can you make the uppercase E?", then most of the children trace the letter in the air with their index fingers as the teacher does the same. The process repeats with the lowercase e, then the class discusses the visual differences between upper- and lowercase Es. After this, the teacher flips the sheet over, and the back has uppercase and lowercase Es in cursive. The teacher says, "The taller one looks like a backwards … like a backwards 3," and she places a finger above the uppercase E. As she continues, saying, "Alright, it looks like a 3 but it is an E in cursive," some of the children begin to disengage by talking among themselves.

The teacher returns the sheet to its location on the underside of the box's lid while a child says, "Yeah, [inaudible] cursive." The teacher responds with, "That's what it's called, cursive. Alright, Phil, are you ready for me to take an item out of the box?" This response marks a new phase of engaging that shifts the pathway through which the box, the box's contents, the children, and the teacher engage. The class will shift to sharing items that some of the children brought from home. This first part of the activity lasts almost two minutes.

It is important to note that the letter box is as central and integral to engaging as the human agents in the activity. Before the box begins engaging in each episode, students' attention is focused in different directions even though everyone is physically present in the same space. Similarly, all of the human and nonhuman participants disengage when the teacher moves the box away at the end of each activity. The box engages in multiple ways once the teacher places it between her and the students. First, the class sings the alphabet song while the teacher points to the letters that decorate the box lid. A discussion of the letter of the week (e.g., how to draw it or how the uppercase version differs from the lowercase) follows. Engaging unfolds in a similar manner as the class discusses the letter H in the other episode. Figure 1a provides a simplified representation of how we can think about human and nonhuman participants engaging with one another through time.
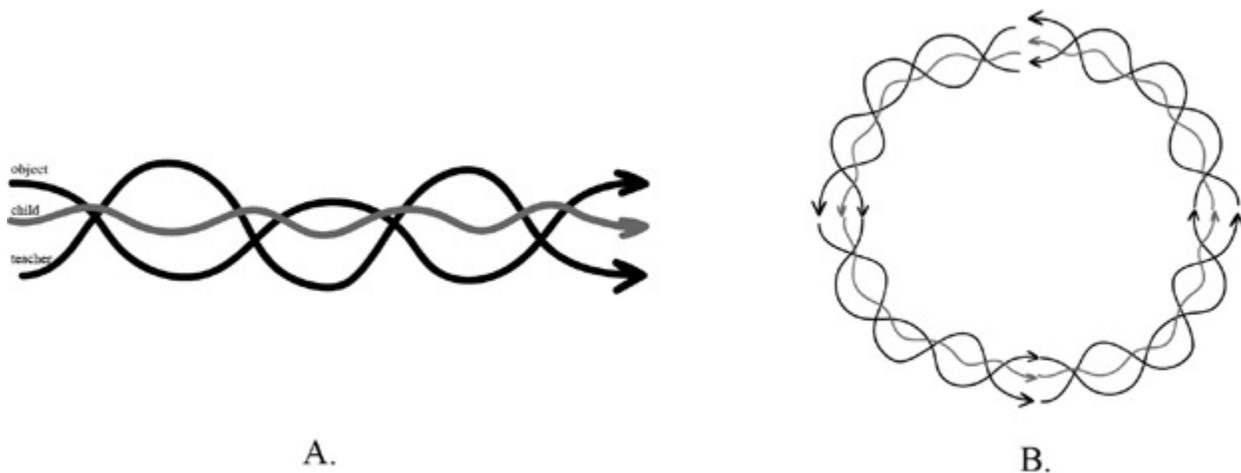
Figure 1. Depictions of engaging as relational and cyclical processes.

To adopt Roth's (2016) terms, the students are in the process of becoming "caretakers" of letters in the Roman alphabet. In some video-recorded episodes, the children further demonstrate this caretaker role by asking the teacher to show the class the cursive versions of letters. For example, on the day the class discusses the letter G, a girl says, "[inaudible] the cursive!" and the teacher responds, "You would like to see the cursive Gs?" Several children say "yes!" repeatedly. Then the teacher says, "It looks a lot different" as she turns the sheet with the print versions of G over to reveal the cursive forms. Several children gasp and laugh while pointing when the teacher reveals the cursive version of the upper- and lowercase Gs. So far, my focus on process is very similar to Roth's emphasis on nontransitive verbs in his descriptions of growing-making during a mathematics-centered activity. One main difference is that I have included the role of the teacher as engager, whereas Roth made the teacher less integral. Differences that are more substantial will be apparent in the next two sections of this paper.

