

Activity frames and complexity thinking: Honoring both public and personal agendas in an emergent curriculum

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Abstract

This article which is largely conceptual in nature, explores the possibilities provided by embracing complexity thinking that are attentive to, but not confined by, externally imposed curriculum mandates while simultaneously honoring the interests and needs of individual students and the classroom collective. From this perspective, the ideas of negotiating authority, adopting a holistic view, engaging in participatory democratic practices, and using a project-based approach to learning are examined. In doing so, the concept of ‘activity frames’ is introduced and developed as a useful way of responding to curriculum mandates while being responsive to and respectful of individual and collective student learning agendas.

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I teach a Social Studies Elementary Methods course in the Faculty of Education. The culminating task for student teachers enrolled in this course is the creation of a unit plan that will be used in their upcoming practicum. Last term I had three sections of the course and, as it turned out, each course ended on consecutive weeks so I found myself reading through unit plans in a constant stream for three weeks. Near the end of the last week, I was sitting with a student, going over her unit plan, when I was suddenly struck by an obvious yet overwhelming observation. Over the years I had read hundreds of very good unit plans written by creative and enthusiastic aspiring teachers. Each plan had a common flaw.

Although they typically included a cogent rationale and a thoroughly delineated list of Ministry learning objectives for Social Studies instruction, a critical element was consistently missing: the children. All these years I have been teaching student teachers to design lessons according to a ‘one size fits all’ recipe. Now I wonder how we ever thought that a teacher could design a unit plan without considering the unique and diverse qualities of their own specific students. How can we plan without thinking about the children? Yet this practice is the dominant approach across education methods courses.

Mea culpa—Steve Collins

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1. Introduction

Classrooms are complex, dynamic, adaptive, interconnected, ‘living’ systems. However, there is

the tendency within schools to reduce their complexity by isolating elements of teaching and learning into discrete, manageable components. For example, creating boundaries between subject areas, instituting calendar-based testing regimes, and attempting to categorize student performance in terms of letter grades. However, those immersed in the daily life of schools know that classrooms are ever changing, unpredictable, and far too complex to be fully understood or rendered satisfactorily through simplistic constructions (Cochrane-Smith & Lytle, 1990).

Even the most rigidly organized classroom cannot totally account for the elusive nature of the interactions and relationships that arise within that context (Mishler, 1979). These interactions and relationships link people and ideas together dynamically in such a way that classrooms never settle into a state of equilibrium. Learning is always unpredictable. Complexity lies at the heart of creativity, exploration, and discovery. This challenges any attempt to tightly structure learning environments for our students.

It is not surprising then that if one approaches learning environments in a highly reductionist or hierarchical manner that the curriculum designed for such settings is similarly reductionist and hierarchical. This results in a prescriptive approach. A mandated curriculum, though theoretically invoking the public will for what we universally value in education, risks countering the emergence of the dynamically adaptive system of curriculum engagement that we argue constitutes the essence of learning within the classroom.

All this complexity keeps people on the edge of chaos. It is important to be on that edge because that is where creativity resides, but anarchy resides there too. Therefore, effective leaders tolerate enough ambiguity to keep the creative juices flowing, but along the way, ... they seek coherence. Coherence making is a perennial pursuit. Leadership is difficult in a culture of change because disequilibrium is common (and valuable, provided that patterns of coherence can be fostered) (Fullan, 2001, p. 6).

Certainly there is value in promoting and reinforcing particular ideas (e.g., universal social and cultural practices essential to the well being of the community), but a highly prescribed curriculum will never anticipate all the learning needs, challenges, and styles of individual children. It will not respect

the immediacy or relevance of the lived experiences that they bring to the classroom and which emerge during interactions with their peers and teachers.

Curriculum as a concept has a long history that continues to evolve today. By the middle of the 20th century, curriculum had been cast as a linear project beginning with aims and objectives, followed by a series of progressively challenging activities, and ending with assessment and evaluation of the various tasks undertaken (Tyler, 1949). As technical rationality gave way to more diverse and inclusive epistemologies toward the end of the 20th century, so too did the concept of curriculum undergo change.

Bill Pinar (1996) and Madeline Grumet (1996) contributed to curriculum theory by highlighting the silences and unspoken elements of curriculum, calling attention to the multiple decisions, and complex layers of social, cultural and gendered engagement and relationships that influence curriculum development and delivery. (Brandes-Minnes & Fels, 2006).

