Winter Counts as Transformative Inquiry: The Role of Creative Imagery as an Expression of Adaptive Change

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Pre-service teachers face a complex educational context and Transformative Inquiry is a useful approach for negotiating this terrain. We interpret the movement of students via the adaptive cycle put forth in panarchy theory as they engage in the inquiry process through 'winter counts', a Plains First Nation tradition, as expressions of their understanding. These image-based expressions demonstrate the emotional, mental, spiritual and physical movement students have made within their inquiry. Panarchy theory moves beyond interpreting systems using simplistic equilibrium models and acknowledging the more complex and dynamic set of equilibria that describes transformation in ecological, social, and economic systems and considers the multiple complexities of systems thinking while providing insight into how change occurs as a constantly adaptive cycle process. Used sparingly within social sciences until recently, we argue it as particularly relevant for seeing Transformative Inquiry through Indigenist and interconnected lenses.

Humans have a collective need to develop a nuanced, wise and intuitive response to the inescapable ecological and social crises currently threatening global human existence and ecological integrity (Convention of Biological Diversity, 2010; Intergovernmental Panel on Climate Change, 2007; Miller, 2005). To move towards a world with increased human and ecological sustainability, humans require a systematic paradigmatic shift from over-consumption to conservation ethics (Barry, 2010). Indigenous scholars help us to remember relational accountability (Wilson, 2007), our inherent responsibility to tend to our home fires, the essential and interrelated "connections among people, animals, plants and natural forces" (Cajete, 1999, p. viii). Drawing on wisdom and compassion to help develop strong and healthy emotional bonds between other people and nature is critical "for we will not fight to save what we do not love" (Gould, 1994, p. 40). In addition, ancient wisdom matters in the current societal and ecological world as we struggle to find a place of balance and resonance with nature and each other (Davis, 2009).

The critical need to embrace ecologically responsible education is accompanied by calls of many curriculum scholars for the adoption of a humanizing pedagogy that is caring and culturally responsive (Bartolomé, 1994; Noddings, 2003). In addition, scholars are finding that an explicit connection with nature positively affects student health, cognitive development, and learning (Barros, Silver, & Stein, 2009; Dyment, 2005; Louv, 2005; Taylor & Kuo, 2006). Hence, sustainable growth comes in the form of paradigmatic change, but our system of public education is historically reluctant to change, preferring familiar positivist patterns of transmissive delivery, reductionism, absolutism, structuralism, and binary thought.

The teacher education program at the University of Victoria seeks to address these concerns through a required course that nurtures Transformative Inquiry (TI) (Tanaka, under review). In the course, each student is expected to unearth salient issues about which they are personally and professionally passionate within the context of their teaching practice. Topics include a wide variety of issues relevant to classroom settings such as: teacher identity, building classroom community, fairness in assessment, quiet in the classroom, learner engagement, etc. At best, the explorations are fueled by compassion, humility and curiosity and help these learner~teachers follow a path with heart in their teaching (Chambers, 2004). The pre-service teachers are encouraged to explore these topics through open-ended and unbounded questions (Henderson, 1992). Individuals are then asked to relinquish the control traditionally associated with research to follow where the inquiry questions takes them, rather than being hypothesis driven. They explore their topic reflexively and relationally within larger educational and socio-cultural contexts (Starr & Tanaka, under review).

The TI approach asks teachers to view themselves as researchers who look through an *Indigenist* lens. We rely on Wilson's justification for the use of the term Indigenist,

> I use Indigenist to name or label the paradigm that I am talking about rather than Indigenous. It is my belief that an Indigenist paradigm can be used by anyone who chooses to follow its tenets. It cannot and should not be claimed to belong only to people with 'Aboriginal' heritage. To use an analogy, one does not need to be female to be a feminist. Researchers do not have to be Indigenous to use an Indigenist paradigm just as researchers do not have to be "white" to use a Western paradigm. (Wilson, 2007, pp. 193-194)

One intention in using the term Indigenist is to acknowledge the concern of appropriation of a Plains First Nations tradition, known as 'winter counts', with non-indigenous students. An Indigenist paradigm involves the act of relational accountability and addresses cultural appropriation, which occurs "when someone comes and uses … knowledge out of its context, out of the special relationships that went into forming it" (Wilson, 2009). Michele Tanaka, the Principle Investigator of this research, acknowledges the web of relationships that led to incorporating winter counts into the inquiry course in order to give credit to their origins:

> My friend Michelle was sharing recent fundamental conceptual changes in her doctoral work. She described a course taught by Dwayne Donald (University of Alberta) where winter count activities helped her to access intrinsic ways of knowing that she had been overlooking in the highly intellectualized context of graduate school. Her excitement was infectious and I felt a resonance between what she experienced with the winter counts and what I hoped could happen for the inquirers in my course. I sought out Dwayne and we had a number of discussions to further understand and contextualize winter counts as he used them in the post-secondary context.

> From these conversations, and the knowledge gained through references Dwayne shared, I spoke with my colleague and co-instructor in the institute, Nick Claxton (Tsartlip First Nation). As of this writing, we continue to discuss how using winter counts might be in relation to local WSÁNEĆ traditions, to be respectful of the land upon which we learn. Only after exploring the relational implications, did I feel

comfortable introducing winter counts into the course. I feel a strong sense of appreciation to Michelle, Dwayne and Nick as they helped me learn how to use winter counts in a good way. In the WSÁNEĆ tradition, I lift up my hands to them to say HÍSW̱ḴE, thank you in gratitude and respect.

As a way to move beyond appropriation, we feel that an Indigenist perspective acts as an ally-based, compassionate approach that partially addresses colonial and oppressive frameworks. From this perspective the process of research departs from a scientific proof of a hypothesis, where TI is located in the intersections of personal and professional. We characterize this process as ecologically oriented, inherently relational and deeply spiritual; resonant with an Indigenist lens.

The process of TI seeks positive dispositional change or transformation that requires pre-service teachers to be attentive to and develop their own learning spirit (Battiste, 2009). An example of dispositional change might be the adoption of a more reflexive and mindful teaching practice. In the TI course, pre-service teachers explore burning topics by thinking both reflexively and contextually. This is done in relationship with self, inquiry partners, peers, instructor-mentors, and others of their own choosing. Underlying these conversations are questions Cajete (1994) posed as being the most important for educators today: How do we deal with the environmental crisis? How do we learn to get along? How do we care for our own souls? These questions become guiding stars from which to navigate through both the course and the complex terrain of teaching.

This paper describes the analysis of 'winter counts' as used within the context of the TI course. Referred to as *waniyetu wówapi*, winter counts are a land and place-based knowledge and practice that acts as a calendrical record of memorable and important events. These winter counts depict natural and social phenomenon of several of the Plains First Nations, including Sioux, Lakota, Blackfoot and Blackfeet, Kiowa, and Mandan Nations (Therrell & Trotter, 2011). Figure 1 below shows a Lakota winter count depicting significant events that characterized many years of a family or tribe's existence.

Figure 1: Winter Count image – Photo taken of Lone Dog Winter Count ca. 1870 by Nicholas Stanger at Smithsonian National Museum Of American Indian January 8, 2013.

In the context of the TI course, each student was asked to submit four winter count drawings at set intervals throughout the inquiry process. Instructors asked them to draw expressions of "where they saw themselves" in either their process or in relation to their topic. We call each student's set of four winter counts a 'winter count collection.' In keeping with Dwayne's vision the activity was designed to help students keep their inquiry process in motion, winter counts allow for alternative ways of seeing, experiencing, and knowing through image-based expression (Phipps, 2010; Prettyman & Gargarella, 2006). From quickly sketched representations to highly complex mind maps, they played an important role in the development of TI amongst participants. Students were encouraged and supported through this process to forgo any perceived artistic limitations, so that with reduced anxiety they could further explore their inquiries, unconcerned about attractiveness or artistic merit. These imagery-based expressions are particularly useful as we try to more fully understand the process of TI. The winter counts offer a holistic representation of student experience, an access point into other ways of knowing, a playful avenue for exploring knowledge, and a place to step out of the cerebral into the intuitive.

The fusion of horizons: Phenomenology, winter counts and panarchy

Our purpose here is to interpret the movement of students as they engage in TI through winter counts as expressions of their understanding. We have chosen the adaptive cycle put forth in panarchy theory to demonstrate the emotional, mental, spiritual and physical movement students have represented in their winter counts. Panarchy theory, a model that helps describe transformation in ecological, social, and economic systems considers the multiple complexities of systems thinking and provides insights into how change occurs as a constantly adaptive cycle process (Holling, 2001). It has been sparingly used within social sciences until recently, and we argue its use is particularly relevant for seeing transformative inquiry through Indigenist and interconnected viewpoints.

