

**EDUCATIONAL CHANGE AND RETHINKING DISCIPLINARITY: A
CONCEPT ANALYSIS**

**LE CHANGEMENT EN EDUCATION ET LA REDÉFINITION DES
DISCIPLINES REMODELAGE : UNE ANALYSE DE CONCEPTS**

Aron Rosenberg and Lisa Starr

Volume 55, Number 1, Winter 2020

Regards croisés de la recherche sur l'accompagnement professionnel
en milieux scolaire et universitaire
Research on Professional Development in School and University
Settings: Intersecting View

URI: <https://id.erudit.org/iderudit/1075724ar>

DOI: <https://doi.org/10.7202/1075724ar>

[See table of contents](#)

Publisher(s)

Faculty of Education, McGill University

ISSN

1916-0666 (digital)

[Explore this journal](#)

Cite this article

Rosenberg, A. & Starr, L. (2020). EDUCATIONAL CHANGE AND RETHINKING
DISCIPLINARITY: A CONCEPT ANALYSIS. *McGill Journal of Education / Revue
des sciences de l'éducation de McGill*, 55(1), 151–175.
<https://doi.org/10.7202/1075724ar>

Article abstract

This article analyzes the potential for reshaping disciplinary divides by engaging with theories and movements that relate to educational change. Generating educational structures that diverge from conventional discipline-based models are a common way of attempting contemporary educational reforms. Interdisciplinary approaches are analyzed in this paper relative to theories of change in the context of secondary level education, with a focus on Québec, Canada. The purpose of this article is to understand and give meaning to the concept of interdisciplinarity within educational change and reform. This exploration proposes a conceptual map for understanding educational change efforts that aim towards rethinking disciplinarity. A model case, NEXTschool, is included to illustrate the applied relevance of the theories and ideas explored in this paper.



Educational Change and Rethinking Disciplinarity: A Concept Analysis

ARON ROSENBERG *McGill University*

LISA STARR *McGill University*

ABSTRACT. This article analyzes the potential for reshaping disciplinary divides by engaging with theories and movements that relate to educational change. Generating educational structures that diverge from conventional discipline-based models are a common way of attempting contemporary educational reforms. Interdisciplinary approaches are analyzed in this paper relative to theories of change in the context of secondary level education, with a focus on Québec, Canada. The purpose of this article is to understand and give meaning to the concept of interdisciplinarity within educational change and reform. This exploration proposes a conceptual map for understanding educational change efforts that aim towards rethinking disciplinarity. A model case, NEXTschool, is included to illustrate the applied relevance of the theories and ideas explored in this paper.

Le changement en éducation et la redéfinition des disciplines remodélage: une analyse de concepts

RÉSUMÉ. Cet article s'intéresse au potentiel de remodeler les clivages existants entre les disciplines en s'inspirant d'articles qui explorent les théories et mouvements permettant des changements en éducation. Créer des structures éducationnelles qui se démarquent des modèles traditionnels basés sur les disciplines se révèle une pratique commune pour amorcer des réformes en éducation (Lenoir et Klein, 2010). Dans cet article, les auteurs analysent des approches pédagogiques qui combinent, traversent ou transcendent les divisions disciplinaires en lien avec des théories du changement, au niveau de l'enseignement au secondaire et particulièrement au Québec, Canada. L'objectif des auteurs est de comprendre et de donner un sens au concept d'interdisciplinarité dans un contexte de changement et de réforme en éducation. S'inspirant du modèle d'analyse de concept de Hupcey et Penrod (2005), les auteurs proposent une carte conceptuelle pour représenter les initiatives de changement mises en place dans le domaine de l'éducation dans le but de redéfinir la disciplinarité. Une étude de cas, NEXTschool, est présentée pour illustrer la pertinence de mettre en pratique les théories et idées explorées dans l'article.

The purpose of this article is to understand and give meaning to the concept of interdisciplinarity within educational change and reform. The question guiding our analysis is: how are approaches to learning that combine, cross, or transcend disciplinary divisions related to theories of change in the context of secondary level education? Drawing from nursing research, four sub-questions have guided our analysis: (1) How is interdisciplinarity situated and/or defined within educational change?; (2) What predictions or explanations of interdisciplinarity “make possible what would be impossible otherwise” (Risjord, 2009, p. 689)?; (3) In what descriptions of patterns does interdisciplinarity appear?; and (4) How does understanding the application of interdisciplinarity make a difference in our research on education change (Risjord, 2009)? The examination represented in this article draws from concept analysis, used widely in nursing research but less commonly in educational research. According to Botes (2002), concepts are the “building blocks of scientific or theoretical frameworks for any discipline” (p. 24). As our research progresses, having a solid conceptual understanding of interdisciplinarity is pivotal to the quality of the research process given its centrality to our project.

Our motivation in undertaking a concept analysis, as opposed to a traditional literature review, is to ground a theoretical understanding of the concept of interdisciplinarity and its relationship with educational reform as we embark on a SSHRC funded research study, NEXTschool: Innovative Systems Change for Québec High Schools (LEARN, 2017). Whereas a literature review is a broad account of what has been published on a particular area, a concept analysis drills down to focus on how a specific concept is used both in the literature and, more importantly, practice. This concept analysis will present the context of the ideas being explored (educational change and interdisciplinarity) and outline relevant literature in relation to four organizational categories or perspectives. The article will then circle around these four categories – first in order to clarify aspects of change theories that impede educational reform or rethinking discipline-based structures, and then to explain elements of change theories that support reform and rethinking disciplinarity. Finally, we will define antecedents, critical elements, and consequences of rethinking schools in the ways analyzed in this article. This will be supported by relating this analysis to our model case: the NEXTschool initiative.

THE NEXTSCHOOL INITIATIVE

NEXTschool is an initiative to reform secondary education in Québec, Canada to support student engagement and facilitate 21st century educational goals (LEARN, 2017). It is being coordinated by the Leading English

Education and Resource Network (LEARN), a non-profit funded by money from the Federal Entente, which supports minority language education in Québec. The initiative is, however, locally driven; each participating school is expected to adopt a model of reform that reflects their school's context, as well as innovative practices as outlined in the NEXTschool research and development report (LEARN, 2017). Interdisciplinarity is a key component expected to be included in all NEXTschool models (LEARN, 2017). We have situated interdisciplinarity within educational reform to reflect its central role in the NEXTschool educational reform initiative. An interdisciplinary approach intends to educate students in flexible and adaptable competencies central to a world changing in such profound technological, economic, and epistemological ways (Fadel et al., 2015; Senge, 2012). The NEXTschool initiative has been designed to support the Québec Education Programme's (QEP) priorities including cross-curricular fusions and connections. Beginning with five English-language high schools, the NEXTschool initiative aims to discover what secondary school will look like when it "is the best it can be at engaging students and preparing them for the world ahead" (NEXTschool, 2018), and to implement the resulting vision.

THE PURPOSE OF CONCEPT ANALYSIS

Several approaches to concept analysis have been taken (Brilowski & Wendler, 2005; Wade, 1998; Walker & Avant, 1995), with the focus on representing concepts as "mental abstractions or units of meaning derived to represent some aspect or element of the human experience" (Hupcey & Penrod, 2005, p. 198). In the field of nursing, "nurses have ... found that where theory does not yet exist, it is useful to start with the knowledge embedded in nursing practice" (Risjord, 2009, p. 690). Knowing this, we have looked to knowledge of interdisciplinarity embedded in understandings of educational change, specifically in four categories of educational change theories: systems change, ecological change/transformation, movement building/activism, and 21st century learning. These categories are overlapping and non-exhaustive but will be explored organizationally to clarify key considerations that can support contemporary educational reforms, especially those that rethink conventional disciplinary divisions.