In recent years, the concept of curriculum has been broadened to include more active and generative possibilities inviting lived engagement with ideas within (and without) classroom settings. “Relationships within a community of mind are based not on contracts but on understandings about what is shared and on the emerging web of obligations to embody that which is shared...similar to those found within a family” (Sergiovanni, 1994, p. 7). For the purposes of this discussion we will take curriculum to mean that which is imagined, proposed, and enacted by teachers as they engage with learners around topics building on, but not limited by, curriculum guidelines as presented by Ministries of Education or similar governing bodies. In other words, curriculum is that which the teacher teaches. Such a curriculum addresses the public desire for a common or core set of experiences, student needs and interests, and it relies on the teacher’s talents, and strengths. This is an integrated view of curriculum and consistent with our argument that classrooms are dynamic systems.

It is a talented and resourceful teacher who can both implement a publicly mandated curriculum and at the same time address the individual and collective learning needs and interests of their pupils. When designing classroom activities this teacher recognizes the central tenets of the mandated curriculum as highlighting public values but

also maintains a vision of the interconnections among a variety of curricular themes and the children's experiences both within and beyond the classroom setting.

2. Complexity thinking and classroom practice

Complexity Thinking (also known as Complexity Theory or Complexity Science, among other descriptors) recognizes elements of teaching and learning that are beyond quantification and predictability. In thinking about curriculum from this perspective the whole is regarded as being greater than the sum of its parts. In a similar fashion, one comes to understand that the intelligence of the group is greater than the intelligence of any individual within the group (Davis, 1996) and that the potential exists for ideas to emerge from an interacting collective that are not resident in the mind of any one individual.

In a previous article in this journal, drawing on the work of several individuals who have written about these ideas, we outlined five characteristics of complex systems that seem particularly germane to classroom environments: networks, feedback loops, self-organization, disequilibrium, and the nested nature of complex systems (Clarke & Collins, 2007). We will not repeat that discussion here, but rather move it forward by framing these characteristics in the context of the classroom and discuss their implications for curriculum.

2.1. Networks in learning environments

...most living systems exhibit multilevelled patterns of organization characterized by many intricate and nonlinear pathways along which signals of information and transaction propagate between all levels, ascending as well as descending. That is why I have turned the pyramid around and transformed it into a tree, a more appropriate symbol for the ecological nature of stratification in living systems. As a real tree takes its nourishment through both its roots and its leaves, so the power in a systems tree flows in both directions, with neither end dominating the other and all levels interacting in interdependent harmony to support the functioning of the whole (Capra, 1982, p. 282).

The public curriculum is often assumed to be 'delivered' in a hierarchical way with IRPs mandated at the upper-most level of policy develop-

ment, in our case the provincial government, filtered through school district officials and school administrators, and then implemented by teachers at the classroom level. Learning, however, from the perspective of a student in a classroom, comes not just through transmission of knowledge from above, but through a multiplicity of interactions at the local level, within and across levels. It is more like the interrelationships among the roots, branches, and leaves of a tree. Knowledge is not imparted to the student as a direct facsimile of the government's wishes or the teacher's syllabus, but rather, it is mediated by, negotiated with, and embodied in the students' past experiences and prior knowledge, making each individual's learning unique. In addition, there are interactions with the physical environment that influence knowledge generation, such as the materials available, the pupil seating plan, the classroom layout, décor, lighting, etc. Perhaps the strongest influence on a student's engagement with the curriculum is their interaction with classmates, which may or may not be directly related to the immediate learning tasks at hand (Bruner, 1996). This view of learning as a networked series of interactions means that learning is necessarily dynamic, evolving, and unpredictable. If we regard learning environments, such as classrooms, as complex systems, then the concept of networks has significant implications for teachers and their approach to curriculum within in their classrooms.

2.2. Feedback loops

In [the feedback] process, organism and medium change together congruently as integral coherent systemic components of a changing biosphere (Maturana & Verden-Zöller, 2001, p. 5).

Few teachers today actually teach in a purely transmissive fashion for the reasons discussed above. Most teachers recognize that learning is interactive and that students will create their own 'reality' through their lived experience in the classroom and beyond. This interaction consists of students observing, manipulating and responding to their environment, exploring, testing, and refining their ideas as they engage with others (teachers, classroom assistants, buddy partners from other grade levels, parent helpers, etc.). Students interact with other people and the environment, changing them as they, in turn, are changed. "Far from merely existing relatively autonomously in the same location, individual and environment continually

specify one another. Just as I am shaped by my location, so is my location shaped by my presence” (Davis, Kieren, & Sumara, 1996). The concept of feedback is an important element of any definition of learning. This ‘co-evolution’ extends throughout the classroom and beyond with all members being affected by each interaction. Learning is ecological and holistic with feedback constantly informing, mediating, and determining what is learned.