In this research, we draw in equal measure on *interpretive phenomenology* (Van der Mescht, 2004) and *transformative phenomenology* (Rehorick & Bentz, 2008). In interpretive phenomenology, "the researcher contemplates the meaning *others* make of objects, or experiences. This essentially constructivist element has significant implications, chief of which is the fact that the *others*' (the research participants) embeddedness in cultural, political and historical contexts is an integral component of the enquiry" (Van der Mescht, 2004, p. 2). In the task of creating winter counts, the emphasis is on "what people experience rather than what they consciously know" (Flood, 2010, p. 9); this is equally true in the analysis. Meaning is co-created by participants and researchers resulting in a *fusion of horizons*.

The horizon is the background of various assumptions, ideas, meanings and experiences, which are fluid and open to change. Understanding and getting to know others is based on a personal horizon of experiences and meanings; thus the art of interpretation is always bounded by the separate, intersecting horizons of researchers and participants (Gaenellos, 2000). In transformative phenomenology, the research experience "clears the focus, reflecting a deeper and truer image of who we are; this phenomenological looking glass also reflects the life world behind the image, revealing structures that we had not seen before, and pathways to new destinations" (Rehorick & Bentz, 2008, p. 4). These pathways lead to the action of transformation.

We gravitate towards phenomenological methodologies with the understanding that "learning is an act of interpretation" (Bray, Lee, Smith, & Yorks, 2000, p. 23) and therefore follows the direction the experience indicates. Because this is a discovery-orientated approach, we did not follow a pre-determined framework; instead our interpretation is based on a cyclical progression generated through a process of

"understanding, explanation and interpretation of phenomena that is continuous and multidirectional and leads to deeper understanding through the revisiting, reworking and juxtaposition of ideas" (Rapport & Wainwright, 2006, p. 235). The winter counts as representative of lived experiences were analysed using a dialogic team process where the researchers enter "humbly into the life world' of each participant to gain understanding of 'his or her wholeness and specificity" (Thomas & Pollio, 2002, pp. 7-8).

For the winter counts research, four members of the larger research team analyzed the data. Vanessa Tse is a new teacher candidate who had recently taken the course. She approaches this work with a lens particularly trained towards issues of social justice and the intricate work of be~coming a teacher. Michele Tanaka and Lisa Starr, are two instructor-mentors of the course (Michele was the instructor for this particular group of participants). Michele is also the Principal Investigator of this SSHRC-funded research project. She has developed the notion of TI first as a classroom teacher trying to gain understanding of learner needs in cross-cultural contexts, and later as a teacher educator intent on helping emerging teachers find ways to deal with the complexity of today's diverse classrooms. Lisa, a graduate student and sessional instructor, has been involved in the evolution of TI from its origins in teacher-oriented action research to its present emphasis on spirituality and transformation. She brings her previous experience as a secondary school teacher to create a practical lens from which we view our work. Finally, Nicholas Stanger, a graduate student in curriculum and instruction is new to the TI process. Nicholas spent his early post-secondary career training to become a canopy researcher and was deeply involved with ecology research across British Columbia's west coast. References to ecology and complexity throughout this paper arise partially from his background as an ecologist.

Of the thirty-one students that were in the course, twenty-seven chose to participate in the research, sharing their written and imagery-based projects.

Winter counts as an entry point

If we consider the expressions of the pre-service teachers to have multiple openings for interpretation, the winter count images are one entry point into the data gathered as part of a larger research project funded by the Social Sciences and Humanities Research Council of Canada. This particular phase of the research looked at the data from within the context of an intense, one-month Indigenous Institute at the University of Victoria, Faculty of Education, Post-Degree Professional Program for pre-service teachers. The institute included three classes that focused on Indigenous history, pedagogy, and ways of being~knowing~doing, and one that engaged TI, as described above. Of the 27 class members in this institute, nine were male, which represents a common ratio in the pre-service teacher programs for secondary students.

The first stage of this research consisted of selecting example students through their winter counts. All of the 27 sets of winter counts and accompanying texts were taped to a long wall, becoming a gallery of 108 winter counts. With this gallery, the changes that were represented in the images over the duration of the course could easily be compared. We familiarized ourselves with each of the students and their collection of winter counts, keeping in mind the question: 'what alerts me when I am looking at these images?' We then compiled this list of criteria by which we looked at each of the winter counts. This was followed by a discussion of how these criteria overlapped, diverged, and/or blended together:

- Movement beyond self-centric towards relational
- Movement to self within larger relational
- Major shift in thought patterns (breakthrough, grounding, resistance)

- Conceptualizing thinking in authentic model

- Morphing clichés (light bulbs, question marks, etc.)

- Moving from binary thinking towards awareness (and acceptance) of complexity

- High degree of positivist thought (absolutes, absence of questions or possibilities)

- Flow – moving away from *cliché*, personalizing (what some call creativity)

- Movement from separateness to connectivity

- Unpacking (looking at the layers knowing – assumptions, cultural beliefs, etc.)

Using these criteria, and being aware of our own biases and lenses described above, each researcher looked for six examples of students with highly dynamic winter count collections and two students who had very little dynamism or change-evidence within their winter count collections. In these eight choices, we also considered the student's accompanying and interpretative text to the winter counts as well. We agreed that eight sets of winter counts were a manageable amount of data that would provide rich insight into the processes occurring for these students as they grappled with the concepts and practice of transformative inquiry.

Using drawings as interpretations of change in student teacher's reflexivity is a well documented research method. Haney, Russell, and Bebell (2004) describe the use of drawings in research as having "consequential validity, in that they seem to promote reflection and change, not via formal research but via action research, or even teaching" (p. 267). That these drawings exhibit a partial interpretation of the student's own process speaks to the concept of consequential validity, even to themselves. These authors also acknowledge that educational research on drawings is further supported through short descriptions of the drawings as a way to explicate their meaning. Our interpretations of students' expressions of their thinking through winter count collections act as viewpoints into their process in addition to a number of other viewpoints we are taking into the data derived from TI (Starr & Tanaka, under review; Tanaka, under review; Tanaka, Nicholson & Farish, 2012).

Once acknowledging the limitations of our data, this is where the methods process took an autopoetic form of flow. As a diverse group of researchers, students, and instructors, we noticed ourselves attempting to categorize 'types of students' we were encountering in this course. Our first interpretation confined the students to three camps: bow-tiers, recursion-without-movement, and complex explorers. We symbolized these three groups by drawing diagrams on the chalkboard (figure 2).

bow-tiers   recursion and spinning   complex explorers
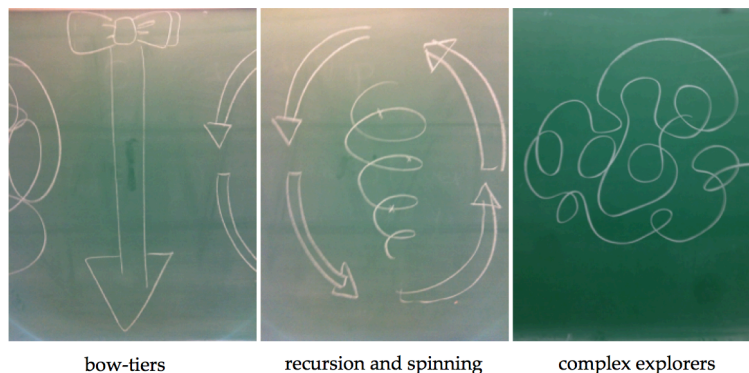
Figure 2: First interpretations of general student approaches
to Transformative Inquiry process.

Bow-tiers could be described as students that were performing the task of inquiry in a superficial way with the intention of 'getting it done'. Recursion and spinning students found themselves spinning in circles, increasingly muddled by their inquiry and sometimes panicking in this confusion. They also could be seen to either moving with confidence or moving towards stuckedness. This can also be a cycling back to a slightly different place on the spiral. Complex explorers were more at ease with the muddiness of self-directed transformative inquiry and were able to make connections among many aspects of their life, practice, passion and curiosities.

However, after sitting with these three categories, we noticed that we were uncomfortable with these three discrete boxes, without acknowledging the nuances and complexities that arise when considering time, scale, holarchical, and inter-dependence of learning systems. Might some of the students be engaging at a superficial level now, but into the future, start moving through and beyond this level of bow-tier? As a team we deliberated over this question, feeling as if something wasn't resonating with our initial categorization. Nicholas suggested that we re-look at the data using an ecological systems theory named "panarchy" that would allow for a view of the approach as a way beyond categorizing and acknowledge the subtleties of learning, representing, and reflecting.

Each winter count represented a snapshot into the student's experience during the month-long course. Using a phenomenological lens, we interpreted them through an adaptive systems approach, a component of panarchy theory, that describes how students transform through their own thoughts and expressions in a stage-based and recursive process. Each student, and his or her progression through the process of TI is plotted on the adaptive cycle diagram explained below.