While the concept analysis provides a clear structure for analysis and examination, it often focuses on a single concept like therapeutic communication (Abdolrahimi et al., 2017), quality of life (Meeberg, 1993) or fatigue (Ream & Richardson, 1996). Our analysis includes a focus on how two concepts relate: interdisciplinarity and educational change. We have therefore employed an approach more in line with Penrod's (2007) discussion of concept analysis. While earlier work on concept analysis often focused solely on what was known, Penrod (2007) advanced the importance of

understanding gaps that provide “greater clarity and utility for research and practice” (p. 659). We have engaged in a thoughtful, comprehensive analysis of what is known about interdisciplinarity and educational change but also included a discussion of gaps in the literature to create a stronger evidence-based understanding of how interdisciplinarity features within educational change (Hupcey & Penrod, 2005). By doing this, we hope to apply that understanding to inform the redesign of disciplinary frameworks for the NEXTschool initiative.

CONTEXT

Education that crosses curricular boundaries or connects various disciplinary perspectives motivates students towards relevant and transferrable content that cultivates creative, open-minded, and joyful learners (Barnes, 2012; Hargreaves et al., 2001; Rennie et al., 2013). These types of cross-disciplinary connections, combinations, or holistic approaches to various school subjects have been practiced and promoted historically by theorists like Plato, Rousseau, and Dewey (Barnes, 2012), as well as within Indigenous communities (Battiste, 2002; Toulouse, 2015). Many leading contemporary curricular designs, like the Finnish education system (Vitikka et al., 2012) and the International Baccalaureate program (Daly et al., 2012), emphasize the value of integrating or relating disciplines in education.

In Québec, cross-curricular competencies are built across the elementary and high school grade levels, as well as across the subjects or disciplines of the curriculum. However, Québec high schools have remained primarily structured around a disciplinary framework (Gouvernement du Québec, 2004). Many high school teachers in the province have struggled to meaningfully engage in cross-curricular approaches beyond a superficial level (Hasni et al., 2015). Although the value of interdisciplinary approaches has often been reiterated, more clarity is needed on how to support and enact educational reform that will entice educators to embrace the value of interdisciplinarity.

Québec’s curriculum, the QEP (Gouvernement du Québec, 2004), highlights rethinking disciplinarity and stresses the importance of cross-curricular competencies. With a curriculum that “identifies interdisciplinarity as one of its main orientations” (Hasni et al., 2015, p. 146), it is particularly vital to connect or combine disciplinary approaches in classrooms in Québec. However, the reform that accompanied the QEP did not effectively support many educators to adjust their teaching. This has resulted in the privileging of disciplinary divisions over interdisciplinary approaches (Hasni et al., 2015).

In order to support reform efforts – like the NEXTschool initiative – that aim to move high schools towards cross-curricular approaches to learning, it is

helpful to clarify what it looks like for educators to work towards interdisciplinary curricula. In clarifying this concept in the context of Québec's educational reforms, one must consider possible reasons behind the struggle of the QEP to be innovated or "replicated reliably on a meaningful scale at practical costs" (Senge, 2006, p. 5). This clarification must include considerations of possible supports or obstacles that may help or hinder reform efforts similar to the QEP.

REVIEW OF EXISTING LITERATURE

Terms for Rethinking Disciplinarity

When discussing teaching across disciplines in high schools, theorists use diverse terms to describe the nature of educators' varied approaches to embracing multiple disciplines. The two most popular terms are interdisciplinary (Applebee et al., 2007; Breunig et al., 2015; Hendry et al., 2017; Mathison & Freeman, 1998; Venville et al., 2002) and integrated (Applebee et al., 2007; Breunig et al., 2015; Hendry et al., 2017; Lyster & Ballinger, 2011; Mathison & Freeman, 1998; Venville et al., 2002). Distinguishing related terms, some explicitly relate to rethinking discipline-based structures such as "multidisciplinary" (Hendry et al., 2017), "cross-disciplinary" (Lyster & Ballinger, 2011), "meta-disciplinary" (Applebee et al., 2007), "transdisciplinary" (Venville et al., 2002), "'package' of courses" (Breunig et al., 2015), or "integrative" (Mathison & Freeman, 1998). Other terms implicitly describe ways to transcend disciplinary foundations: "holistic" (Venville et al., 2002), "whole child" (Mathison & Freeman, 1998), "student-centered" (Applebee et al., 2007), "inquiry-based" (Lyster & Ballinger, 2011), "experiential" (Breunig et al., 2015), or "project- and problem-based" (Hendry et al., 2017).

Depending on which term is being used by which theorist, how disciplinarity is rethought can unfold very differently. Some of the terms – interdisciplinary, multidisciplinary, and cross-disciplinary, for example – describe practices and approaches that involve educators consciously working within disciplinary divisions in order to overcome them, or at least complicate them. More terms though – transdisciplinary, holistic, student-centered, inquiry-based, project- and problem-based, and others – are used to characterize approaches that are initiated or organized around an idea, experience, or students and that relate back to various disciplines.

Looking beyond the secondary school context, scholars studying educational and research approaches that rethink disciplinarity – especially at the post-secondary level—mostly use the term interdisciplinary (Augsburg, 2005; Bailis, 2002; Henry, 2009; Klein, 2008; McMurtry, 2011; Newell, 2001; Repko, 2008; Robinson & Beaver, 2009; Vickers, 1998). These researchers agree on a

generous understanding of interdisciplinarity as an umbrella concept to discuss approaches that rethink conventional disciplinary divisions. McMurtry (2011) has explained that interdisciplinarity does not just refer to multidisciplinary combinations of disciplines but cross-disciplinary integrations of different subject areas, and that this understanding conforms to the “widely accepted definition of interdisciplinarity” (p. 20). The NEXTschool educational reform initiative reflects McMurtry’s framing of interdisciplinarity and aims to combine disciplines and/or transcend disciplinary divisions (LEARN, 2017). In their research and development report, NEXTschool problematizes the overly compartmentalized structure of a high school student’s timetable and uses the term “interdisciplinary” (LEARN, 2017, pp. 3, 8, 21) to describe their proposed alternative.

Four Theories of Change

In order to articulate various perspectives on educational reform and rethinking disciplinarity, four categories of change theories have been used: systems change, ecological change / transformation, movement building / activism, and 21st century learning. All four are strategic categories that involve rethinking educational structures. They are overlapping and do not represent an exhaustive list of categories related to theories of change. Before articulating the connection these four perspectives on change theories have to educational reform, it is important to say how our concept analysis is framing these categories of change.

Systems Change Systems change is a perspective associated with complex systems and ways of thinking that try to work within complexity without resolving it. Systems thinkers value approaches that engage actors at various levels and advocate for reflection, transparency, balance, and collaboration (Fullan, 2011; Hargreaves, 2005; Senge, 2006; Stroh, 2015). The NEXTschool initiative explicitly names “systems thinking” (LEARN, 2017, p. 22) as their approach to navigating a “complex theory of change” (LEARN, 2017, p. 22). They value systems thinking for the way it considers various relationships within a school, how the school relates to the community beyond the classroom, and particularly for its focus on “the interdependence of systems” (LEARN, 2017, p. 22), such as those operating in educational organizations undergoing change.

Complexity is often seen as the basis for approaches to education and research that combine or transcend disciplinary divisions (McMurtry, 2011; Newell, 1986; Nikitina, 2002; Phelps & David, 2005; Repko, 2008). If a problem or question is too complex to be solved within a single disciplinary focus, educational structures must develop beyond disciplines. As Phelps and David (2005) explain, acknowledging and working with complexity functions as an “interdiscourse” (p. 3) that can bridge various disciplinary perspectives “while

never reducing or conflating them” (McMurtry, 2011, p. 21).

Ecological Change Ecological change or transformation is often associated with similar concerns to systems thinking, but it is framed within the complexity of environmental or ecological systems. Ecological change or transformation is also a theory associated with reflection and various scales of action, but ecological change is more sensitive to context, to non-human elements in systems, and to unknown or unknowable scales at which systems can be framed (Bronfenbrenner, 1976; Lotz-Sisitka et al., 2015; Ogbu & Simons, 1998). NEXTSchool intends to reorganize the various phenomena that come together to compose a school by facilitating design labs with educators at each participating school. These educators will be split into teams to develop their local school context in relation to various aspects of their school. These teams will work on reiterating prototypes that negotiate the complex and diverse phenomena that come together to compose their school (LEARN, 2017).