2.3. *Self-organization*

[Most importantly], complex phenomena are emergent: they self-organize. Coherent collective behaviors and characters emerge in the activities and interactivities of individual agents. Such self-organized forms can spontaneously arise and evolve without leaders, goals, or plans (Davis & Sumara, 2005, p. 455).

Within a Complexity Thinking perspective, we understand that learning is not entirely the product of a deliberate infusion of predetermined information, but rather, learning emerges from a multiplicity of interactions that often defy prediction. Neither is learning simply the collection of information or ‘bytes’ gathered from each interaction. Contextualized, meaningful learning emerges from a complex mix of experiences and has varying degrees of relevance for each individual. As such, to a large degree individual and collective learning is determined at the local level and governed by local conditions. A collective perception of reality forms which has qualities and characteristics (‘emergent properties,’ Capra, 1982) that are not necessarily present in any of the individuals that contributed to its emergence, nor is it necessarily directed by any overseeing authority. Teachers often describe the ‘personality’ of a particular class. For example, they may describe the class as a helpful class or a needy class or a class that is concerned about social or ecological issues. There is an element of self-organization that cannot be seen solely as the result of teachers or curriculum. Rather, instruction takes place within the context of a learning environment where there are many interactions among classroom.

2.4. *Disequilibrium*

The simple act of walking requires us to be off balance to move forward. In our classrooms, we do not ever want our students to complete their

learning. It is a continuing “walk”, marked by celebrations and milestones, but always in disequilibrium so that learning and development progress. Students are constantly adapting to changes in their setting which, in turn, promote new changes. As such, learning is enacted in a fluid, often turbulent, social setting. Multiple and constant interactions continually reshape that body of learning. It is this activity, this enacting of shared experiences and knowledge that constitute creative learning (Collins, 2004, p. 9).

In the past, reductionism has promoted a belief in learning as a series of tightly structured and sequentially ordered lesson activities. Clearly the complexivist approach, while not diminishing the importance of a universal curriculum outline, recognizes that such a view of teaching and learning can only be approached in the most regimented of environments. Such regimentation could range from passive compliance (superficial learning) or active resistance (rejection of the curriculum) on the part of students. Creativity and freedom could be severely restricted or lost altogether. As a result, the nature of relationships with the teacher and other students could be severely compromised. Attempts to control for all factors and eventualities leads to the false hope that the system can be brought into a state of balance and defined order.

This reductionist view of transmitting prescribed curriculum, unaltered and unresponsive to circumstances and context, denies the inevitable effects of a social environment with its multiplicity of influences. Teachers who attempt to approach teaching in this way would find it difficult trying to account for, anticipate, or correct the many ways that a curriculum might deviate from its original form in the light of a dynamic social learning environment. From a complexivist’s perspective, one would expect an element of improvisation, be open to a broad range of reactions and interactions, and acknowledge the importance of disequilibrium for its generative potential. At the very least, this perspective allows deviations to be part of the unfolding of the students’ learning rather than being solely regarded as disruptions to that learning.

All learning systems, by definition, are in a state of disequilibrium. Disequilibrium allows growth, development and adaptation rather than stagnation. Learning does not end when the bell rings or when the timetable directs a change in subjects. It is an on-going process that responds and is sensitive to

the contributions of public and personal curriculum agendas. We argue that if learning is a process of growth and adaptation, it exists in a stable state far from equilibrium.

2.5. *Nestedness and self-similarity*

For the complexivist, all complex phenomena are learners. Cells, bodily organs, social groupings, societies, species—among other nested, co-implicated forms—are all cognitive agents. They obey similar adaptive dynamics, albeit at very different timescales ... they all arise from and have the potential to contribute to the emergence of other orders of complexity (Davis & Sumara, 2005, p. 456).

The complex, adaptive system called a school is comprised of classrooms that are comprised of teachers and students, where each person is comprised of a myriad of biological systems. In short, this spectrum of possibilities represents a series of nested systems. If we zoom out rather than in to systems larger than schools, we note that schools are part of districts, districts are part of regions, which are part of provinces, etc. Again, the concept of nestedness is evident. Further, at each level, there is sufficient similarity to the level before and after for one to readily recognize and respond to those levels.