Panarchy adaptive systems as a theoretical framework for interpreting transformation

Originally conceived to describe connections among chaos theory, complexity theory and ecological system management, 'panarchy' is a term that "explains the evolving nature of complex adaptive systems" (Holling, 2001, p. 392). Panarchy theorists argue that humans need to move beyond interpreting systems using simplistic equilibrium models and acknowledge the more complex and dynamic set of equilibria that describes the states of ecological, societal, and economic systems (Gunderson & Holling, 2002). Rather than describing the equilibrium nature of a well-adjusted student-teacher, we are interested in the ramifications of using panarchy to describe how humans move and adapt through multiple equilibria of thought and expression (Varey, 2011). This is particularly useful when analyzing transformation over space and time through an Indigenist approach, which also celebrates complexity and interconnectedness (Wilson, 2009).

Panarchy not only forms a framework for our analysis, but for the ecology of transformation in general. The cyclical component of panarchy can be represented through a three-dimensional model of an adaptive cycle (Figure 3):
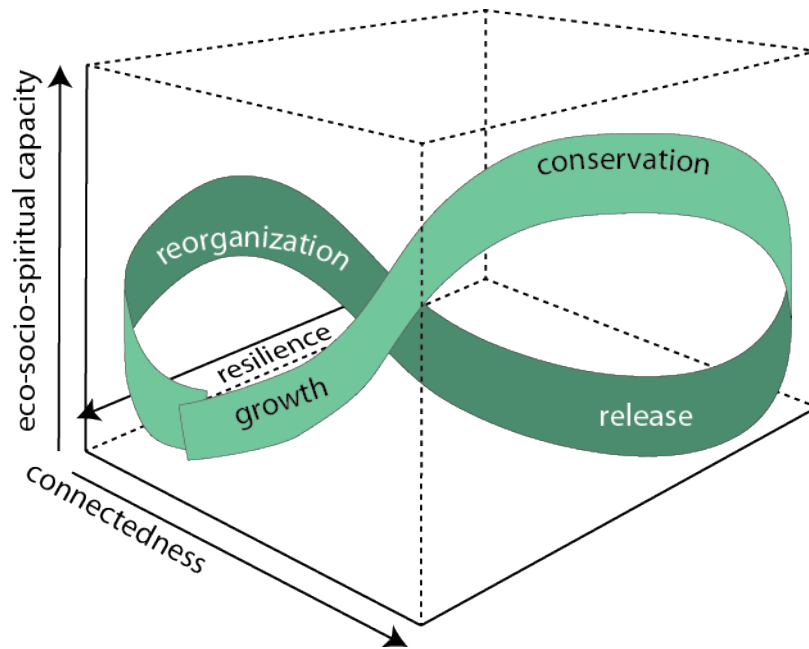
Figure 3: Three dimensional panarchy model showing the relationship among eco-socio-spiritual capacity, connectedness, and resilience within an adaptive cycle (adapted from Holling, 2001).

Figure 3 shows four stages of ecosystem dynamics within the adaptive cycle: *conservation, release, reorganization,* and *growth* (Gunderson & Holling, 2002). These stages exist within the three dimensional space constructed by the interaction among x-axis: connectedness, y-axis: eco-socio-spiritual capacity, and z-axis: resilience. As a student learns and moves clockwise through this model from growth to conservation, he or she makes more connections (increasing complexity of their knowledge). Approaching conservation, however, the resilience of this student's knowledge in whatever has been learned is decreased; that is, he or she is more susceptible to change and adaptation through the attempted maintenance of one view. Moving from release to re-organization, the student decreases connectedness and capacity amongst his or her understandings and resilience and adaptability increase again, suggesting new potential and possibility for adaptation. As a way to further illustrate the adaptive cycle, each stage is explained using Vanessa's experience as a pre-service teacher in the Post-Degree Professional Program.

Interpreted as a map of transformation, individuals can start anywhere within this cycle. Vanessa started at *conservation.* When biodiversity and complexity of interactions within ecological systems increase over time (connectedness), the *conservation* stage represents the role of carrying capacities and an apparent equilibrium. Vanessa describes an act of conservation:

> I entered the First People's House to find a room with desks splayed out in a circle and students shuffling backpacks, notebooks, and mugs of morning coffee. The Aboriginal Education class was primarily a concert of student voices filling up our sessions, and subsequent classes replicated this structure. I found it irritating. I was paying substantial money to listen to my peers discuss complex issues, while my instructor sat quietly within the circle. I was conditioned to expect her voice to be the dominant one, not those of my classmates.

Vanessa entered the Indigenous Institute confidently believing that she knew what teaching and learning looked like in schools; teachers give instructions and students respond correctly. In group discussions, instructors pose questions designed to illicit the

right answer which students compete to provide. When the instructor did not follow the traditional model, Vanessa was in conservation around her belief that teachers should behave in a particular way. Eventually she reluctantly began to reconsider teaching and learning roles.

The shorter *release* stage occurs when a stochastic (random) event or competitor/predator alters the conditions that supported the equilibrium, increasing the resilience, and complexity of the interactions. Vanessa's exposure to another way of teaching precipitated her entrance into the release phase:

> I did not realize it then, but I was not only learning Indigenous pedagogy but experiencing it simultaneously. The silence of our instructor, who often only punctuated lulls in the conversation with words that further encouraged chatter from my classmates, disrupted my notions of what a university classroom should be. Our instructor spoke softly, listened carefully, and was more concerned with the students inhabiting her classroom than charging through the syllabus. The class challenged both my perception of Indigenous learners, and my notion of the way in which teaching and learning happens.

Vanessa's participation in the class was her stochastic event. Some of the material presented in the class focused on students in residential schools, experiences that were powerful and disturbing. People gently explored emotions and ideas that emerged as a result of the careful conversations that took place through storytelling and circular ways of speaking. It was during these conversations that Vanessa began to view teaching from a previously unexplored perspective, one that disrupted her thinking, but powerfully resonated with her. Senge (2000) describes this learning as the transformation of spirit and mind; where learning becomes synonymous with the capacity for change. "Deep learning takes place when new skills and capabilities, new awareness and sensibilities, and new attitudes and beliefs reinforce each other" (Li, 2002, p. 402). Further, Clark (1993) believes that a critical feature of such change is in how individuals see themselves and their world. Kegan (2000) adds that through the process of engaging transformation we move beyond simply adding to what we already know to profoundly alter *how* we know.

Vanessa's next phase of the adaptive cycle, *reorganization,* can be described as the reconstruction of a system with remaining components, such as successful organisms that survive natural selection processes associated with the stochastic event:

> Before entering the program I had completed a BA, and was well aware of how a university classroom should be; the professor pontificating at the top, and students listening and scribbling notes at the bottom. I emerged from the Aboriginal Education class, both overwhelmed with the complexity of education, and excited about this different way of knowing and teaching.

Vanessa made immediate changes to her own style of teaching with the belief that such changes would not only make her a more effective teacher, but more importantly, would help her students learn in more authentic and meaningful ways. She began setting students up in a circle during discussions and made the effort to step back, to talk less, and listen more. In doing so, the previous hierarchies that she subscribed to gave way to a space where multiple perspectives were not just acknowledged but valued.

Growth occurs in this system through a rapid expansion of a population where there is a plethora of ecological niches:

> What began in the class developed into my practice as a new teacher, as the idea of a teacher as an architect or facilitator of knowledge was introduced. Certainly, I had read literature and listened to other professors preach the concept, but few had taught using the methodology. As with most teaching and learning, the experience of Indigenous pedagogy far superseded the didactic transmission of the method.

Vanessa recalls many of her professors telling her that teachers were the architects or facilitators of learning but until her participation in the described course, she had little experience to contextualize these descriptions. Once she did, the results had a profound impact on her understanding and practice of teaching.