Discussions about educational change that work towards rethinking disciplinary divisions are ecological discussions in their awareness of both the intricate educational structures within a school and the complex concepts that form a curriculum. There is a popular perspective that frames the need for interdisciplinary approaches to learning as based on the irreducibly different phenomena that come together in any field of study (Barak, 1998; Bell et al., 2002; Henry, 2009; Newell, 2001; Robinson and Beaver, 2008). This perspective has been explained by Newell (2001) using the example of acid rain as “produced by human economic activity driven by a global economic and financial system, sanctioned by a political system, and embedded in a culture and history” (p. 16). Newell has suggested that all of these different arenas or disciplines must be engaged to understand a complex phenomenon like acid rain. McMurtry (2011) has described this ecological approach as attending to “the complexity of the phenomenon one is studying and its interrelationships with other phenomena” (p. 22).

Movement Building and Activism Movement building and activism highlights the importance of local contexts or structures, the value of including voices that are often ignored, the role of collaboration, and acknowledging the difficult reality that there are no shortcuts to complex reform (Choudry, 2015; Dhillon, 2017; Olson, 2009; Tuck & Yang, 2013). NEXTSchool’s rollout through a series of design thinking labs (LEARN, 2017) will aim to provide local educators with a high degree of control over what the NEXTSchool reform will look like for their school’s context. Movement building and activism rely on collaboration between diverse individuals, pointing to a need for embracing approaches to change that combine or transcend disciplinary divisions. One popular perspective on the need for interdisciplinary approaches relates to the socio-cultural dynamics of researchers, learners, and educators (Abbott, 1988; Beattie, 1995; Hall, 2005; Klein, 1986). Instead of looking to phenomena

beyond or bigger than ourselves (as discussed in the section on ecological change), a socio-cultural approach for rethinking disciplinarity understands the world as “a neutral assortment of phenomena that are ordered through human thought and action” (Klein, 1986, p. 12). McMurtry (2011) has pointed out that those involved “must acknowledge that their knowledge is a construction necessarily shaped by their embodied, biological, social, cultural and political history” (p. 22). This historically constructed and subjective thought and action is complicated to negotiate considering “issues such as class, gender, history, [and] economic interests” (McMurtry, 2011, p. 25). The perspective of interdisciplinarity related to movement building and activism assures that communities can come together with socio-cultural concerns addressed and inter-individual subjectivities honoured.

21st Century Learning 21st century aims of education, especially adaptability, are explicit objectives of the NEXTschool educational reform initiative (LEARN, 2017). NEXTschool (2017) has been working from the assumption that “[t]he current organization of the high school is out of step with the expectations of student learning, growth, and survival in the 21st Century” (LEARN, 2017, p. 28). It proposes various holistic 21st century learning aims or objectives (Fadel et al, 2015; Project Tomorrow, 2011) – including interdisciplinarity – as the keys to making schools more relevant and in sync with the experiences of 21st century students (LEARN, 2017).

Interdisciplinarity counts as essential knowledge in educational change for 21st century learning (Klein & Newell, 1996), this based on “new developments in research and scholarship, the continuing evolution of new hybrid fields, the expanding influence of particular interdisciplinary methods and concepts, and the pressing need for integrated approaches to social, economic, and technological problems” (p. 5), to which Wagner (2008) has added: greater attention as well to communication, problem solving, and synthesis.

ASPECTS OF CHANGE THEORIES THAT IMPEDE RETHINKING DISCIPLINARITY

Based on the review of interdisciplinarity within literature on educational change, we have advanced two specific arguments.

Argument 1: Educational change efforts that rethink disciplinarity cannot unfold when they are prescribed. They cannot be motivating, equitable, or meaningful unless they are shared. Educational leaders, though, have diverse personal values that inform their aspirations for education and change. Differences may be resolved without dissolving them, and engaged together without leading to singular and thus imbalanced solutions.

When approaching change efforts that are meant to apply broadly across democratic educational systems, various individuals and groups are involved in determining whether the change is warranted and how it will be enacted (e.g., educators, students, administration, parents, support staff, community groups, etc.). Establishing a shared vision of change for public and mandatory education systems across a broad group of people is complex but can be conceptually mapped within the interconnectedness of systems thinking (Fullan, 2011; Hargreaves, 2005; Senge, 2006; Stroh, 2015); the contextual awareness of an ecological approach (Bronfenbrenner, 1976; Lotz-Sisitka et al., 2015; Morton, 2011; Ogbu & Simons, 1998); the demanding work of sustained movement building (Olson, 2009; Tuck & Yang, 2013); or the holistic collaboration of 21st century learning (Robinson & Aronica, 2016), which – as shown later – includes Indigenous models that share many of the same characteristics as 21st century approaches (Battiste, 2002; Howell, 2017; Munroe et al., 2013; Wilson, 2007). In this age of “increasing hybridization of cultural categories, identities, and previous certainties” (Klein, 2004, p. 8), interdisciplinarity provides an approach to learning that embraces complexity and difference.

The following section lays out aspects of educational reform that can impede rethinking disciplinarity, grouping them within the aforementioned four perspectives. Considering these cautions while aiming for effective and ethical educational change is not to suggest that change efforts are futile, nor is it meant as a shortcut to any individual’s ideals for the future of schools; rather, this section aims to guide the slow, ongoing, collective process of attending to relationships between the various partners involved in educational reform.

Systems Thinking

Systems approaches often demand a critical awareness of the complexity of the interconnections between the many moving partners in educational systems (Fullan, 2011; Hoban, 2002; Senge, 2012, Stroh, 2015). Systems thinking highlights issues with “repetitive change syndromes” (Hargreaves, 2005, p. 975) or superficial reform efforts that are not accompanied by reflection (Fullan, 2011; Hargreaves et al., 2001). Systems approaches also demonstrate the potential for manipulative or prescriptive educational reform efforts surreptitiously prescribed and subtly imposed by a particular leader or group (Allan & Evans, 2006; Baldwin, 2006; Simpson, 2017). Stroh (2015) goes as far as to suggest that when people are resistant to change within complex systems, one option is to “work around them” (p. 82). Working around resistant educational partners may be efficient, but it does not reflect authentic collaboration. Systems thinking opens up various moments of autonomy for actors at various scales and in diverse arenas. However, with

such a dispersal of responsibilities, it is important not to fall into a blind approach that treats everyone as equally powerful: differences in roles within the education system or differences in social privilege exist (Battiste, 2002; de Wet & Schoots, 2016; Olson, 2009). In summary, systems thinking facilitates critical reflection on rushed reform, overly prescriptive or discreetly manipulative changes, and power differentials.

Ecological Approaches

Ecological approaches to thinking about education take a similarly cautionary approach as systems thinking, but often with a specific focus on contexts and the relationship between individual and shared realities, especially when these are at odds as in the case of marginalized actors (Bronfenbrenner, 1976; Cho et al., 2013; Gow, 1997; Lotz-Sisitka et al., 2015; Ogbu & Simons, 1998). The first caution relates to educational reforms from other contexts that are transplanted into a new setting without the critical care necessary to navigate differences between educational systems (Bronfenbrenner, 1976; Fullan, 2011; Hargreaves et al., 2001). Another issue that ecological thinking highlights is the difficulty of including the perspectives and ideas of marginalized members of an educational community (Cho et al., 2013; Gow, 1997), some of whom are so disenfranchised that they do not even see value in being part of the reform efforts (Ogbu & Simons, 1998). Finally, ecological approaches value transforming imbalances between collective imperatives for schools and personal or intrinsic priorities of people affected by education systems (Casey, 2012; Lotz-Sisitka et al., 2015). Such imbalances can come about through impersonal and technocratic instrumentalizations of learning, which value standardized assessments within results-based management approaches to education (Biesta, 2007; Klees, 2012; Steiner-Khamsi, 2012; Westheimer, 2015). Ecological approaches reflect an awareness of complex, interconnected, educational ecosystems, similar to that achieved through systems thinking. With an ecological attention to context, change efforts can work, as long as there is an understanding of the idiosyncratic importance of circumstances, of marginalized educational voices, and of the balance between personal and collective imperatives.