We can consider the public curriculum from this perspective also. The school, classroom, and pupils represent nested levels of curriculum engagement. And these levels are nested within district, regional, provincial, and even national curriculum imperatives. Again, nestedness and self-similarity are evident within and across levels. The teacher and students add relevance at the local level through their activities, projects, experiences, environment, and interactions. Muijs and Reynolds (2002) suggest that the factors in the students' environment that are most proximal (e.g. teacher behaviors) have the strongest direct impact on student achievement. Sanders and Rivers (1996) claim that teacher effectiveness has an enduring influence on learning and achievement for year after year. But each level has value and a unique function. The influence of each level on others is undeniable. This underscores the importance of viewing curriculum systemically or holistically across levels. This includes the contributions and modifications at each nested level. Bruner (1996) reminds us of the importance of interactivity across levels: “[Learning] is best

when it is participatory, proactive, communal, collaborative, and given over to constructing meanings rather than receiving them” (p. 84).

3. Embracing complexity in the classroom

We believe that the ecology of the classroom compels us to acknowledge that we are all interconnected. One's actions affect the whole and vice versa. This ecology also obligates us to be responsible to public will and, in turn, the public curriculum, as professionals within a community. In the interest of maximizing learning and preserving the ideal of the classroom as a unique site of learning (and not as a fixed entity to be replicated across the system), it is important to foster rich, relevant, creative learning in each and every classroom. We believe that embracing complexity rather than attempting to reduce it will best serve this end. Davis and Sumara (2005) offer several conditions to enhance complexity in a constantly evolving, dynamic learning environment. Some of these conditions include redundancy, diversity, interactivity, and decentralized control. We will comment briefly upon each of these conditions to illustrate the importance of each in honoring both the public curriculum and the private learning agendas of pupils in classrooms.

The first condition, redundancy, refers to the commonality within educational complex systems among people and ideas. This redundancy can provide a sense of purpose that unites a collective in their action. In a classroom, these are the shared values or interests that allow for agreed upon purposes and common goals. Without redundancy shared understandings would be impossible. Sometimes redundancy is represented as the common goal presented in a learning activity. Common goals allow for focussed engagement that unites a community of learners in their exploration of a particular topic or idea.

In contrast to redundancy, diversity highlights the importance of having a range or variety of people and ideas within a group to ensure creativity and initiative within the system. A classroom that honors diversity is able to take advantage of multiple perspectives that might be brought to bear within the context of a curriculum goal or project.

The third condition, interactivity, is essential for complex systems to operate at the local level and to be self-organizing. Emergent properties then arise within the collective. In a classroom, this can

determine the collective attitude, personality, interests, and nature of actions taken. Appropriate ways of interacting must be encouraged. This is necessarily an on-going dynamic process where children constantly develop effective and respectful skills and practices for communication. These interactions often go beyond the verbal. Physical movement, gestures, even bumps, prods, and pokes often support the communicative intent of students, especially considering that many have limited verbal skills. Murphy, Delli, and Edwards (2004) found agreement among young students, student teachers, and practicing teachers that the best teachers were those that encouraged student-centered instruction in which both the teacher and students are active.

We know that in most classrooms there is some measure of redundancy, diversity, and interaction. Decentralized control of curriculum outcomes may be the most challenging aspect of complexity in a typical public school system that is based upon a hierarchical structure.

[A] complex adaptive system operates in a state of decentralized control. In complexity terms, learning is an emergent event. That is, learning can only be defined in the process of engagement. In terms of collective action, the understandings and interpretations that are generated cannot be completely pre-stated, but must be allowed to unfold. Control of outcomes, that is, must be decentralized. They must to some extent emerge and be sustained through shared projects, not through prescribed learning objectives, linear action plans or rigid management strategies. Complexity cannot be scripted (Davis & Sumara, 2005, p. 459).

Reducing centralized control and allowing students to have a voice in the nature and substance of how the curriculum unfolds at the classroom level is essential to the emergence of a dynamic and vibrant learning system. We argue that it is important to embrace complexity in the classroom, rather than reduce it, to preserve an awareness of the myriad of meaningful connections and, in so doing, acknowledge the contributions of the individual, the power of the collective, a deep desire for learning, and a deeper, ecological understanding of the classroom.