Reengaging and disengaging are cyclical processes

Engaging processes happened in cycles that occurred on different timescales. For example, the letter box activity itself repeated week after week. Students, the box, and the teacher start near one another to begin the (re)engaging process, then the alphabet song joins the engaging. After discussing the physical form of the letter of the week, students share objects from home that had been placed in the box. The teacher retrieves objects and students cycle through sharing and labelling objects. Table 1 lists the objects that children brought from home in each episode. Each of these objects enters their own cycles of engaging with the other engagers in the activity, and children take turns briefly engaging with those objects. On occasion, these objects and the children who brought them to school misengage. The piece of paper, for example, moves the cycle of sharing out of its otherwise predictable pathway. At the end of the activity, unengaging occurs as the letter box, the teacher, and the students all go to different locations and shift roles toward other instances of engaging.

The engaging cycles contained within any one day the class used the letter box happened over the span of several minutes, but they were embedded within longer series of cycles that lasted for weeks and months in the lives of the teacher, students, and artifacts. The letter box activity itself occurred numerous times throughout the school year. Furthermore, the teacher and the letter box had participated in these activities for several years prior to the case study. In sum, it is best to imagine these cycles of reengaging and disengaging (with misengaging often mixed in) as spinning bubbles instead of static forms usually captured in a diagram. However, Figure 1b offers an attempt to

represent these cycles in a static two-dimensional image.

Cycles of engaging can "float" in time and space to converge and diverge

One also should visualize these bubbles as floating around—attaching and detaching from one another. Consider the following interaction in which one child shows the rest of the class her hairbrush during the episode that focused on the letter H.

> Teacher: Someone brought this. Audrey.
>
> Audrey: This is a brush from Disneyworld. [The child gets up and walks to the teacher. She takes the brush from the teacher's hand.]
>
> Teacher: What do you brush with it?
>
> Audrey: My hair. [Audrey runs the brush over the side of her head.]
>
> Teacher: Hair! Good job. You brush hair with it.
>
> [Audrey leaves the carpeted area with her brush before returning to the spot where she had been sitting.]

The teacher, focal student, rest of the class, and hairbrush are engaged with in this fleeting moment, which occurred in a sequence of similar engagings (within the broader engaging for the entire episode). At the same time, this process draws in engaging processes from other places and times. Audrey's recollection and comment regarding Disneyworld draws that past engaging—involving her family, the hairbrush, and the theme park—into contact with the present engaging. Repeated engagings with Audrey and her brush in the context of brushing hair also float in to connect with the presenting engaging. Furthermore, the teacher is able to bring in previous engagings involving the letter H by highlighting the word "hair." The hairbrush's engaging provides the "gravity" that pulled these various bubbles together across space and time. Because this metaphor involves movement, using a static figure would not be effective.
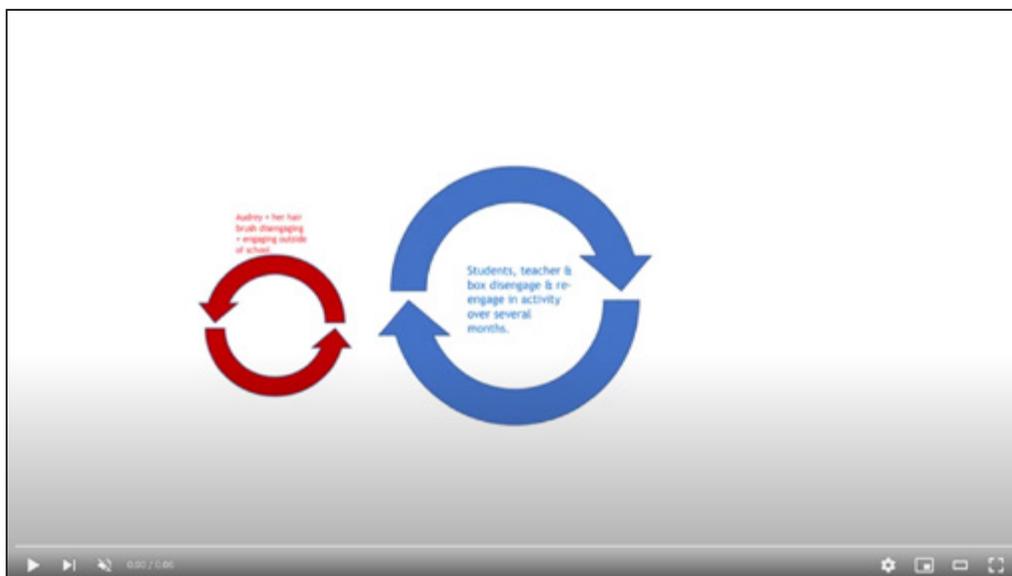
a rudimentary way, the concept of the spinning bubbles of reengagement and disengagement

In another episode, the teacher holds up a magazine photograph of a giraffe, and a child shouts, "Just like Derek!" The teacher repeats, "Just like Derek." Students take turns taking Derek, a stuffed giraffe, home and write reports about what they did together at home, so Derek is well known (and beloved) among the class. In this instance, Derek isn't physically near the teacher and students, but it engages with the class nonetheless.