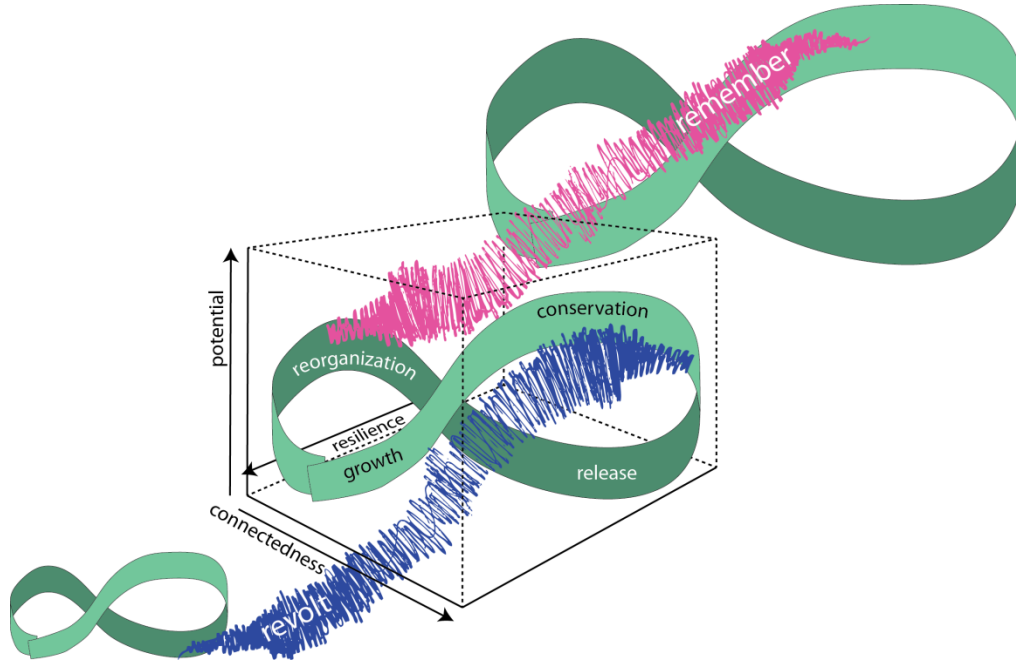The panarchy process then cycles into the future, with potential to spin into other loops 'above' and 'below' this one through events called *remembering* and *revolt* (figure 4):

Figure 4: Remembering and revolt as a function of moving among multiple equilibria and scales of systems (adapted from Holling, 2001).

Revolt, occurs when a series of rapid stochastic events leads to the escalation of the adaptive cycle to a much larger and slower cycle:

> An ecological version of this situation occurs when conditions in a forest allow a local ignition to create a small ground fire that spreads first to the crown of a tree, then to a patch in the forest, and then to a whole stand of trees. Each step in that cascade moves the transformation to a larger and slower level. (Holling, 2001, p. 398)

Similarly, *remembering* is triggered by a cross-scalar event, pertaining to the use of legacy items such as seed banks after a stand-replacing forest fire. In terms of scholastic research, an example of *revolt* would be a series of events that expose a new paradigm. *Remembering* might be the major re-organization of thought based on a hermeneutic analysis of long-forgotten texts.

> Moving out into teaching practice, I quickly realized the tension between Indigenous pedagogy in positivist classrooms. Most days I walk into schools to find students lined up in neat rows, trained to recognize my voice as the one filled with answers, and as the conductor of their waving arms for when they might speak. Resisting the positivist classroom is tricky business, it is grafted into me, but then there is the new experience I found in the Indigenous setting. I remember our instructor, who listened more than she spoke, and brought me into a circle where deep learning is possible.

Vanessa characterizes her experience as revolt through remembering. When she recalls her own school experience she remembers the teacher standing at the front, telling students what to do, know and say; this was *normal*. But as her understanding was challenged she recognized her previously held beliefs were anything but normal. Once

she committed to this new way of viewing teaching and learning that was inclusive and open, in her words, 'there was no going back' without feeling as though she would be betraying her own commitment to be a teacher.

Winter count collections as expression of TI expressions

Vanessa's story lays the ground of panarchy and now, to illustrate the usefulness of images in TI, we present six winter count collections within that model (table 1). We then chart each journey on the panarchy loop to show growth in the course. Remember, we are only looking for movement – there is no value placed on 'how far' or to 'what point' someone could go. The collections fall into processes of (in)form (primarily conservation); (re)form (embodying release and reorganizing); and (trans)form (moving beyond reorganization and growth). It should be noted that some students had a predisposition to artistic processes that could be useful (e.g. they were willing to jump right in, as they felt familiar with images) or limiting (e.g. they got overly caught up in a product orientation). Conversely, students who felt they were not 'artistic' sometimes expressed hesitation at first, and took varying amounts of time to warm up to the process.

Table 1: Key to the participant titles, their inquiry topics and their expression of transformation.

Participant	Inquiry topic	Expression of transformation
D04	Indigenous education taught by non-Indigenous educators	(in)form
D01	Feminism in Education	(in)form
D23	Peer Pressure in classrooms	(re)form
D18 and D25	At-risk youth in classrooms	(re)form
D12	Spirituality and carving	(trans)form
D19	Math and multiple ways of knowing	(trans)form

(In)form

Students that exhibited (in)form within their winter counts were able to reflect carefully on their topic from a personal perspective within the context of the program and their practicum experience. Often this was a personal reflection that positioned themselves in relation to the beliefs of the program and others around them.

Participant D04

Participant D04 began by announcing her "elaborate plan to make a mini winter count representing each day of the institute" and her instructor needed to remind D04 of the true purpose of the activity. While she did not have a concise inquiry topic, as indicated by the multiple bubble thoughts around her head, D04 gravitated towards exploring concerns around tensions between being non-Aboriginal and teaching Indigenous content (figures 5 and 6).
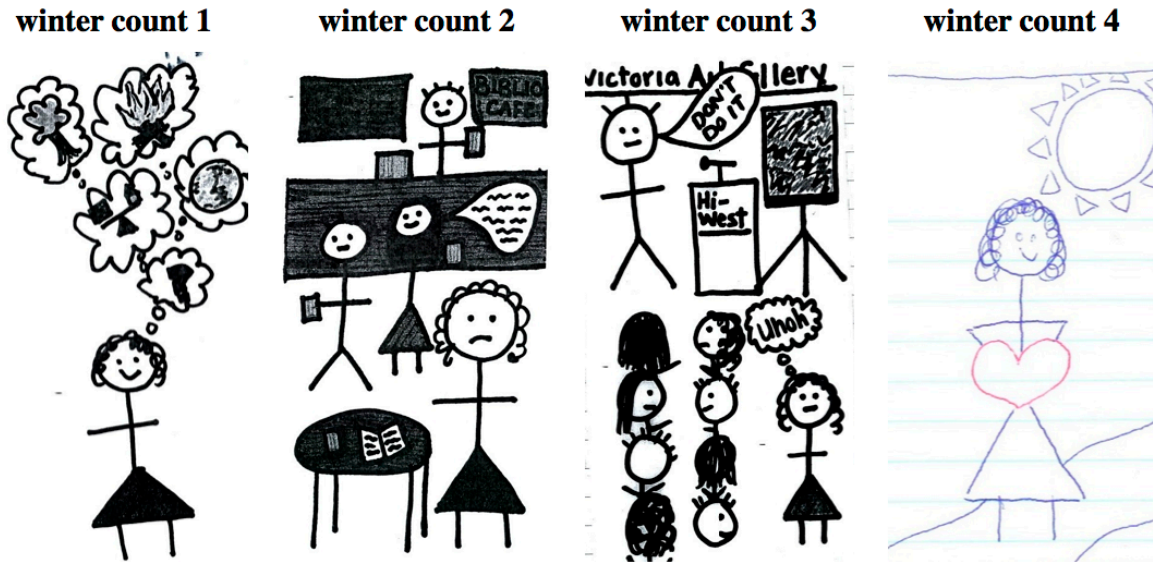
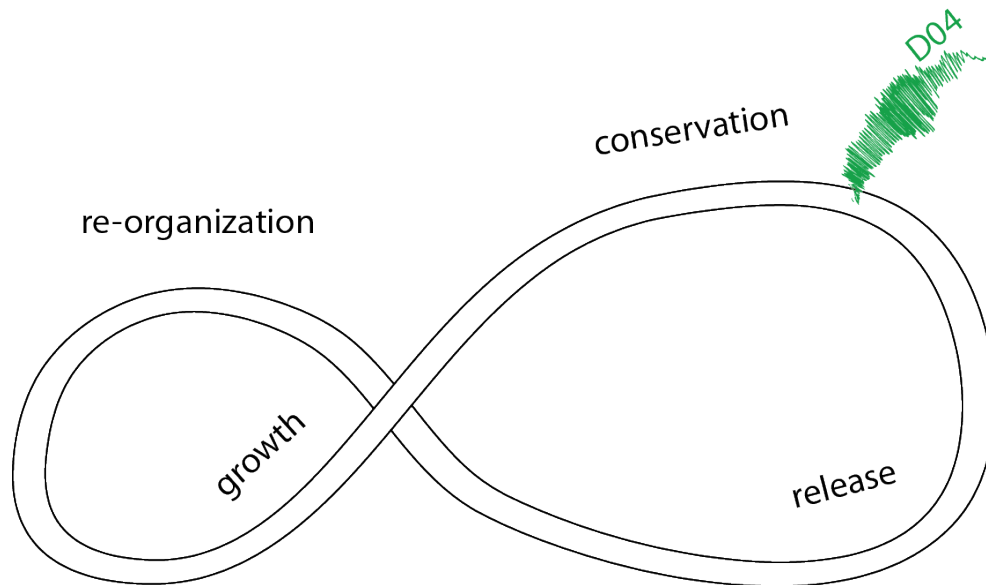Figure 5: Participant D04's winter count collection.