4. The emergent curriculum

Ownership of curriculum is traditionally seen as something distant from the learners it is intended to

serve and typically originating at the apex of the public school power structure, that is, in our case the Ministry of Education. This may seem to hinder the free emergence of a complex classroom system at the local level where disequilibrium is acknowledged, suggesting unpredictable outcomes and unexpected self-organizing structures. However, there is much that can be done at the classroom level to enhance the factors that enable the emergence of complexity within the classroom. In particular, students and teachers negotiating authority in a participatory democracy within a holistic approach to curriculum can create opportunities for complex interactions that promote the emergence of personally meaningful learning experiences that are responsive to a publicly sanctioned curriculum (Bruner, 1996).

4.1. Negotiated authority

A teacher's role as an authority in the classroom is institutionalized, as well it should be. The teacher is an adult and in our society children intuitively and sensibly view adults as authority figures due to their upbringing, again for good reason. In practical terms, this structure makes sense as the teacher bears the final responsibility for the safety and well being of students. The teacher also has the 'authority of experience' (Munby & Russell, 1994) and knowledge which, although not absolute, serves as an important guide for students and their work within the classroom. But the teacher's role can also be perceived as a participant in a community of learners. A person in authority need not be authoritarian. Bruner (1996) presents an opportunity for exploring the possible existence of a more democratic community within firmly entrenched school structures.

One of the most radical proposals to have emerged from the cultural-psychological approach to education is that the classroom be reconceived as just such a subcommunity of mutual learners, with the teacher orchestrating the proceedings. Note that, contrary to traditional critics, subcommunities do not reduce the teacher's role nor his or her "authority". Rather, the teacher takes on the additional function of encouraging others to share it (p. 21).

Following Bruner, the basic role of the teacher as the person responsible for the classroom and the learning of students is not reduced when viewing

classrooms from a complexity thinking perspective. Responsibility is indeed increased through the increased risk and obligation involved in sharing authority within the classroom. Teachers, as adults, can draw upon this unique role in a number of ways. They can guide other community members along paths they have already traveled. They can serve as an inspiration for new learning, rather than pretending that knowledge is absolute. They can be the liaison with the educational system speaking on behalf of the learning community, assuming a role of advocacy.

4.2. *A participatory democracy in the classroom*

In our view, the popular conception of democracy too often focuses on the technical aspects, such as voting, representation, and bureaucratic oversight, which seem to breed apathy and cynicism. We instead advocate a ‘participatory democracy’ that focuses on the unpredictable, changing human aspects of democracy. A participatory democracy, in addition to collective decision-making and resolution, addresses the process of active inclusion of all members in the on-going development of a community.

In a participatory democracy within a classroom setting, students simultaneously have individual autonomy and responsibility to the community. These seemingly competing concepts can be unified when existing in a caring, respectful environment and where there is a strong desire on the part of individuals to develop and strengthen their own community for the betterment of all members. A participatory democracy in the classroom promotes learning in an active, practical, and relevant context. The community is in a continual state of renewal as its members grow within its influence while also influencing the community’s growth.

4.3. *A holistic perspective*

The need for a holistic rather than a reductionist approach to curriculum leads us to the idea of enactivism. Among several authors who have developed ideas about enactivism are Maturana and Varela (1987) and Davis et al. (1996). In response to the writings of these authors, Begg (2000) offers the following:

In enactivism, instead of seeing learning as “coming to know”, one envisages the learner

and the learned, the knower and the known, the self and the other, as co-evolving and being co-implicated. In this situation context is neither the setting for a learning activity, nor the place where the student is, the student is literally part of the context. With enactivism the complexity of learning is emphasized (p. 8).

Enactivism regards learning as contextualized, active, and integrated. It focuses on the social aspects of a learning environment, in which knowledge is shared among participants. Although at times we may wish to focus on a single element of learning for the purpose of clarity, we can never ignore its interconnectivity to the whole, and its inextricable attachment to the environment and culture. Learning is doing and vice versa. It is about a way of *being* in the world and not just responding to the world (as some assume to be the case when implementing a prescribed curriculum). Enactivism is the practitioner’s response to the complex view of student learning.