Movement Building or Activism

Writing on the subject of movement building and activism often highlights a need for slow, sustained, and informed community organizing, rather than spontaneous, sensational, or rushed change efforts (Choudry, 2015; Dhillon, 2017; Hargreaves, 2005; Olson, 2009; Tuck & Yang, 2013). Activism is valued for being ongoing and responding to normalized issues, and not to crisis narratives (Dhillon, 2017) or sensational leaders or texts (Choudry, 2015; Olson, 2009). The importance of historicizing change and connecting it with relevant past models or attempts is especially important when rethinking disciplinarity (Choudry, 2015; Hargreaves, 2005). There is a long history of

rigidity to subject-specific structures – timetabling, teaching associations, professional development, standards or outcomes, and examinations (Hargreaves et al., 2001) – that cannot be ignored if changes to subject-specificity are to be possible. Finally, given such long standing structures, it will take time to transform ideas that various educators and their partners hold about what is acceptable within educational systems or reform (Fullan, 2011; Olson, 2009; Schnurer & Hahn, 2009).

21st Century Learning

21st century approaches stress a few final hindrances to educational change efforts (Battiste, 2002; Howell, 2017; Robinson & Aronica, 2016; Wilson, 2007). Approaches must be process-oriented to acknowledge the non-prescriptive unfolding of complex collaboration (Tuck & Yang, 2013; Wilson, 2007). This contrasts with conventional matriculation standards and results-based cultures that treat education as a measuring tool for entrance into educational and social opportunities (Hargreaves et al., 2001). Additionally, this approach is wary of any change efforts that lack a support network to share resources and community (Battiste, 2002; Howell, 2017). Like the barriers framed from a community building or activist approach, 21st century approaches connect contemporary reforms with the contrasting conventions – like discipline-specific class schedules – from which change can develop. Although reform efforts that rethink disciplinarity may be different than current educational realities, they can reflect previous realities with a supported shift from the individual to the communal or structural, and from the cumulative to the processual. For example, interdisciplinary learning clusters can be facilitated by teachers with subject-specialties if they work together with other teachers or community members on cross-curricular or transdisciplinary projects and rethink assessment. The resulting changes may seem radical but must be part of a sustained and organically unfolding ecosystem of shared and conscientious action.

The barriers that hinder educational change efforts aimed at rethinking disciplinarity may be frustrating, but they have significance. Becoming aware of the overlapping challenges discussed allows change actors to work within and thus, even overcome these hindrances through a sustained, process-oriented critical consciousness. Within such an engagement, each impediment can appear as “an opportunity instead of an obstacle” (Allan & Evans, 2006, p. 9); a hurdle, not a fence, and part of the complex course upon which an authentically collaborative change towards interdisciplinarity becomes possible.

ASPECTS OF CHANGE THEORIES THAT SUPPORT RETHINKING DISCIPLINARITY

Argument 2: Educational change efforts that rethink disciplinarity unfold when they are distributed amongst all partners in ways that are mutually enriching, motivating, genuine, and shared—retroactively or in processual ways. Working with historical precedents, community values, and with other people can allow particular visions—like a bird that takes advantage of opposing wind currents and gravity to achieve flight—to build in conversation (and thus, reflection) with rethinking disciplinarity in education.

Looking again at the perspectives of systems thinking, ecological approaches, movement building, and 21st century learning, it becomes clear that the collective, ongoing work of reform is both possible and inevitable when a slow, genuinely communal and less-hierarchical, context-based effort is shared, engaged in, and supported with resources and reflection. Honouring their processual and collaborative nature, educational change efforts engage the kind of continual collectivity that allows diversity to coexist within a public and democratic system, each mutually enriching the other. As referenced earlier, Allan and Evans (2006) suggest that:

Reconciling our differences does not mean obliterating them. Relationality in the sense relevant to life in a pluralistic society find our differences an opportunity instead of an obstacle...Learning to compromise our demands for the sake of a common good is not to sacrifice them but to transform them. In the long run, after all, the common good is our good. (pp. 9-10)

For the first argument as we have proposed it in this paper, Klein (2004) emphasized the potential that rethinking disciplinarity has to work with difference and complexity. Here it is also valuable to consider how interdisciplinarity can engage subtleties and nuance, without simplifying or reducing them within or towards a certain field or perspective (Klein, 2004). This ironic process – coming together by virtue of diversity – can transform individuals' understandings of educational systems, shifting culture at larger scales, and contributing to structural change. In the end, the aspects of educational change that support rethinking disciplinarity look a lot like the aspects impeding this work. They become supports as opposed to impediments with an openness to educational partners or 'the common good,' and to our own dialectical transformations. Here, we will rotate again through the four categories we have used for organizing our discussion of educational change that rethinks disciplinarity. This time, the exploration focuses on characteristics of schools that support reform and rethinking disciplinarity.

Systems Thinking

Systems thinking stresses that the fundamental building blocks that set the groundwork for educational reform are distributed amongst various people within complex educational systems (Hoban, 2002; Stroh, 2015). Educational

reform efforts can thereby promise more genuine and sustained change as various people and structures that are involved are mutually and carefully engaged. Rethinking disciplinarity may be possible in Québec with the NEXTschool initiative because this current educational reform effort – aiming for authentically engaging with the QEP’s insistence on cross-curricular competencies, amongst other goals – is working with and listening to the voices of various “people and organizations that affect and are affected by the issue” (Stroh, 2015). These include policy makers, administrators, educators, parents, community members, business leaders, and students, namely, a “broad representation of educational stakeholders” (LEARN, 2017, p. 24). Including many diverse partners is important both to ensure that “anyone that can make a contribution to the effort” (Stroh, 2015, p. 79) is considered, and to also ensure that anyone who could “possibly derail it if not on board” (Stroh, 2015, p. 79) is also included. The complexity of educational systems necessitates an approach that “does not focus on independent elements...but instead focus[es] on the interrelationships that result from the dynamic interactions among multiple elements” (Hoban, 2002, p. 38) or people.

Also from the perspective of systems thinking, time is a vital component for allowing slow incubation of change (Senge, 2006). Despite the widespread belief that the QEP’s implementation was unsuccessful (Potvin & Dionne, 2007), the QEP “informally ranks among the top five innovative curricula in the world” (LEARN, 2017, p. 3). It will take time for this innovative idea to become an established innovation. An incubation period provides space for individuals within the education system to affect their firmly held “mental models” (Senge, 2006, pp. 8-9) of what education should or can look like. This involves the mutual or collaborative process of “balanc[ing] inquiry and advocacy” (Senge, 2006, p. 8) such that educators and their partners “expose their own thinking effectively and make that thinking open to the influence of others” (Senge, 2006, p. 9).

Educational change theories that work towards rethinking disciplinarity can work with a systems thinking perspective – paying attention at a systems level – in order to find out “what is actually happening[, r]ather than imposing a single model or making a priori assumptions about what will work best” (Klein & Newell, 1996, p. 9). This focus can help reformers “to attain contextual understanding, to assess multifaceted problems, to gain a sense of the complexities and interrelationships of society, and to examine the human, social, and political implications” (Klein & Newell, 1996, p. 5) of what is being changed. In recent years, there has been a perceptual shift such that “interdisciplinary approaches have become essential, not peripheral” (Klein & Newell, 1996, p. 6) to educational organizations, both in terms of reforms and curriculum.

Ecological Approaches

An ecological approach takes advantage of looking at successful models, but with a nuanced awareness of diverse contexts. Drake (2012) looked at various examples of effective programs that are meaningfully engaged in integrated curriculum organized around transdisciplinary projects or activities. Building off Drake, alternative disciplinary frameworks could focus around broad-based big ideas or themes, engage in student-centred and inquiry-based projects, synchronize class activities with out-of-class excursions, or with current or community events and partners, or take any other approach to developing focused transdisciplinary foundations upon and around which curricular outcomes might be connected (Drake, 2012). However, on their own or taken generically, these ideas are unlikely to be adopted; engaging the shared and collaborative approach described in relation to systems thinking means allowing local actors – educators and learners in a school and their partners – to adapt these approaches with critical care, mindful of local conditions (Fullan, 2011; Hargreaves et al., 2001).

