
RESEARCH BRIEF

Brought to you by McGill's NEXTschool Research Team

Interdisciplinary Learning

INTERDISCIPLINARY

approaches to learning

“An approach that integrates two or more subject areas into meaningful association to enhance and enrich learning within each subject area”.

Many Quebec teachers plan their classes with the Progressions of Learning Documents that prescribe learning outcomes in disciplinarily discreet ways. Within an interdisciplinary approach, instead of initiating and planning class activities starting with discipline-specific curricular outcomes, educators start with activities and assignments that are focused around broad-based major themes or big ideas², inquiry-based project/problem-based learning projects³, or current events and community partnerships⁴. Students and educators design these activities and assignments together in a flexible and ongoing process, meeting on a regular basis to revise plans and ensure that relevant curricular connections are being made, across disciplines.

Beyond supporting and facilitating the design of coursework, educators need to support students' thinking on how to connect disciplinary outcomes as their educational experiences unfold. Coming from a disciplinary background, most students will need explicit guidance on how to be consultants in and co-connectors of class activities and assignments with curricular outcomes from various disciplines. These connections must be constantly and collaboratively negotiated through discussions, meetings, and reflections with students and teachers.

1 You, 2017, p.1
2 Daugherty & Carter, 2017; Drake, 2012
3 Kodkanon, Pinit, & Murphy, 2018
4 Kodkanon, Pinit, & Murphy, 2018

INTERDISCIPLINARY is often used as an umbrella term to discuss various practices and approaches that rethink conventional disciplinary divisions.

OTHER RELATED TERMS include those that involve educators working within disciplinary divisions but complicating them:

MULTIDISCIPLINARY
CROSS-CURRICULAR

OR are organized around an idea or theme, and then connected back to various disciplines:

INTEGRATED
TRANSDISCIPLINARY
HOLISTIC
INQUIRY-BASED
PROJECT-BASED LEARNING
PROBLEM-BASED LEARNING

QUESTIONS TO ASK:

- **How can schools rethink disciplinary structures in order to more fully engage students in learning and to prepare them for the world ahead?**
- **How can educators collaborate with one another and with students to connect curricular outcomes from various disciplines throughout the process of facilitating educational experiences?**

BENEFITS

The curriculum in Quebec “identifies interdisciplinarity as one of its main orientations”.⁵ Echoing the importance of this approach, interdisciplinary structures are key components of leading contemporary curricular designs like the Finnish education system⁶ and the International Baccalaureate program.⁷ National commitments around embracing Indigenous epistemologies – which often stress the importance of interdisciplinary engagement in holistic curricula⁸ – further emphasize the value of integrating or relating disciplines in education. Interdisciplinary approaches to learning are often associated with real-world relevance⁹ and various positive learning outcomes. With an interdisciplinary approach, “students were able to approach tasks/challenges with a broader lens, could communicate and collaborate more effectively, and were more reflective when problem-solving towards a shared vision”.¹⁰ Educational structures that combine disciplines can enhance students' learning outcomes and develop more independent, joyful, and meaningful engagement in learning.¹¹

5 Hasni, Lenoir, & Alessandra, 2015, p. 146
6 Vitikka, Krokfors, & Hurmerinta, 2012
7 Daly, Brown, & McGowan, 2012
8 Battiste, 2002; Toulouse, 2015
9 Daugherty & Carter, 2018
10 Gillis et al., 2017, p. 204
11 Barnes, 2012; Hargreaves et al., 2001; Rennie et al., 2013; You, 2017

CHALLENGES

A common concern about interdisciplinary learning is that it can be quite difficult to implement.¹² With such a long tradition of discipline-bases for teacher specialization, school timetables, and assessment structures, it is difficult for many to embrace the necessary culture shift.¹³ As Daugherty and Carter (2018) explain, “the structure of public schools systems, especially at the secondary level, may stifle collaboration and integration of subject matter” (p. 4). Within these structures, many educators, administrators, and students struggle to engage in the technical or logistical changes that are needed for interdisciplinary reforms.¹⁴ Some scholars and practitioners are also concerned about the lack of balance between different subject areas in programs that blend disciplinary areas.¹⁵ Similarly, various researchers and educators worry about the potential for losing or watering down specific, disciplinary skills within a holistic, interdisciplinary context.¹⁶

Aware of these difficulties, educators who are trying to connect various disciplines holistically need to work collaboratively in order to balance the different disciplinary areas and to ensure that they do not lose or water down technical, discipline-specific skills. It is important not to rush into or prescribe changes within contexts that are not ready or open to them.¹⁷ This critical care must therefore be mindful of local conditions¹⁸ and responsive to all educational partners.¹⁹

12 Humes, 2013; Nagle, 2013
13 Daugherty & Carter, 2018; Hargreaves et al., 2001
14 Hargreaves et al., 2001
15 Daugherty & Carter, 2018; Ewing, 2017
16 Applebee et al., 2007; Hargreaves et al., 2001
17 Fullan, 2011; Schmurer & Hahn, 2009
18 Fullan, 2011; Hargreaves et al., 2001
19 Allan & Evans, 2006



STUDENT AND EDUCATOR EXPERIENCES

As Ken Robinson (2015) pointed out, learning and education does not depend on disciplinary structures within schools; in fact, it “happens anywhere there are willing learners and engaging teachers. The challenge is to create and sustain those experiences within schools” (p. 72). Interdisciplinary approaches insist on focusing education around embracing all the potential learning moments during a school day – within diverse contexts – and connecting curricular outcomes as they unfold.