Integration of the learning experience is at the heart of an enactivist approach. However, integration, within this way of thinking, is not something that is preplanned or grafted onto a learning activity. Rather it is revealed. The world is naturally integrated. Division into arbitrary or artificial categories or disciplines has been the work of reductionist thinkers. Many educators have worked hard to separate knowledge into isolated subjects. The efforts of modern educators ‘to integrate’ is rather like trying to pack up the Pandora’s box. Once we see knowledge as divisible into separate, isolated areas, it is very difficult to locate and recognize the connections again. Enactivism, on the other hand, embraces the whole. Given the structure of most public schools (individual rooms, block scheduling, boundaries between school and public spaces) it is not always possible to directly experience real events or organize authentic experiences for students. It is often necessary to approximate an enactivist undertaking. For example, Karen Beatty,² one of our students, taught a Social Studies unit on ‘Elections’ to her grade 3–4 class. The challenge, of course, was to take a topic that was almost certainly irrelevant and likely boring to 8 and 9 year olds and make it real and interesting. A pure enactivist approach would involve having

²Karen Beatty is a teacher in Vancouver, British Columbia and has given us permission to use her real name.

students participate in a school-based decision-making process. This would undoubtedly be formal and technical in nature, with the typical kinds of decisions that students get to make being of little consequence at the conclusion of the activity. So Karen chose something that mattered in the lives of her students, the school playground, around which children could develop meaningful arguments and positions.

Given the opportunity to design their school's playground would be the ultimate contribution to the school community in the minds of children. The fact that this was a fantasy rather than actual, only served to remove practical restrictions from the imaginations of these students. However, the activity was bounded by criteria established by the teacher. Students were to consider their values, safety, happiness of the playground users, inclusion of peers, and budgetary constraints. Further, students were to work in groups that were imagined to be political parties. They chose and named a fictitious candidate, made a puppet that represented their candidate, brainstormed a playground design, created a political poster with a slogan, drew the design of the playground, and wrote a speech to explain their candidate's position and the associated rationale for the candidates platform.

Karen's unit plan listed various provincially prescribed learning outcomes (PLOs) for Social Studies, including "Describe functions of local and provincial government," "Explain their roles, rights, and responsibilities within the community," and "Explain Canada's symbols". She could also have included "draft ideas for images using feelings, observation, memory, and imagination" for an Art PLO, or "describe and recount key ideas or information from various media" for Language Arts, and so on for many other subject areas. But her prime consideration was to determine what would motivate her students and to respond to their needs and ideas as the activity unfolded.

Although this was not pure enactivism (they did not build a real playground), it was clearly an enactive approach. It was contextualized in a meaningful way. It was naturally integrated. It was social and inclusive.

5. A project-based, activity frames approach to curriculum

We argue that a project-based approach, similar to the election campaign activity outlined above,

provides an important backdrop to the work that we believe validates a complexity thinking sensibility within the demands of a public school curriculum context. Further, we argue that the notion of activity frames, derived from the project-based approach, provides a clear but flexible and permeable structure that facilitates the emergence of learning.

5.1. A project-based approach

Any classroom that has co-evolved as a community has redundant (common) interests that often are unique to that particular group. For example, young students almost universally have interests in collections (e.g., cards, rocks, pictures, etc.). This interest provides a great opportunity, for example, to capitalize on personal artifacts to explore the nature of a classroom community at the start of a school year. Redundant interests among older students might be less tangible but still of equal fascination. Older students may like popular television series that highlight inquiry and curiosity in solving crimes. It has been said that everyone loves a mystery. Mystery can intrigue and engage learners and is not dependent on a particular subject or theme. Again, these types of interests provide an opportunity to use an investigative approach to inquiry in many subjects and enables teachers to capitalize on common interests in the classroom.

Conversely, a teacher examining the various dimensions of a public curriculum can recognize overarching themes that would address several PLOs and, knowing the children in his or her class, can see how these themes would be of high interest to the class. In either case, a highly motivating, broad topic can be identified as the basis for a class project. In almost all cases a topic of sufficient breadth will naturally address many PLOs, but with this approach, they can also be intrinsically connected to the classroom context and presented in an integrated, engaging, and meaningful way. Whether the Ministry curriculum documents suggest the project theme or the theme prompts discovery of related PLOs, there is an interplay and a negotiation among the various curriculum considerations. The eventual curriculum that the teacher oversees is not prescribed but 'co-evolves' during the process of engaging with the learners in the classroom. In a sense, classroom activities develop the curriculum themes rather than the curriculum themes predetermining classroom activities.