Figure 6: Participant D04's transformative inquiry process

In her second winter count D04 refers to a stochastic event where she overheard peers discussing the institute and concerns that "one of our profs didn't know anything because she wasn't Aboriginal." Another significant event can be seen in winter count three when she went to an art gallery opening and a guest speaker told the audience to "leave Aboriginal content to Aboriginal teachers." Both of these statements were contrapuntal to the theme of the Indigenous Institute in which D04 was partaking.

Despite the significant of these events, D04 appeared to remain in a type of holding pattern, making comments like "this topic is much too big for the next two weeks." We wonder how much of this was due to the intensity of the professional program and her focus on her impending practicum. We also consider how her instructor might have been able help her go deeper into the topic of Indigenous education. This raises the concern that the TI process needs more time than a single course can provide. In the text

of her fourth winter count, D04 describes that she had a 'turning point' after reading an article that carefully laid out principles of indigenous pedagogy. We believe that this final event could have held significance for her moving into release and growth if given more time and space. Instead, she neglects the complexity of her topic opting for the stability that comes with simplicity.

Participant D01

Participant D01's choice in topic reflects a long-time passion for feminist theory, as she pondered how Indigenous education might fit within her existing framework. Entering the panarchy loop at a point of conservation, her image of webbed feet were a way of remembering that all humans are animals, and reflected past dealings with power structures (figures 7 and 8). Her second winter count mapped out the terrain that she was embedded in – the feminist fist, books as knowledge, trying to find a path with heart, while the figures in the upper left represent her "attempt at inclusion and community… a reminder to keep my awareness about who I am and the biases I innately have as a privileged person in this world."
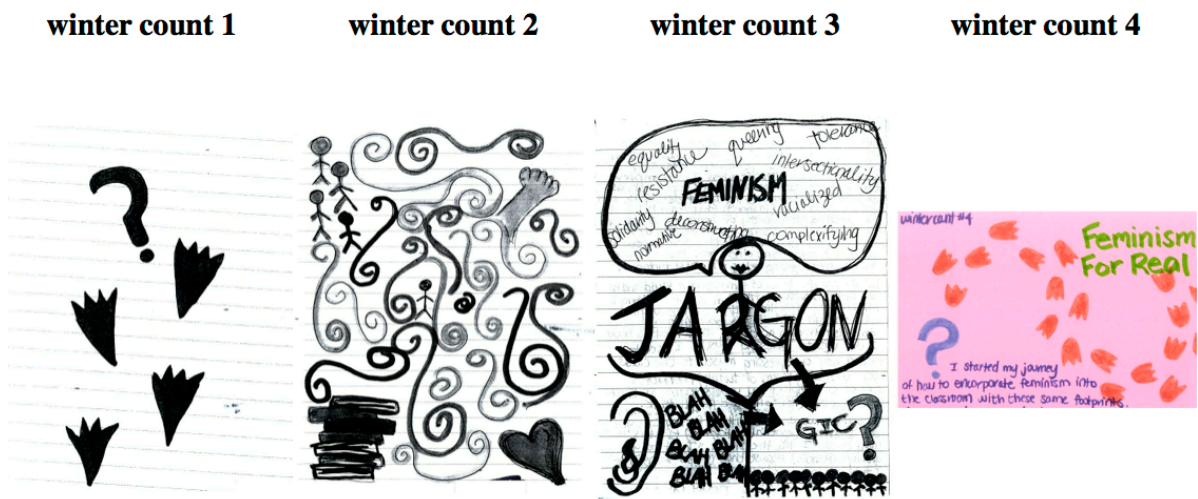
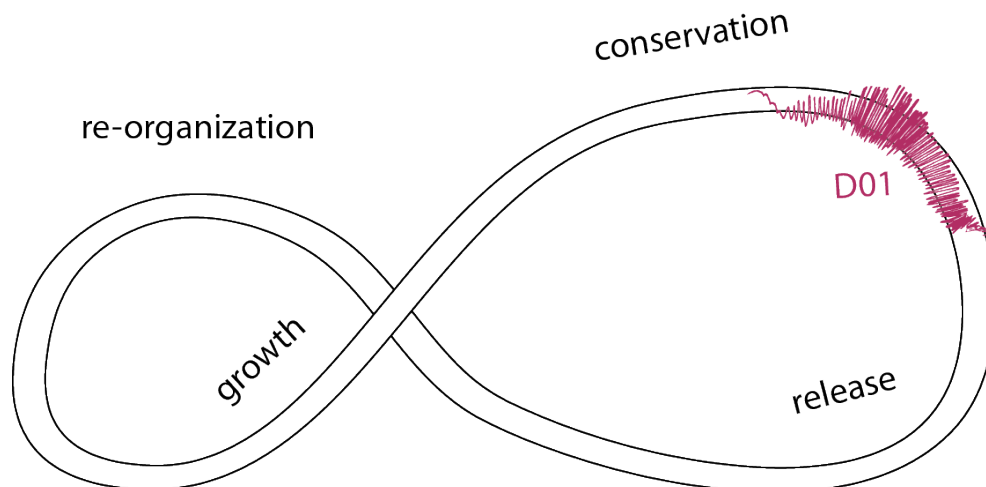

Figure 7: Participant D01's winter count collection.

Figure 8: Participant D01's transformative inquiry process.

D01's third winter count reflects her concern with language and struggle to navigate expressing herself to her peers "without confusing them or turning them off' as she prepared for a final class activity designed to keep inquiries in motion through peer discussion. Although instructors repeatedly remind students that the process is more important than the product in this course, there is a tension to create the 'right' product for this activity. Additionally, D01 was driven by a need to educate her peers on the tensions around issues of feminism and Indigeneity, perhaps at the cost of facilitating complicated conversations on these issues. While there is a sense that she was somewhat static in her explorations, D01 did appear to move into a deeper realization as to the role of language within privilege.

(Re)form

Students that exhibited (re)form within their winter counts moved beyond remembering events to a critical reflection, where memories were analyzed within the context of their learning experiences in the education program. We saw explorations of pluralism through the acknowledgement of the fallibility of binary thinking, the value of complexity, and relationality. Two winter count collections display (re)formation of thought: participant D23, who is exploring peer pressure, and the partnered work of the participants D18 and D25, who were inquiring about the role of teachers supporting at-risk youth in a school setting.

Participant D23

Like many students in this program, when asked to 'remember' their motivation and learning spirit, D23 exhibited a reflexive exercise that moved beyond simple recall (figures 9 and 10). D23's winter count collection do not explicitly show this movement to (re)formation until the interpretation of her movement through adaptive cycle is combined with her final summary. She reflects on her movement between winter count two and three as deepening her understanding of peer pressure as having "a lot to do with expectations and motivation," going on to describe this understanding has influenced her teaching practice and interest in using inquiry as a professional teacher.
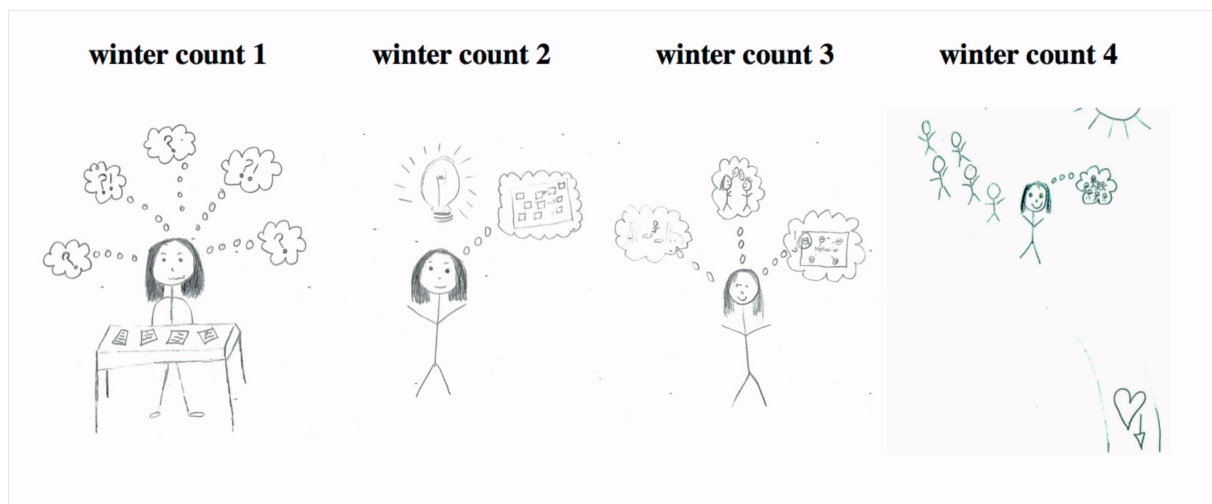