Within this approach, it is helpful if educators have some intentional curricular connections and learning outcomes built into class activities. However, it is vital that they are also open to other possible educational experiences, and to students’ reflections on relevant learning opportunities that emerge. This includes actively communicating with other educators and providing students with the information, tools, and support they need to identify curricular connections within class activities and relevant prescribed outcomes.

START-UP CONDITIONS

To develop authentic and sustainable interdisciplinary approaches, schools need a committed group of educators who can work as a cohort within a flexible schedule.²⁰ Effective team teaching relies on time for planning amongst educators and between educators and students.²¹ As Kodkanon, Pinit, and Murphy (2018) describe, leadership can be shared effectively through open and supportive forms of communication that value each member’s opinion. To facilitate this shared leadership, educators will likely need initial professional development on how to facilitate curriculum design that is collaborative and interdisciplinary.²² Similarly, students in this approach may need support co-designing activities and assignments with their teachers, understanding curricular outcomes, and connecting their classroom experiences with these prescribed learning outcomes. Educators, students, and administrators may also benefit from ongoing support from educational services departments and consultants.

²⁰ Benade, 2019; Ewing, 2017

²¹ Kodkanon, Pinit, & Murphy, 2018

²² You, 2017

IN CONCLUSION

Organizing curricula in interdisciplinary ways has been proven to motivate students towards relevant and transferrable content that cultivates creative, open-minded, and joyful learners.²³ In an age of climate instability, technological revolution, refugee watershed, public health emergencies, and other upheavals, this pedagogical approach educates students in flexible and adaptable competencies central to a world changing so profoundly.²⁴

Within an interdisciplinary approach, students direct their learning more independently, and – with the support of educators – they will be able to ground what they learn in personalized and holistic ways that also align with prescribed learning outcomes. Real-world connections and open-ended competencies like adaptability, balanced with conventional content-literacy, can be nurtured as course content within an interdisciplinary classroom. Working together and supported by administrators and the community, students and educators can embrace interdisciplinary learning to improve student engagement and success.

²³ Barnes, 2012; Hargreaves et al., 2001; Rennie et al., 2013; You, 2017

²⁴ Fadel, Bialik, & Trilling, 2015; Gillis et al., 2017; Senge, 2012



REFERENCES

- Allan, G., & Evans, M. D. (2006). A different three Rs for education: Reason, relationality, rhythm. *Rodopi*.
- Applebee, A. N., Adler, M., & Filhan, 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.
- Battiste, M. (2002). Indigenous knowledge and pedagogy in First Nations education: A literature review with recommendations. National Working Group on Education Ottawa, Canada.
- Benade, L. (2019). *Flexible Learning*. In Hill, M., & Thrupp, M. (Eds.), *The professional practice of teaching in New Zealand*. Cengage.
- Daly, K., Brown, G., & McGowan, C. (2012). Curriculum integration in the International Baccalaureate Middle Years Programme: Literature review. International Baccalaureate Organization.
- Daugherty, M. K., & Carter, V. (2018). The nature of interdisciplinary STEM education. *Handbook of Technology Education*, 159-171.
- 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.
- Gillis, D., Nelson, J., Driscoll, B., Hodgins, K., Fraser, E., & Jacobs, S. (2017). Interdisciplinary and transdisciplinary research and education in Canada: A review and suggested framework. *Collected Essays on Learning and Teaching*, 10, 203-222.
- Gouvernement du Québec. (2004). *Secondary*. Retrieved April 05, 2018, from <http://www.education.gouv.qc.ca/en/contenus-communs/teachers/quebec-education-program/secondary/>
- Hargreaves, A., Earl, L., Moore, S., & Manning, S. (Eds.) (2001). *Curriculum Integration. Learning to change: Teaching beyond subjects and standards*. (pp. 83-112). Jossey-Bass.
- Hasni, A., Lenoir, Y., & Alessandra, F. (2015). Mandated interdisciplinarity in secondary school: The case of science, technology, and mathematics teachers in Quebec. *Issues in Interdisciplinary Studies*, 33, 144-180.
- Humes, W. (2013). Curriculum for excellence and interdisciplinary learning. *Scottish Educational Review*, 45(1), 82-93.
- Kodkanon, K., Pinit, P., & Murphy, E. (2018). High-school teachers' experiences of interdisciplinary team teaching. *Issues in Educational Research*, 28(4), 967-989.
- Nagle, B. (2013). Preparing high school students for the interdisciplinary nature of modern biology. *CBE Life Sciences Education*, 12(2), 144-147.
- Robinson, K., & Aronica, L. (2016). *Creative Schools: The grassroots revolution that's transforming education*. Penguin Books.
- 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. (2012) *Schools that learn: A fifth discipline fieldbook for educators, parents, and everyone who cares about education*. Doubleday.
- Toulouse, P. R. (2015). *Beyond shadows: First Nations, Métis and Inuit student success*. Canadian Teachers' Federation.
- Vitikka, E., Krokfors, L., & Hurmerinta, E. (2012). The Finnish national core curriculum. *Miracle of Education*, 83-96.
- You, H. S. (2017). Why teach science with an interdisciplinary approach: History, trends, and conceptual frameworks. *Journal of Education and Learning*, 6(4), 66-77.