With the emphasis on process, public curriculum goals and individual learning agendas can be interrelated and the curriculum adjusted accordingly. For example, in the National Film Board's documentary "The Dig" [The National Film Board of Canada \(1989\)](#), Richard Edwardson, an award winning Social Studies teacher inspires in his students enthusiasm for studying ancient civilizations. His main emphasis is not on standard teaching methods that include memorizing historical facts and recalling information for quizzes (though he does evaluate children's knowledge). Instead, he teaches his students to 'become' archeologists and discover for themselves relationships between theoretical understandings, previously known facts, and the 'discoveries' they make themselves. In what might be termed an enactivist approach (although they are not on an actual dig), Grade 7 students excavate a dig site beside their school and through the discovery of artifacts, exuberantly put together a coherent story of an ancient civilization. The artifacts for the dig were created and placed at the site by Edwardson and a group of his former students prior to the dig. For the Grade 7 students, the dig felt authentic even though they realize the setting is manufactured. In the words of Edwardson, "The students postpone their belief." In fact, the students' engagement in this activity provides a context that makes other more traditional learning methods associated with it more meaningful. The text and lecture-based information, the quizzes, even the culminating final assessment are far more engaging for the students because they become connected to the reality of an archeological dig.

Over the course of a number of years, Edwardson's dig took on mammoth proportions, growing and co-evolving with students, former students, parents and university professors. One wonders how such a 'living' entity could arise from the small seeds of its beginning to its unpredictable emergence as a significant community-based project.

5.2. *Activity frames*

We can see the potential within a participatory democracy for decentralized control enabling the freedom to choose, enhanced interactions among group members, and a celebration of diversity and inclusion within the community, while valuing the redundancy that is essential for shared understandings and values. This does not describe chaos, but

rather, it outlines an interplay between extrinsic boundaries and intrinsic freedoms. This interplay points to a way of valuing both personal agendas and public mandates. [Davis, Samara, and Luce-Kaplar \(2000\)](#) have used the term 'liberating structures' to describe the structuring of learning experiences in the classroom. This approach is neither too redundant nor too diverse. Rather it advocates sufficient organization for the focus of learning to occur, while allowing sufficient randomness to allow for flexible and varied responses.

Such situations are matters of neither "everyone does the same thing" nor "everyone does their own thing" but of everyone participating in a joint project. In our experience, minor modifications are sometimes all that is needed to transform tasks that are either too narrow or too open into liberating structures ([Davis & Simmt, 2003, p. 155](#)).

In a more recent commentary, [Davis and Sumara \(2004\)](#) describe this approach with a different term, "enabling constraints," which "are the boundaries imposed on activity, designed in ways that allow for expression of diverse possibilities." In an earlier work ([Collins, 2004](#)) we used the term 'activity frames' to describe the boundaries or limitations for activity and behavior that are made explicit for students as they pursue high-interest, open-ended learning activities. This term readily and accurately captures the sense of curricular enactment that we have witnessed in numerous classrooms that exhibit a complexity sensibility. Within clear activity frames, freedom and choices are possible.

A teacher can set a topic based on the publicly mandated curriculum but allow for a great amount of freedom as to how students make sense of, negotiate and engage in the research on the topic. This is true also for the subsequent presentation on the topic to their classmates. The curriculum itself is interpreted by the children and made accessible, open to questions and suggestions. The goals of activity frames are described in 'student-friendly' language including the reasons it is a good idea to learn about particular topics. Negotiation is a central feature of this approach when implemented within a participatory democracy. Students and teacher can negotiate the activity frame within which their projects can take place. Students negotiate with each other as to the specific construction of the projects. Together they decide on the content, the format, and the make-up of their

groups (or whether they deem it appropriate to work alone) and the roles of each person. This project-based approach resides inside activity frames.

We should be cautious and clear when using a term like ‘frame’ since it may evoke a reductionist view of arbitrarily separating and isolating one area or piece from the whole. This would be similar to how past educators, in a sense, have taken an aspect of the totality of complex interconnected knowledge and reduced, isolated, and even *framed* part of it into a separate subject for easier, more focused teaching. When we speak of frames in a complexity sense, we must remember that they indicate boundaries that are dynamic, flexible and porous, much like the membranes of a living cell. They are changeable in response to the different needs of students and situations. They are negotiable rather than fixed so that the optimal learning preferences, styles, possibilities, and needs are addressed for each student. They are porous in the sense that information can pass through from outside sources and influences, while allowing information to be shared with the larger community from within the learning frames. A reductionist framing would discourage connectivity and interaction but, from a complexity perspective, frames preserve and enhance relationships and interactions both from within and without.