Similarly, one engaging bubble can split from another. Students and their shared objects disengaged when those students carried away those objects. There also were repeated instances of students pulling their peers away from the letter box activity by drawing attention to themselves for their peers' entertainment—one might consider this misengaging from the perspective of maintaining the letter box activity, but it could also be engaging between friends. One boy, Roger, after showing his toy elephant during the October episode, walks around the carpeted area with the trunk of the toy in his nostril, saying, "Heeyah! My pet elephant. Ah, he [slipped] up my nose!" This causes several children to laugh. A different student, Stephen, had also brought a toy elephant (toward the end of the same episode), and Stephen sticks the toy's trunk in his nostril while he puts the toy away. Around the same time, another child, Phil, walks around with his stomach sticking out and announces, "A fat tummy, a fat tummy. A fat tummy!" This also causes other children to laugh until the teacher asks Phil to sit down.

These phenomena are similar to Goulart and Roth's (2006) observations of children simultaneously moving to the margins of one activity while becoming central to another. Using my metaphor, these children create smaller engaging bubbles on the surface of the larger, predominant bubble (i.e., the letter box activity). Here the bubbles split and perhaps float away from one another, instead of moving together and merging, as in the hairbrush example.

Conclusions

Although the model presented here shares many similarities with Roth's (2016) growing-making model, there are some significant points of divergence. The engaging approach described in this paper attempts to overcome these limitations in a few ways. Roth acknowledges that the hexagon has a history in the West that extends for thousands of years, and he notes that "it is the grower-maker who is a caretaker of the mathematical object, which in caretaking is handed on to the next generation" (p. 101). Elsewhere in his paper, Roth emphasizes that the tangrams and children are in a process of change together, but in his explanation of caretaking the tangram becomes relatively passive as a thing to be cultivated by students. In the engaging model, people and things have equal agency.

Furthermore, Roth does not directly address relationships between the teacher and the students and between the teacher and the tangram. In the literacy-based examples described above, the teacher is just as integral to the (re) engaging process as children and artifacts. The teacher-as-knotter created the letter box and continually guided the letter box in its engaging with the classroom members. The teacher also played a role in guiding "bubbles" of engaging cycles toward one another in helping students think about how their shared objects stored in the letter box relate to the letter of the week and to experiences outside of the class. Presumably, the teachers in the mathematics classroom Roth describes played similar roles.

The growing-making account does not directly address the connections between a specific activity (e.g., using tangrams) and other activities. However, the notion that engaging cycles can attach and detach from one another addresses how seemingly isolated activities observed in a classroom connect to activities that exist or existed in other points in time and space. In sum, the model I present here complements Roth's approach, and I do not mean to imply that his should be replaced.

Moving away from seeing activity unfolding over linear time is also consistent with non-Western conceptions of time (see Bynum, 1999) and with some iterations of cultural historical activity theory. Expansive learning

cycles emerge from questioning aspects of established practices through generating, implementing, and reflecting on new practices (Engeström, 2011). Similarly, Arievitch and Haenen (2005) recast Galperin's model of mental development as a spiral that proceeds from orienting oneself toward a task, engaging in physical actions, engaging in verbal actions, engaging in purely mental actions, then orienting oneself to the task in a more sophisticated manner.

The process-oriented account of activity also provides a way of explaining "the reproduction, maintenance, and modification of cultural patterns" (Adams & Markus, 2004, p. 344). Reproduction is a matter of new actors engaging in recurring activities. Maintenance occurs with recurring cycles of engaging and disengaging. Modification involves new processes or changes in how engaging and disengaging manifest themselves. In the present study, there were changes over time to what letters were the focus of the letter box activity, and changes to which objects are shared through the letter box shape how people and artifacts in the classroom knot and unknot over time. A challenge for future research will be to determine how reproduction, maintenance, and modification occur on larger scales.

An emphasis on process has implications for research in that it encourages designs that capture change. The present study demonstrates how microgenetic designs can document small-scale engaging cycles. Longer-term longitudinal designs can be implemented to study engaging-disengaging cycles on larger time scales. For example, a different project could have explored the evolution of the letter box from its creation as an undecorated box to a literacy-related tool for a classroom to whatever it became after the preschool closed soon after data collection ended. Longitudinal designs would allow researchers interested in process to "relate typical patterns to certain antecedents, contexts, and outcomes" (Boons et al., 2014, p. 342).