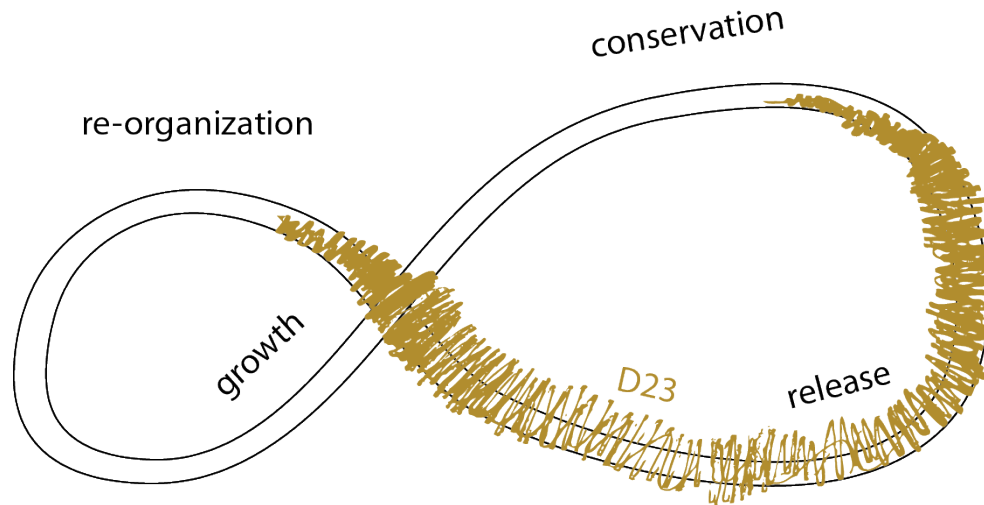Figure 9: Participant D23's winter count collection.

Figure 10: Participant D23's transformative inquiry process.

Despite this movement of thought and understanding, she displayed little interest in reorganizing her teaching practice, especially around her inquiry topic: "My inquiry has not really prompted me to make huge changes in my future practice." We see D23 as being on the verge of reorganization and movement to a new adaptive loop, when she finishes her reflexive discussion on the meaning of TI:

> A transformative inquiry stance to me means patience. Patience in selecting a topic; patience in sitting in the swamp; patience while waiting for that 'golden nugget' and patience while selecting how one wants to research and find information to guide them through the inquiry process…This process is one that I have never used before, and it is one that has taken me a little while to get used to. It seems strange to have a process like this that is "non-linear, recursive and meandering."

This statement exhibits the complexity of the interrelation of time with transformation. For some students much more time and space is needed to be able to digest complex inquiry questions to the point where reorganization can lead to further growth. D23 shows the initial indicators of this release to reorganization, but is limited by time to explore her topic within the context of the growth phase of the adaptive cycle.

Participants D18 and D25

Participants D18 and D25 combined their inquiry projects, an option given by the instructor, as a way to engage in the process through a relational approach. In the cases of D18 and D25, their winter counts were drawn individually, showing the ebb and flow of their work as individuals, but also how they supported a co-constructed movement (figures 11 and 12).
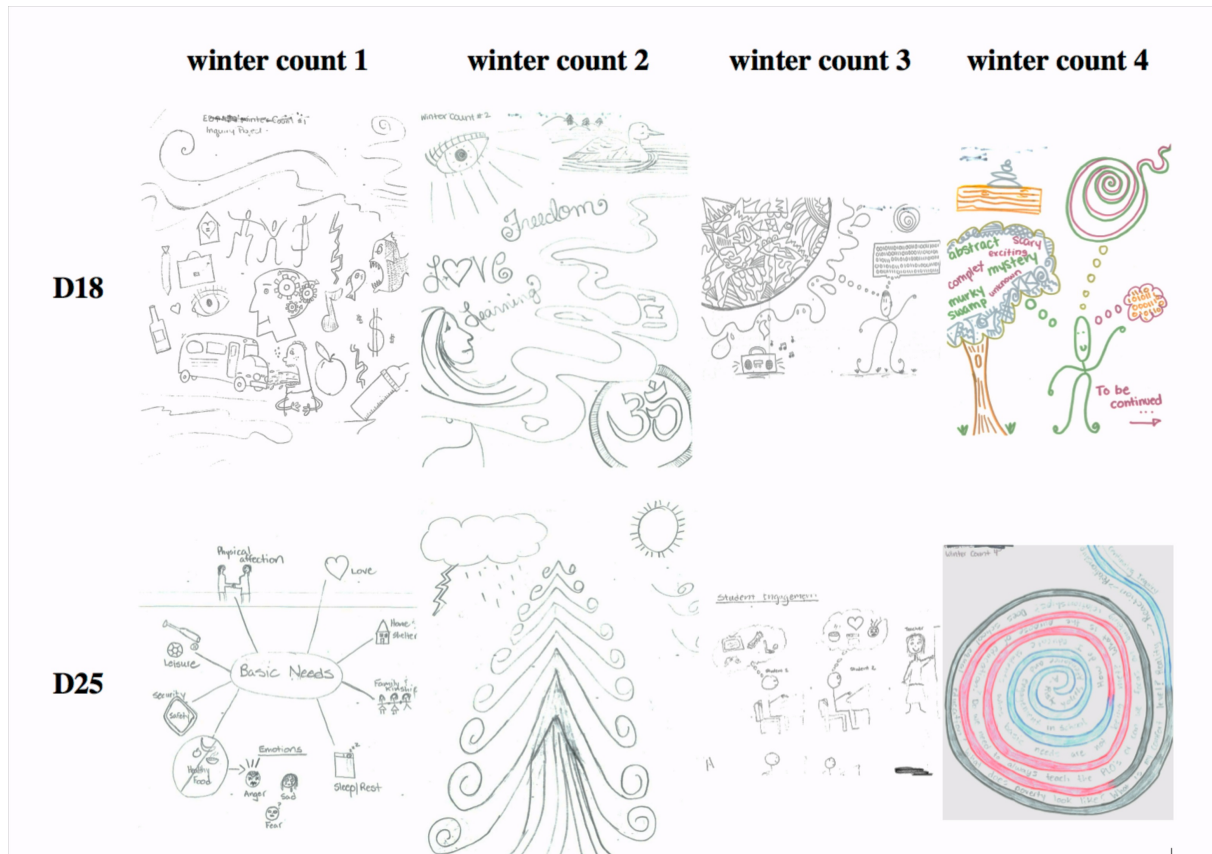
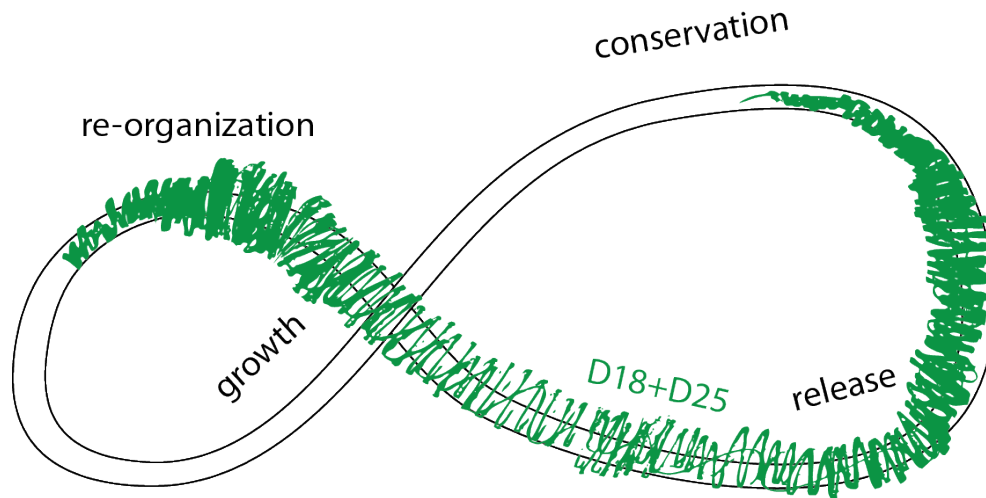Figure 11: At-risk team (participants 18 and 25) winter count collections.

Figure 12: At-risk team (participants 18 and 25) transformative inquiry process.

We interpreted D18's winter count three as representing the discovery of the problematic of binary thinking and the limitations she put on herself as a future educator: "More and more I'm coming to recognize the narrowness of my personal beliefs…This winter count represents the way in which I'm beginning to listen more closely to myself, to the bias I hold, to the assumptions I make and the stereotypes I perpetuate." Exhibited as thoughts as a complexity of interrelated designs at the same

time as binary thinking, she drew winter count four as a metacognitive statement of thinking in multiple ways.

Similarly, D25 shows movement in her thought through her winter count three and four where she shows a mind map and spiral diagram that question the fundamental limitations of educating at-risk students. D25 feels limited by her own drawing abilities, "first let me apologize for the stick figures… I am NO artist!" and uses the accompanying text heavily to help the reader interpret her drawings. In her final winter count, she comes the image of the spiral, similar to her inquiry partner, D18. She uses this spiral to represent an opening to continuing her inquiry into the future:

> My new swamp is that students realities lead to our reaction which then dictates the kind of relationship will be formed… The question for me now is How will I react to my students realities. This path is still forming and has not ended.