With NEXTschool, the opening design year has looked at potentially successful educational models in a more universal and theoretical way. As schools that will actually attempt to apply these models develop ideas for reform, their success will rely on taking the time within their own context to determine how to revise these approaches within the reality of their schools and communities. Because our communities and educational systems are currently undergoing unpredictable and rapid change (Fadel et al., 2015; Senge, 2012), it is not enough to simply adapt reform approaches or ideas for local contexts; these local contexts must be building in flexible ways and with an openness to ongoing change and revision as the needs and realities of these schools and communities shift. The resulting programs and structures can honour this variation by remaining open to further changes or by building educational approaches that nurture flexibility and adaptability within learners (LEARN, 2017).

Movement Building or Activism

Movement building or activism can help navigate the variety of actors who must be involved and play a role in educational reform in order for changes to be plausible, meaningful, and sustainable. Like systems thinking, having diverse partners engaged is crucial. These partners must be open to other educators' or to students' reflections on incidental learning opportunities that emerge. Educators must therefore be actively communicating with students and providing them with the information, tools, and support they need to independently identify curricular connections and relevant outcomes (Allan & Evans, 2006).

Discussing movement building and activism, Tuck and Yang (2013) suggested that this process of working collaboratively towards change and empowering young people as partners is itself a theory of change. Distributed collaboration reflects the importance of making activism and movement or community building about the “difficult, slow” (Olson, 2009, p. 41) shared organizing work and not “tales of strong, charismatic individuals, smart authors, and great ideas” (Choudry, 2015, p. 75). This approach simultaneously honours each individual’s unique perspective while reflecting a structural view that looks beyond the individual for sustained and restorative movement building and justice (Dhillon, 2017).

21st Century Learning

As pointed out by Munroe et al., (2013), trends in 21st century learning aim to be “holistic and interconnected” (p. 318) based “in context and experience” (p. 321), ideas “rooted in very old ideas embedded in Indigenous knowledges” (p. 319). 21st century approaches remind us of the ethical dimensions – as reinforced by the Truth and Reconciliation Commission of Canada’s recommendations – that urge Canadian educators towards rethinking disciplinarity (Truth and Reconciliation Commission of Canada, 2015). Québec is home to almost 150,000 Inuit, Algonquian, and Iroquoian people from eleven distinct ethnic groups (Gouvernement du Québec, 2011). Educational reform for the future of this province does not need to invent brand new approaches, with the potential to carry on colonial impositions, but can instead learn from Indigenous epistemologies. In order to honour the Truth and Reconciliation Commission of Canada’s recommendation to “provide the necessary funding to post-secondary institutions to educate teachers on how to integrate Indigenous knowledge and teaching methods into classrooms” (Truth and Reconciliation Commission of Canada, 2015, p. 7), our current educational approaches need to become more open to rethinking disciplinarity towards realizing more interconnected (Wilson, 2007), holistic (Howell, 2017), and interdisciplinary (Battiste, 2002) approaches. 21st century learning approaches often includes these foci, although without referencing the Indigenous communities who have been advocating for them well before people began writing about 21st century learning (Munroe et al., 2013).

While we strive to include Indigenous perspectives on teaching and learning, the more common view of 21st century learning is largely driven by public-private enterprises like the Organisation for Economic Co-operation and Development, Partnership for 21st Century Skills (2009) and Action Canada (Patterson, 2015). Looking at the 21st century approach, one often hears the term “knowledge-based economy” (OECD, 1996) to describe the way that educators are expected to reorient their objectives to fulfill the needs of a labour market that requires “workers to acquire a range of skills and to

continuously adapt these skills” (OECD, 1996). The term “knowledge-based economy” comes from the OECD’s attempt to characterize our economic era as based on “knowledge and technology” (OECD, 1996). This rhetoric advocates for educational systems to reorient their focus towards these shifting and uncertain economic ends. This reorientation may often be based on a neoliberal push for techno-scientific management that limits learning in organizations (Casey, 2012). However, the insistence on a knowledge and technology focus can be appropriated towards transdisciplinary models that go beyond disciplinarily discreet divisions to focus on knowledge and technology as the organizing tools of curriculum. Connecting conversations around knowledge-based economies to education that rethinks disciplinary divisions presents a way forward for reform that favours holistic educational models that fulfil shared calls – from Indigenous scholars and communities, and from scholars of 21st century learning – for interconnected and interdisciplinary orientations of knowledge.

As Nikitina (2002) explained, interdisciplinary approaches involve carefully figuring out what tools will be most effective for solving complex problems or questions. Interdisciplinarity is key to the adaptable and open-ended problem solving that grounds 21st century learning aims (Fadel et al., 2015; Project Tomorrow, 2011; Wagner, 2008). Teaching students how to solve any problem – across disciplines – reflects NEXTschool’s 21st century learning goals and the way NEXTschool aims to structure reformed school curricula: “[a]daptability is the universal skill for the 21st Century; and applies to both the learner’s skillset and the continuous reorganization of the school experience” (LEARN, 2017, p. 28).

DEFINING CHARACTERISTICS OF RETHINKING SCHOOLS: ANTECEDENTS, CRITICAL ELEMENTS, AND CONSEQUENCES

The defining characteristics explored in this paper – the antecedents which create the conditions for educational change, the critical elements that must be in place for the change, and some consequences of change – reflect patterns derived from this concept analysis. The conceptual map (below) visually represents the ideas discussed so as to clarify that these defining characteristics do not exist in distinct or separate ways, but in dynamic relationships.

Antecedents

Before a reform can be realized, much must already be in place. Considering first the school’s context, the curriculum and the school building must serve as a legal and physical framework that can accommodate rethinking disciplinarity and encourage collaborative teaching. The context of the school also includes that of the teaching staff and administration (Hargreaves, 2005). For example,

it matters what research and information staff have access to and what kinds of historical precedents members of the staff have been involved with and how these two information sources may be similar. For any educational reform, the time must seem appropriate, at least as reflected in educational and public discourses. For the NEXTschool reform, various timely antecedents exist: the rapid pace of change and uncertain work world of the future, which calls for adaptability, flexibility, and similarly “generic” (Hargreaves et al., 2001, p. 87) competencies (Hargreaves, 2005; LEARN, 2017; Robinson & Aronica, 2016); technological changes towards a knowledge-based economy also call for developing general competencies that value connecting various disciplines as well as working beyond them (Jenson et al., 2010; OECD, 1996); and the increasing support for embracing Indigenous epistemologies in education stresses the importance of holistic learning (Battiste, 2002; Howell, 2017; Munroe et al., 2013). All of these antecedents support the idea that it is time for a reform that rethinks disciplinarity. One last crucial antecedent is a school’s community, which must be supportive, both within the school and outside of it. The community may be frustrated with certain aspects of the current school system (Howell, 2017), and must be networked with community partners who can connect or diversify class structure (Ewing, 2017), as the staff within the school function collegially, with an openness to collaborating (Lotz-Sisitka et al., 2015).