The process-oriented approach to activity also has implications for formal education. It is compatible with the idea that education should deepen students' participation in communities (Ingold, 2015; Roth & Lee, 2004; Wortham & Jackson, 2012) and should help students find or make connections between their immediate, everyday environments and broader contexts (Gergen, 2009). Wortham and Jackson (2012) refer to this as a "relational approach to education which emphasizes facilitating individuals' participation in systems that include both people and artifacts" (pp. 11–12), contrasting with "individualist education," which emphasizes decontextualized knowledge and the separateness of knowledge and the learner.

Thus, there are several ways in which the relational-process model described in this paper can be applied to classroom settings, particularly preschool classrooms. First, teachers should focus on relatedness and helping students make connections. The teacher in the present study occasionally made direct references to how the objects students brought engaged with other people and places (e.g., referring to vacations from which objects originated or referring to parents using objects at home), although these references did not occur for every object. The teacher also rarely discussed how objects' labels related to the letter of the week beyond slowly saying the labels so the students could hear the starting sounds for those labels. Although it is not always necessary to make relationships explicit to learners, teachers may want to be more cognizant of how they help students understand connections between themselves and others (both human and nonhuman).

Second, deemphasizing separateness between teachers, learners, and class materials can help educators move away from the idea that students are receptacles for knowledge transmitted by the teacher. Bringing in the practices, social relationships, and material artifacts from children's lives outside of the classroom and engaging in repeated activities, like the letter box activity, that the class can look forward to supports relational educational practices. Third, a focus on the cyclical nature of engagement can help teachers plan lessons and activities that build on one another or revisit ways of engaging with others. This focus could help students remember information

more effectively and help engrain ways of participating that are part of the habitus (Bourdieu, 1977) within the classroom. Fostering or reinforcing recurring cycles of engagement may also help students and teachers more easily understand the roles they may have in the classroom and contribute to their development as social beings (see Nsamenang's [2006] theory of social ontogenesis).

Lastly, the model outlined above can help educators move away from privileging decontextualized knowledge. Some traditional models of knowledge and skill transfer (Day & Goldstone, 2012) view transfer as a matter of bridging different settings (e.g., class and home, or class and workplace). However, conceptualizing classroom activities as a mesh of spinning bubbles of engagement and disengagement may prompt teachers to structure lessons and activities in ways that acknowledge interconnectedness and context.

It should be noted that the letter box activity also exemplifies best practices from a traditional (i.e., not relational-process) standpoint. This activity occurred during circle time, and a wide range of activities can occur during circle time across preschools, including academic content like literacy and numeracy and nonacademic content like discussing the day's activities (Zaghlawan & Ostrosky, 2011). However, circle time is sometimes underutilized as an opportunity to teach children. Bustamante and colleagues (2018), for example, noted few conversations between teachers and students, a lot of repetitive or highly scripted interactions, and low quality of instruction during circle time in a sample of public preschool classrooms serving urban, low-income populations in the United States. The letter box activity was repetitive in some ways (because of its cyclical nature), but variation was a key feature of the activity in terms of students' contributions. Also, the students had some agency during the activity, were active participants, and continually conversed with the teacher. So, the letter box activity was unlike the less effective manifestations of circle time noted by Bustamante and colleagues. Furthermore, literacy instruction appears to be more effective in group activities relative to one-on-one classroom interactions in both public urban preschools (Cabell et al., 2013) and public rural preschools in the United States (Bratsch-Hines et al., 2019). It is reasonable to believe that this principle would apply to a private preschool like the one I observed in the present study.

There are a few limitations to the present study, some of which involve the generalizability of the results. I analyzed six relatively brief examples of a specific type of activity, although it is expected that other literacy-related activities like joint book reading or completing worksheets could also be examined in terms of fostering connections across time and space. This study is also limited in that it focused on a particular type of preschool in a particular location (a small city in the midwestern United States) with mostly European-descent children. Future studies could overcome these limitations relatively easily. Another set of limitations is more conceptual in nature. Throughout this paper, I employed words like "teacher," "box," and "student," but this type of language still implies the existence of distinct, stable entities. Future scholarship should continue to develop notions of subjects, tools, rules, communities, and other facets of activity in terms of process.

However, this article provides a way to continue moving toward thinking about activity primarily in terms of flowing, moving, or "eventing" (Whorf, 1956) instead of imagining subjects, artifacts, rules, and communities as relatively static entities. This approach blends multiple Indigenous models of relational being with Western process theories. Ideally, a more complete understanding of how activities change over time will emerge from shifting toward verb-centered conceptions of people, things, and activities, and this relational-process view of activity will offer additional tools to do so.

Acknowledgments

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