This final paragraph and spiral diagram exhibit a deeper understanding and openness to the transformational process, where she releases a positivist view of the world, and embraces the complexity and ever-changing nature of understanding and inquiring about topics of passion.

Though D18 and D25's process is combined, one can see different patterns in their own transformation. D18 was able to articulate the complexity of her inquiry much earlier in the winter counts than D25, and perhaps supported D25 in further deepening her thinking.

(Trans)form

Students that reflected (trans)form moved deeply into the realms of reorganization and growth. There were strong elements of reflexivity: locating self-beliefs, values and attitudes in the larger eco-socio-spiritual contexts. These participants were connecting to the why of what they were doing; Participant D12 and D19 all entered into the panarchy loop in the realm of release. This could be in part, due to the nature of the institute, which assumes there are other ways of knowing and other paradigms of perception outside of mainstream western thought. These participants appear to have been poised for reorganization and took full advantage of the time and space the course afforded.

Participant D12

Participant D12 began his winter counts by depicting how he felt he was "spinning in circles" in deciding on a topic, discarding numerous possibilities when he realized "that they do not really interest me in ways that spark my will to learn more about them." He consciously placed images of the humpback whale and eagle heads to represent 'indigenous influences' as being outside the circle of his inquiry interests at this point. In his second winter count these images become more centrally located and he added an image of an interview session he had with a master carver that was influential to his topic choice of spirituality and carving (figures 13 and 14).
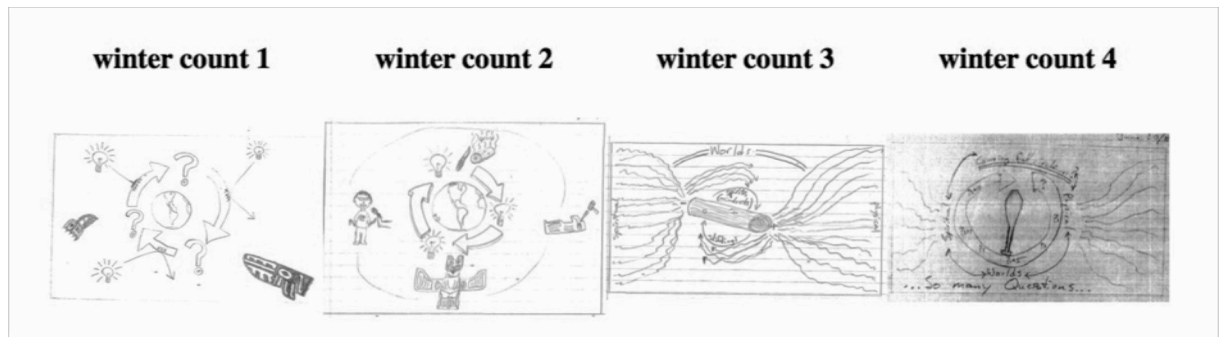
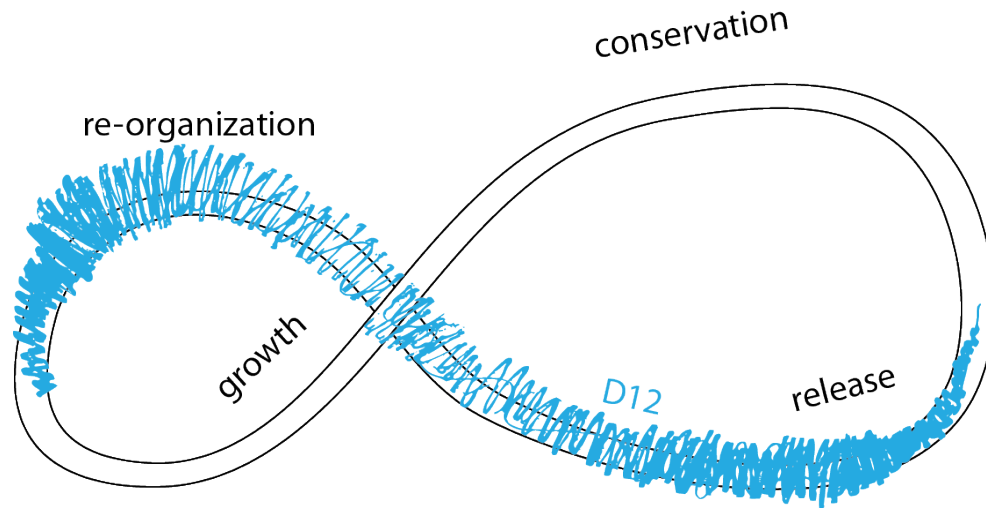Figure 13: Participant D12's winter count collections.

Figure 14: Participant D12's transformative inquiry process.

In the third winter count, D12 focuses in on the upper image from the previous assignment. Here he shows the attractive nature of the "co-existence of both the spiritual and physical worlds that meet at a cedar log that represents the art of indigenous carving." Later he writes that "deep down the image is a representation of people's mindsets shifting when they witness or experience the meeting of both worlds." In his final winter count, D12 places his carved paddled at the center. He describes a feeling of 'coming full circle' and of rediscovering his 'love for carving.' At the same time, he has fresh questions that are taking him in 'new directions' expressed relief that his inquiry did not need to come to some 'perfect conclusion'; holding a sense of completion and expansion at the same time. He ends his final winter count writing by acknowledging that the class gave a space "to understand that the process of learning is more important than creating a final product, which is what I'm used to doing in academia."

Participant D19

Participant D19 entered the process with a sense of conceptual depth as evident in her winter count 1 writing where she is reflexive of own identity and how she might be different than others (figures 15 and 16). Her inquiry questions the relevancy of required math courses and whether it is "tokenism to lace my math 10 work problems with

Indigenous content." In winter count 2, D19 acknowledges that she has done a lot of listening (note enlarged ear) and begins to "ponder the 'worldview' of math itself." She worries that "some articles seem to make a greater effort at 'coaxing' aboriginals to be more math inclined rather than changing the math system to meet the needs of aboriginal students."
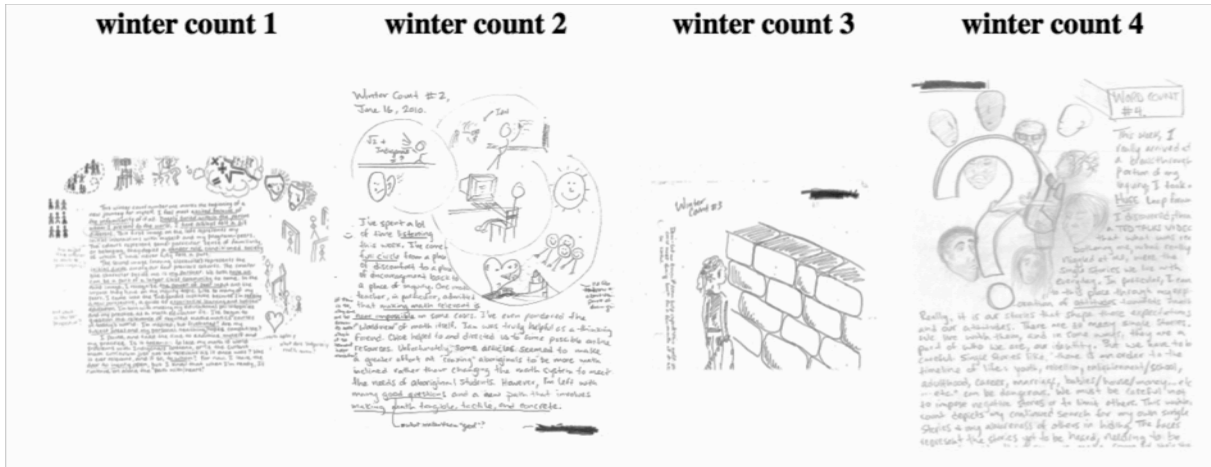

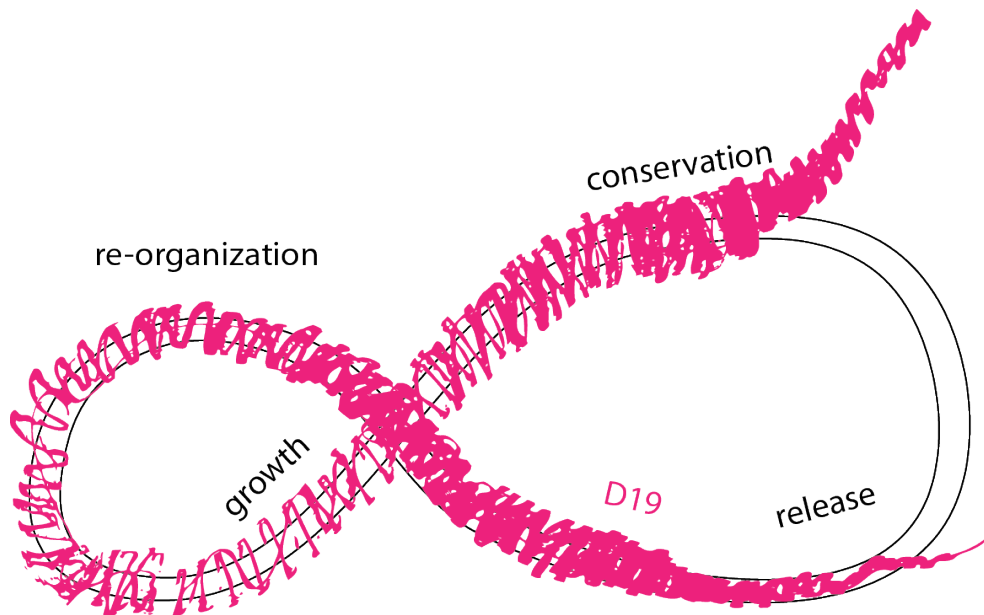Figure 15: Participant D19's winter count collections.