Critical Elements

The critical elements necessary for reform can be organized in the same categories as the antecedents, namely context, time, and community. Because rethinking disciplinarity involves people working together in more and new ways, the context for reform in schools must include staff, students, and educational partners collaborating and reconciling differences by transforming their own and each other’s’ previously held beliefs (Allan & Evans, 2006). The context in the classroom requires teachers to maintain a relationship to what is going on in the community and larger world so that they can find meaningful ways to connect lessons to the students’ lives (Drake, 2012). Rethinking disciplinarity also works best if teachers understand that different degrees of integration may be more or less appropriate for different contexts (Applebee et al., 2007). Context is critical, not only for figuring out what kind or degree of disciplinary change to make, but for ensuring that the way the reform unfolds works within local contexts (Hargreaves et al., 2001; Levin, 1998; Mukhopadhyay & Sriprakash, 2011). The second category of critical elements is time. It represents the process of the reform, which many scholars suggest should not be rushed (Fullan, 2011; Olson, 2009; Schnurer & Hahn, 2009). Teachers need release time for professional development to support new

approaches to unit planning and to plan collaboratively. Students need a timetable that is more flexible and open to cohort-based or team taught classes (Ewing, 2011). The final category, like its antecedent, involves a connected community: students and teachers taking their classwork beyond the borders of the school (Robinson & Aronica, 2016), and teachers rethinking the way they collaborate, mixing, fusing, or transcending disciplinary conventions (Applebee et al., 2007; Drake, 2012).

Consequences

The critical elements described above work with the aforementioned antecedents towards many positive implications, beyond just a disciplinarily dynamic school structure. The reform that results is sustainably collaborative (Senge, 2006; Stroh, 2015), and students tend to become more passionate about school, they learn more personal and more adaptable content, and they often become happier, more open, and more creative (Barnes, 2012; Hargreaves et al., 2001; Rennie et al., 2013).

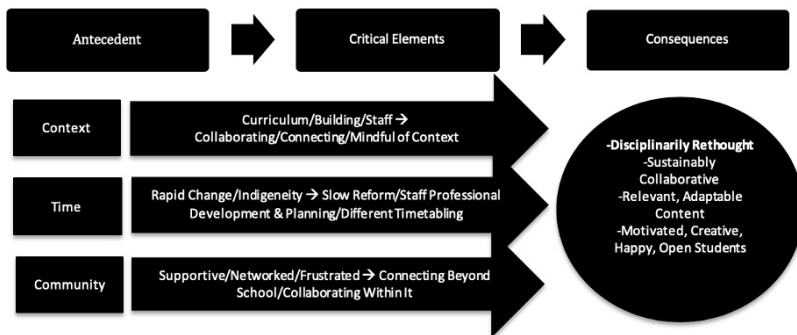


FIGURE 1. *Conceptual Map*

Model Case

NEXTschool has been working with various groups that represent a diverse range of leaders and partners within the educational community. The importance of rethinking disciplinarity as a critical element to this reform has been reiterated by these groups. Now that some prototypes which facilitate more interdisciplinarity have been established, NEXTschool has begun working in pilot schools to allow the staff at those schools ample time to design their own vision for reform before rushing to implement it. During this planning stage, schools have been facilitated through a process of considering the research, ideas, and prototypes already gathered, and then they are in the process of or will soon begin designing their own local reform, mindful of

their own school's context. This process, so far, has generated much interest, perhaps reflecting its timeliness as well as the motivating potential of this important collaborative approach to reform.

CONCLUSIONS

In the context of secondary level education, there is growing support for approaches to learning that combine, cross, or transcend disciplinary divisions. We have argued throughout this paper that understanding interdisciplinarity is key to effectively supporting contemporary educational change efforts. Engaging critically with theories of change can transform this research into momentum for achieving appropriate and sustainable educational reforms. By meaningfully and actively addressing 21st century learning, the NEXTschool initiative and its focus on interdisciplinarity contributes to the continued growth and evolution of the Québec Education Program. In revisiting the questions that guided our analysis, four key perspectives – systems thinking, ecological approaches, movement building or activism, and 21st century or Indigenous learning – helped to organize our understanding of the complex relationship between interdisciplinarity and educational change. Further, our analysis explored a robust conceptualization of interdisciplinarity beyond a simplistic and conventional school model of combining siloed school subjects and calling them interdisciplinary. Our conceptualization better informs the challenging reality of educational change and clarifies the importance and the process of rethinking disciplinary divisions in schools.

Branson (2010) posed an important question, “If deliberately focused organizational change has been endemic within our schools for over 50 years, then why have we not perfected it?” (p. 9). The diversity of perspectives that go into educational changes makes reform challenging. However, these differences can be engaged together to support equitable and motivating transformations in schools. Making changes while engaged with historical precedents, community values, and a diverse group of educational partners has the potential for meaningfully rethinking disciplinarity and successfully navigating other contextually-significant elements of school reforms. We suggest that a multi-faceted understanding of interdisciplinary and its relationship with educational change, like the one we have presented throughout this paper, may be missing from previous conversations of educational reform including the NEXTschool initiative. The challenges of multi-stakeholder change processes and of reforming schools in interdisciplinary directions share a complexity that, when engaged, can lead to richer educational models that

serve diverse school populations and various community needs.

We have attempted to create conceptual building blocks that will enable as opposed to constrain the educational change towards which the NEXTschool initiative is working. Educational reform efforts that rethink conventional disciplinary structures are a collaborative and contextual pursuit. There are universal elements to these reform efforts but the way they unfold in specific schools is varied. Although the concept of educational change and reform is extensively addressed in educational research, a specific look at efforts to reform or change disciplinary structures has only been addressed in limited ways. It is vital to clarify this concept as more schools attempt these types of changes. This will allow dynamic and personalized roll-outs of educational changes that are slowly and diligently built within communities, inside and beyond a school. As curricular documents and physical school designs shift to accommodate more innovative approaches to structuring learning across disciplines, it is in the hands of local teaching staff and their partners to think and work together towards a shared vision for disciplinary reforms. Through efforts that reflect on and work mindfully with community, time, and context, schools can embrace a more meaningful, practical, and motivating approach to learning.

REFERENCES

- Abbott, A. (1988). *The system of professions: An essay on the division of expert labor*. University of Chicago Press.
- Abdolrahimi, M., Ghiyasvandian, S., Zakerimoghadam, M., & Ebadi, A. (2017). Therapeutic communication in nursing students: A Walker & Avant concept analysis. *Electron Physician*, 9(8), 4968-4977.
- Allan, G., & Evans, M. D. (2006). *A different three Rs for education: Reason, relationality, rhythm*. Rodopi.
- Applebee, A. N., Adler, M., & Flihan, S. (2007). Interdisciplinary curricula in middle and high school classrooms: Case studies of approaches to curriculum and instruction. *American Educational Research Journal*, 44(4), 1002-1039.
- Augsburg, T. (2005). *Becoming interdisciplinary: An introduction to interdisciplinary studies*. Kendall/Hunt.
- Bailis, S. (2002). Interdisciplinary curriculum design and instructional innovation: Notes on the Social Science program at San Francisco State University. In C. Haynes (Ed.), *Innovations in Interdisciplinary Teaching* (pp. 3-15). Oryx Press.
- Baldwin, S. (2006). *Organisational justice*. Institute for Employment Studies.
- Barak, G. (1998). *Integrating criminologies*. Allyn & Bacon.
- Barnes, J. (2012). An introduction to cross-curricular learning. In P. Driscoll, A. Lambirth, & J. Roden (Eds.), *The primary curriculum: A creative approach* (pp. 235-254). Sage.
- Battiste, M. (2002). *Indigenous knowledge and pedagogy in First Nations education: A literature review with recommendations*. National Working Group on Education.