Dot Clouston,³ a gifted primary teacher who, along with a combined class of grade 1 and 2 pupils, helped enlighten us with regard to the implications of complexity thinking in the classroom setting and the potential of an enactivist approach to school curriculum (Clouston, Hunter, & Collins, 2007). In one case she wanted students to engage with a ministry-recommended curriculum goal that stated “Describe the basic structure of the various organs involved in speech and hearing.” Realizing her students would never understand that language, she said: “What we’re supposed to do here is figure out how our body helps us talk and hear.” This restatement of a curriculum goal was a topic that any 8-year-old was likely to find interesting.

With a participatory democratic approach one dimension of the teacher’s role is to make the curriculum explicit and accessible. The first step toward democratic involvement of students is to provide explanations about the topic, inquiry, or

issue. In this way students can relate it to their lived experience, interpret it, challenge it, and take ownership for it, even as they respond to public curriculum guidelines. In Dot’s class, the students brainstormed the topic, listing everything the group knew about it, and then, everything they wondered about it. The latter became ‘burning questions’ and developed into research areas for the group. She called this process “guided participation” because it was open-ended within activity frames negotiated among Dot and the children. Public curriculum goals were used in this case as a frame setting tool rather than a prescription for the activity.

For this theme, the following criteria defined the activity frames:

- (1) Each child could choose an aspect of the class’s research and work with a small group, a partner, or individually.
- (2) The research could consist of talking to various adults and classmates, visiting the library, searching the internet, and other appropriate methods, all within the guidance of a skilled and knowledgeable teacher.
- (3) Dot would outline three to five ways that each child or group might present their knowledge to the class and would encourage other forms of representation that might arise.
- (4) There were the usual behavioral frames that the children had helped to negotiate.

There was choice within limits and the process was open to negotiation to ensure that each child learned and expressed their learning in a way that best suited their style or preference. Everyone was fully included. When the projects were complete, a sharing and celebration time took place. All the knowledge that was generated by the children on the topic was shared with the whole class. With this process, the teacher acted as a partner in learning, validating children’s ideas and challenging them to extend their thinking. The projects could also become part of the students’ portfolio in providing a qualitative assessment and sharing with parents, teachers, and administrators. The public curriculum was addressed, individual interests and needs were met, and along the way, there were many extra surprises in the students’ learning that may never have entered the classroom otherwise. Learning was enjoyable, comprehensive, integrated, and contextualized.

³Dot Clouston is a teacher in Richmond, British Columbia and has given us permission to use her real name.

The idea of an activity frame is itself complex. In a participatory democracy, the frames may not be as fixed as it might otherwise be assumed. However, the frames must be clear for all concerned or insecurity will result in a search for the limits of conduct that learners bring to the activity. But frames vary from task to task, from day to day, and from setting to setting. A teacher may wish to have a very narrow frame with limited freedoms for a new activity and gradually broaden the frame as students demonstrate their responsibility in undertaking the particular task. Different teachers will have varying levels of comfort with particular frames. Activity frames honor the idea of disequilibrium and as such are a constant focus for reflection as teachers attempting to support the principles of participatory democracy within the learning environment. It is ultimately part of the teacher's responsibility and authority to establish a particular activity frame for learning, but a democratic teacher seeks the input of students and clarifies the frame to explain the purpose and the limits for behavior and the activity.

It is interesting to note that Dot's particular democratic approach highlighted salient features of complexity thinking while, in the process, complexity thinking helped to define the democratic approach. Within this co-evolution, democracy and complexity defined each other.

6. Conclusion

Dot's example is an instance where a teacher embraced the notions of complexity thinking within the school setting and designed curriculum that met both public and personal agendas. She demonstrated that these agendas need not be mutually exclusive and can be addressed simultaneously. She contributed to a sense of community by creating redundancy in values and purposes within the community when students engaged in high-interest projects. By implementing a process of inclusive participatory democracy, she was able to value the diversity within the class to enhance creativity and multiply learning opportunities. Through this inclusive approach, encouraging communication in both verbal and non-verbal ways, interaction was maximized. A democratic approach enabled the negotiation of authority and allowed for decentralized control. A project-based learning strategy allowed for enactivism while negotiated activity frames ensured both redundancy and diversity,

bounded order and chaos, and validated both public and private curricula, as a naturally integrated, cohesive whole.

It is our hope that the sometimes abstract and vague discussion about complexity thinking can be made more accessible for practicing teachers by considering an activity frame approach to learning that draws on the concepts of negotiation, participation and a holistic approach to publicly mandated curriculum and individual student learning agendas.

Acknowledgments

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