Figure 16: Participant D19's transformative inquiry process.

From this point, after speaking in depth with her peer inquiry partners, D19 hoped to speak with various educators further afield. She faced a brick wall of no responses as indicated in winter count three. This stochastic event forced her to look elsewhere, leading her to a second event when she found a Ted Talk video on the topic of 'single stories.' She describes this as helping her 'take a HUGE leap forward' in her inquiry as she discovered "what was really bothering me, what really niggled at me were the single stories we live with everyday." She realized how attitudes towards math are shaped by our underlying stories; a fundamental shift in her thinking about western constructs. She wondered how she might "unlearn some of the single stories I've been harboring as well

as how I can allow my students to discover and deconstruct their own single stories." Thus, she moved through the growth phase of the loop and 'revolted' to another loop.

Winter Counts as Transformative Inquiry

The interpretations of winter counts have shown three distinct expressions of transformation: (in)form, (re)form, and (trans)form. With *form* as the root of these descriptions, we are playing with the prefixes in, re, and trans as an acknowledgement that our view of these individuals are limited, and that each of these expressions are not fixed in time, but are part of the systems of change. That is, each of the three prefixes nest within each other such that the student's experience is likely much more complex than we can interpret from only four winter counts. This might mean that their forming is occurring through other events in their life. We acknowledge that the limitations of our data preclude us from analyzing experiences outside of the course. Historically teacher education has been analyzed using a linear understanding to development (Zeichner, 1983). More recently, curriculum theorists have called for teacher development as complicated conversations (Phelan, 2011; Pinar, 2012). We see that Teacher education is tied to cultural assumptions such that we are responsible to explore the nuances of knowing through reflexivity, relationality, and other ways of knowing. Our analysis reveals three complicated conversations that we present here and invite you to participate in. First, the purpose of artistry and the perception of being a 'good' or 'bad' artist seemed to hinder some students' ability to immediately engage in winter counts as a form expression. Participants often acknowledged their limitations as an artist and thus worried whether their work was adequately represented through winter counts. To assist our interpretation of more simplistic drawings, we were drawn to their accompanying text. The text predominantly functioned to illuminate our interpretations of any evidence towards transformation. As an entry point, the images demonstrated how the pre-service teacher placed themselves within their own thinking, suggesting deeper metacognition and relational representations. We believe that the winter counts helped the students engage in reflexive activities, where they were asked to represent their own thinking and feeling throughout a process of inquiry. This reflexivity supported our interest in modeling Indigenous ways of knowing by encouraging students in their consideration of themselves, their community, and the Earth as sites for learning. At the same time, the winter counts acted as an acknowledgement of adaptation and cycles.

Second, we wondered why certain students seemed more inclined to move into (trans)form expression over others. This question cannot be fully answered with existing data, but as a contextual query it helps frame our understanding of TI. For instance, winter count collections that were interpreted as expressions of (in)form seem to maintain status quo within the conservation stage of panarchy as a way to cope with the stressful student-teacher experience of the post-degree-program. This could be due any number of factors that are internal or external to the class such as being overwhelmed, comfortable with 'what they have', uncomfortable with change and adaptation, and limited experience of the value of adaptation. It is linear approaches such as these that the TI process is attempting to disrupt, asking students to dwell in the complexity of their practice.

Winter count collections that were interpreted as expressions of (re)form, appeared to be on the verge of re-organization. For each of the three (re)form examples, students moved from their release (caused by some event or intervention) to statements of thinking differently or seeing the complexity of their inquiry through new eyes. Perhaps further movement was limited by time constraints of the month-long institute. If more time and space were given to their TI process, perhaps deeper transformation could

occur, allowing for the reorganization of thoughts and beliefs, and the growth of new ways of perceiving and inquiring about the world.

Winter count collections that were interpreted as expressions of (trans)form exhibited signs of resonance or a deeply powerful emotional connection. Each of our examples made meaning of the connections amongst elements of their own identities. Whether it was math and multiple-ways of knowing or science and indigenous spirituality, the (trans)form students were connecting with the complexity of their identities as their inquiry path. This movement could result from a predisposition to the inquiry process due to life experiences as a source of data and exploration. Also, these students could have a greater understanding and/or intuition of what the instructor wants. In related data analysis, we have found that students that exhibit (in)form and (re)form submit drawings and reflexive statements that we interpret as superficial or avoidance-oriented. Further investigation into what pre-disposes or limits students in engaging in TI will complement these findings and we are currently engaged in this work through other publications and research.

Finally, using panarchy theory and its underlying complexity theory in the context of social sciences, and educational transformation is understudied. Our interpretation of each of the three expressions of transformation (in~re~trans) is not hierarchical or stage-based, though this language is hard to escape; instead they are nested within each other. The process of providing space, time, and using mentor-based facilitation techniques for transformation, can lead to movement from simply remembering through release, reorganization, and growth. In light of this, we return to Holling's leadership and Indigenist lenses, by rooting our work in ecological and relational principles.

Nestedness, or holarchical structure, is a main component of panarchy. We use this language of nestedness as an interpretation as imperceptible change such as (in)form, moderate change (re)form, and significant change (trans)form. Consider that these adaptive cycles are nested at different scales, timing, and structures amongst the individual and communal learning systems. This concept suggests that small movement could represented by a smaller adaptive cycle, whereas a 'revolt' could be used to describe (trans)form and thus transformation in the student (figure 4). The concept of holarchy also resonates with relationality, a critical aspect of Indigenist research and teaching approaches. By decolonizing our approach to education, we are rethinking the role of the teacher, reconsidering what counts as knowledge, and challenging common sense and normalizing discourses.

The researchers are deeply immersed in the process of TI. We are simultaneously living the experience of our own transformational inquiries while noticing at a metacognitive level what might be happening to ourselves and others around us. We would be remiss if we didn't explore our culpable nestedness within this mentor-mentee teacher education space. Throughout this research and the development of this paper, we notice ourselves moving through growth, conservation, release, and reorganization. Our thoughts and interpretations are constantly in movement, and what we capture here through this paper, is only part of a much larger constantly cyclical dance among mentor, mentee, content, and curiosity. Our own stories of TI are more thoroughly explored through the complimentary papers that relate to our research (see papers in the references with Tanaka as primary author). Gregory Bateson has helped lay a path for languaging our understanding of this phenomenon of cyclical learning. So we will leave you with some of his words that resonate with us:

> You have probably been taught that you have five fingers. That is, on the whole, incorrect. It is the way language subdivides things into things. Probably the biological truth is that in the growth of this thing – in your embryology, which you scarcely remember – what was important was not five, but *four* relations between pairs of fingers. (Bateson, 2011)

We believe, in recognition of the relationality of learning and understanding, that winter counts can help portray the change that students are experiencing is an encouraging affirmation that the TI course is supporting students to leave with a more earth-centric, community-centric, and soul-centric view of their own identity as teachers.

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Acknowledgments

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Lisa J. Starr is a former secondary school teacher currently completing a doctoral degree in Social, Cultural and Foundation studies in the Department of Curriculum and Instruction at UVic. She received a Master of Arts degree in administration and supervision while working overseas. Her teaching career led her from Canada to Pakistan, Kuwait and Mongolia and created a passion for the study of the relationship between identity and culture, particularly in relation to educational effectiveness and school leadership. Of critical importance to her practice as an educator is the facilitation of opportunities to challenge thinking around three questions: What are we doing? Why do we do what we do? How can we do the things that we do better? Lisa strives to facilitate experiences beyond simple show and tell to create transformative learning environments where individuals are inspired and empowered. Her current research focus is the use of autoethnography in the study of leadership philosophy and practice.