- Beattie, A. (1995). Troubled times: War and peace among the health tribes. In L. Mackay, K. Soothill & C. Webb (Eds.), *Interprofessional relations in health care* (pp. 11-26). Edward Arnold.
- Bell, I., Caspi, O., Schwartz, G., Grant, K., Gaudet, T., Rychener, D., Maizes, V. & Weil, A. (2002). Integrative medicine and systematic outcomes research: Issues in the emergence of a new model for primary health care. *Archives of Internal Medicine*, 162, 133-140.
- Biesta, G. (2007). Why 'what works' won't work: Evidence-based practice and the democratic deficit in educational research. *Educational Theory*, 57(1), 1-22.
- Botes, A. (2002). Concept analysis: Some limitations and possible solutions. *Curationis*, 25(3), 23-27.
- Branson, C. M. (2010). *Leading educational change wisely: Examining diverse approaches to increasing educational access*. Brill Sense.
- Breunig, M., Murtell, J., & Russell, C. (2015). Students' experiences with/in integrated Environmental Studies Programs in Ontario. *Journal of Adventure Education and Outdoor Learning*, 15(4), 267-283.
- Brilowski, G. A., & Cecilia Wendler, M. (2005). An evolutionary concept analysis of caring. *Journal of Advanced Nursing*, 50(6), 641-650.
- Bronfenbrenner, U. (1976). The experimental ecology of education. *Educational Researcher*, 5(9), 5-15.
- Casey, C. (2012) Organizations and learning: A critical appraisal. *Sociology Compass*, 6, 389-401.
- Cho, S., Crenshaw, K. W., & McCall, L. (2013). Toward a field of intersectionality studies: Theory, applications, and praxis. *Signs: Journal of Women in Culture and Society*, 38(4), 785-810.
- Choudry, A. (2015). Critiquing the study of social movements: Theories, knowledge, history, action. In A. Choudry (Ed.), *Learning activism: The intellectual life of contemporary social movements* (pp. 41-80). University of Toronto Press.
- Daly, K., Brown, G., & McGowan, C. (2012). Curriculum integration in the International Baccalaureate Middle Years Programme: Literature review. International Baccalaureate Organization.
- de Wet J. P. & J. Schoots (2016) The learning organisation: Conditions of possibility in a feminist NGO. *Development in Practice*, 26(1), 64-76.
- Dhillon, J. (2017). *Prairie rising: Indigenous youth, decolonization, and the politics of intervention*. University of Toronto Press.
- Drake, S. M. (2012). *Creating standards-based integrated curriculum: The common core state standards edition*. Corwin Press.
- Ewing, N. (2017). *Learning to find a sustainable balance: A case study of the Reynolds flexible studies program* (Doctoral dissertation, University of Victoria).
- Fadel, C., Bialik, M, and Trilling B. (2015). *Four-dimensional education: The competencies learners need to succeed*. Center for Curriculum Design.
- Fullan, M. (2011). *The six secrets of change: What the best leaders do to help their organizations survive and thrive*. John Wiley & Sons.
- Gouvernement du Québec. (2004). *Secondary*. Retrieved April 05, 2018, from <http://www.education.gouv.qc.ca/en/contenus-communs/teachers/quebec-education-program/secondary/>
- Gouvernement du Québec. (2011). *Amérindiens et Inuits: Portrait des nations autochtones du Québec* (2nd ed.). Bibliothèque et Archives Nationales du Québec.
- Gow, D. (1997). Can the subaltern plan? Ethnicity and development in Cauca, Colombia. *Urban Anthropology and Studies of Cultural Systems and World Economic Development*, 26(3/4), 243-292.

- Hall, P. (2005). Interprofessional teamwork: Professional cultures as barriers. *Journal of Interprofessional Care*, 19(S1), 188-196.
- Hargreaves, A., Earl, L., Moore, S., & Manning, S. (2001). *Learning to change: Teaching beyond subjects and standards*. John Wiley & Sons.
- Hargreaves, A. (2005). Educational change takes ages: Life, career and generational factors in teachers' emotional responses to educational change. *Teaching and Teacher Education*, 21(8), 967-983.
- Hasni, A., Lenoir, Y., & Alessandra, F. (2015). Mandated interdisciplinarity in secondary school: The case of science, technology, and mathematics teachers in Québec. *Issues in Interdisciplinary Studies*, 33, 144-180.
- Hendry, A., Hays, G., Challinor, K., & Lynch, D. (2017). Undertaking educational research following the introduction, implementation, evolution, and hybridization of constructivist instructional models in an Australian PBL high school. *Interdisciplinary Journal of Problem-Based Learning*, 11(2), 7.
- Henry, S. (2009). School violence beyond columbine: A complex problem in need of an interdisciplinary analysis. *American Behavioral Scientist*, 52(9), 1246-1265.
- Hoban, G. F. (2002). *Teacher learning for educational change: A systems thinking approach*. Open University Press.
- Howell, L. (2017). *Reconciliation in action and the Community Learning Centres of Québec: The experiences of teachers and coordinators engaged in First Nations, Inuit and Métis social justice projects* (Doctoral dissertation, University of Ottawa).
- Hupcey, J.E., & Penrod, J. (2005). Concept analysis: Examining the state of the science. *Research and Theory for Nursing Practice: An International Journal*, 19(2), 197-208.
- Jenson, J., Taylor, N., & Fisher, S. (2010). *Critical review and analysis of the issue of skills, technology and learning*. Ontario Ministry of Education.
- Klees, S. J. (2012). World Bank and education. In S. Klees, J. Samoff, N. P. Stromquist (Eds.), *The World Bank and education* (pp. 49-65). Sense Publishers.
- Klein, J. T. (1986). The dialectic and rhetoric of disciplinarity and interdisciplinarity. In D. Chubin, A. Porter, F. Rossine, & T. Connolly (Eds.), *Interdisciplinary analysis and research: Theory and practice of problem-focused research and development* (pp. 7-130). Lomond.
- Klein, J. T. (2004). Interdisciplinarity and complexity: An evolving relationship. *E:CO*, 6(1-2), 2-10. Retrieved June 1, 2019, from <https://journal.emergentpublications.com/article/interdisciplinarity-and-complexity-an-evolving-relationship/>
- Klein, J. T. (2008). Evaluation of interdisciplinary and transdisciplinary research: A literature review. *American Journal of Preventive Medicine*, 35(2), S116-S123.
- Klein, J. T. & Newell, W.H. (1998). Advancing interdisciplinary studies. In W. Newell (Ed.), *Interdisciplinarity: Essays from the literature* (pp. 3-22). College Board.
- LEARN (2017). *NEXTschool: Learning - decompartmentalized*. (Rep.). LEARN. Retrieved March 1, 2019, from <http://blogdev.learnquebec.ca/nextschool/wp-content/uploads/sites/23/2018/02/NEXTschool-Phase-1-RD-Report-P.pdf>
- Lenoir, Y. & Klein, J. (2010). Interdisciplinarity in schools: A comparative view of national perspectives. *Issues in Integrative Studies*, 28, 1-331.
- Levin, B. (1998). An epidemic of education policy: (What) can we learn from each other? *Comparative Education*, 34(2), 131-141.
- Lotz-Sisitka, H., Wals, A. E., Kronlid, D., & McGarry, D. (2015). Transformative, transgressive social learning: Rethinking higher education pedagogy in times of systemic global dysfunction. *Current Opinion in Environmental Sustainability*, 16, 73-80.
- Lyster, R., & Ballinger, S. (2011). Content-based language teaching: Convergent concerns across divergent contexts. *Language Teaching Research*, 15(3), 279-288.

- Mathison, S., & Freeman, M. (1998). The logic of interdisciplinary studies. CELA Report Series 2.33. Retrieved January 22, 2021, from <http://files.eric.ed.gov/fulltext/ED418434.pdf>
- McMurtry, A. (2011). The complexities of interdisciplinarity: Integrating two different perspectives on interdisciplinary research and education. *Complicity: An International Journal of Complexity and Education*, 8(2), 19-35.
- Meeberg, G. (1993). Quality of life: A concept analysis. *Journal of Advanced Nursing*, 18, 32-38.
- Morton, T. (2011). Dawn of the hyperobjects. [Video file] Lecture presented at New Climes Conference, Exeter, UK. Retrieved December 1, 2017, from <https://www.youtube.com/watch?v=NS8b87jncqw>
- Mukhopadhyay, R. & Sriprakash, A. (2011). Global frameworks, local contingencies: policy translations and education development in India. *Compare: A Journal of Comparative and International Education*, 41(3), 311-326.
- Munroe, E., Borden, L., Murray Orr, A., Toney, D., & Meader, J. (2013). Decolonizing Aboriginal education in the 21st century. *McGill Journal of Education*, 48(2), 317-337.
- Newell, W. H. (1986). Interdisciplinary undergraduate programs: A directory. Association for Integrative Studies.
- Newell, W.H. (2001). A theory of interdisciplinary studies. *Issues in Integrative Studies*, 19, 1-25.
- NEXTschool. (2018, February 28). Welcome to NEXTschool. Retrieved March 27, 2018, from <http://blogdev.learnquebec.ca/nexschool/2018/02/28/hello-world/>
- Nikitina, S. (2002). "Navigating the disciplinary fault lines" in science and in the classroom: Undergraduate neuroscience classroom in mind, brain, and behavior at Harvard. *Issues in Integrative Studies*, 20, 27-44.
- OECD. (1996). The knowledge-based economy. *OECD*, 96(102), 1-46.
- Ogbu, J. U., & Simons, H. D. (1998). Voluntary and involuntary minorities: A cultural ecological theory of school performance with some implications for education. *Anthropology & Education Quarterly*, 29(2), 155-188.
- Olson, J. (2009). The problem with infoshops and insurrection: US anarchism, movement building, and the racial order. In R. Amster, A. DeLeon, L. A. Fernandez, A. J. Nocella, & D. Shannon (Eds.), *Contemporary anarchist studies: An introductory anthology of anarchy in the academy* (pp. 35-45). Routledge.
- Partnership for 21st Century Skills. (2009). Framework for 21st century learning. Retrieved January 21, 2021 from <http://www.p21.org/our-work/p21-framework>
- Patterson, J.A. (2015). 21st Century Learning Initiatives as a Manifestation of Neoliberalism. In K.M. Sturges (Eds.), *Neoliberalizing educational reform: Bold visions in educational research* (pp. 213-237). Sense Publishers.
- Penrod, J. (2007). Living with uncertainty: Concept advancement. *Journal of Advanced Nursing*, 57(6), 658-667.
- Phelps, R. & Davis, B. (2005). Exploring the common spaces of education and complexity: Transphenomenality, transdisciplinarity, and interdiscursivity. *Complicity: An International Journal of Complexity and Education*, 2(1), 1-4.
- Potvin, P., & Dionne, E. (2007). Realities and challenges of educational reform in the province of Quebec: Exploratory research on teaching science and technology. *McGill Journal of Education*, 42(3), 393-410.
- Project Tomorrow. (2011). Going to school in 2015: How students envision the future! Retrieved January 21, 2021 from [https://tomorrow.org/speakup/pdfs/Student%20Vision%202015%20\(SU10\).pdf](https://tomorrow.org/speakup/pdfs/Student%20Vision%202015%20(SU10).pdf)
- Ream, E & Richardson, A. (1996). Fatigue: A concept analysis. *International Journal of Nursing*, 33(5), 519-529.

- Rennie, L. J., Venville, G., & Wallace, J. (2013). Knowledge that counts in a global community: Exploring the contribution of integrated curriculum. Routledge.
- Repko, A. (2008). *Interdisciplinary research: Process and theory*. Sage.
- Risjord, M. (2009). Rethinking concept analysis. *Journal of Advanced Nursing*, 65(3), 684–691.
- Robinson, K., & Aronica, L. (2015) *Creative schools: The grassroots revolution that's transforming education*. Penguin.
- Robinson, M.B. & Beaver, K.M. (2009). *Why crime? An interdisciplinary approach to explaining criminal behavior*. Carolina Academic Press.
- Schnurer, M. & Hahn, L. K. (2009). Accessible artifact for community discussion about anarchy and education. In R. Amster, A. DeLeon, L. A. Fernandez, A. J. Nocella, & D. Shannon (Eds.), *Contemporary anarchist studies: An introductory anthology of anarchy in the academy* (pp. 147-158). Routledge.
- Senge, P. M. (2006). *The fifth discipline (2nd Ed.): The art and practice of the learning organization*. Doubleday/Currency.
- Senge, P. M. (2012). *Schools that learn: A fifth discipline fieldbook for educators, parents, and everyone who cares about education*. Doubleday.
- Simpson, L. B. (2017). *This accident of being lost: Songs and stories*. House of Anansi.
- Steiner-Khamsi, G. (2012). For all by all! The World Bank's global framework for education. In S. Klees, J. Samoff, N. P. Stromquist (Eds.), *The World Bank and education* (pp. 3-20). Sense Publishers.
- Stroh, D. P. (2015). *Systems thinking for social change: A practical guide to solving complex problems, avoiding unintended consequences, and achieving lasting results*. Chelsea Green Publishing.
- Toulouse, P. R. (2015). *Beyond shadows: First Nations, Métis and Inuit student success*. Canadian Teachers' Federation.
- Truth and Reconciliation Commission of Canada. 2015. *Truth and Reconciliation Commission of Canada: Calls to action*. Retrieved January 21, 2021 from http://trc.ca/assets/pdf/Calls_to_Action_English2.pdf
- Tuck, E., & Yang, K. W. (2013). Thinking with youth about theories of change. In Tuck, E., & Yang, K. W. (Eds.), *Youth resistance research and theories of change* (pp. 125-138). Routledge.
- Venville, G. J., Wallace, J., Rennie, L. J., & Malone, J. A. (2002). Curriculum integration: Eroding the high ground of science as a school subject? *Studies in Science Education*, 37(1), 43-83.
- Vickers, J. (1998). "[U]framed in open, unmapped fields": Teaching the practice of interdisciplinarity. *Arachne: An Interdisciplinary Journal of the Humanities*, 4(2), 11-42.
- Vitikka, E., Krokfors, L., & Hurmerinta, E. (2012). The Finnish national core curriculum. In H. Niemi, A. Toom, & A. Kallioniemi (Eds.), *Miracle of education: The principles and practices of teaching and learning in Finnish schools* (pp. 83-96). Rotterdam: Sense Publishers.
- Wade, G. H. (1998). A concept analysis of personal transformation. *Journal of Advanced Nursing*, 28(4), 713-719.
- Wagner, T. (2008). *The global achievement gap: Why even our best schools don't teach the new skills our children need – and what we can do about it*. Basic Books.
- Walker L.O. & Avant K.C. (1995) *Strategies for theory construction in nursing* (3rd ed.). Appleton & Lange.
- Westheimer, J. (2015). *What kind of citizen? Educating our children for the common good*. Teachers College Press.
- Wilson, S. (2007). Guest editorial: What is an Indigenist research paradigm? *Canadian Journal of Native Education*, 30(2), 193.

ARON ROSENBERG is a high school teacher and a doctoral student in the Department of Integrated Studies in Education at McGill University. His research focuses on critical digital literacy education and the social and environmental justice implications of using digital technologies. Recent publications have focused on systems-level educational reform and informal learning in community gardens. aron.rosenberg@mail.mcgill.ca

LISA STARR is an Assistant professor at McGill University in the Department of Integrated Studies in Education (DISE) and the Director of the Office of Internships and Student Affairs. She is also the Past President of the Canadian Association for the Study of Women and Education (CASWE). Her current research focuses are on the relationships between leadership and gender equity and on the use of autoethnography and self-study as means to investigate, understand and make meaning of the intersections inherent in 21st century leading and learning. lisa.starr2@mcgill.ca

ARON ROSENBERG est enseignant au secondaire et doctorant au Département des études intégrées en sciences de l'éducation à l'Université McGill. Ses recherches ciblent l'éducation numérique et les implications en terme de justice sociale et environnementale de l'utilisation des technologies numériques. Ses publications récentes portent sur la réforme des systèmes éducatifs et sur l'apprentissage informel dans les jardins communautaires. aron.rosenberg@mail.mcgill.ca

LISA STARR est professeur adjoint au Département des études intégrées en sciences de l'éducation de l'Université McGill (DISE) et directrice du bureau des stages et des affaires étudiantes. Elle est également la présidente sortante de l'Association canadienne pour l'étude sur les femmes et l'éducation (ACÉFÉ). Ses recherches actuelles ciblent les relations entre le leadership et l'équité entre les genres. Elle s'intéresse aussi à l'utilisation de l'autoethnographie et de l'auto-évaluation comme moyen d'évaluer, de comprendre et de donner une signification aux liens existant entre le pouvoir et l'apprentissage au 21^e siècle. lisa.starr2@mcgill.ca