

# Inquiry-based Learning (IBL) in the Classroom

## Context: Transforming Learning Everywhere

Hamilton-Wentworth DSB's 5-year initiative, Transforming Learning Everywhere (TLE), aims to design and create innovative learning environments, through a 2-pronged strategy:



TLE Inputs	TLE Goals
<ul style="list-style-type: none"> <li>• Funding</li> <li>• Technology distribution (iPads)</li> <li>• Professional learning (inquiry pedagogies, iPad use)</li> <li>• Evidence-based feedback</li> </ul>	<ul style="list-style-type: none"> <li>• Creating a professional culture supporting the TLE</li> <li>• Fostering teacher shifts in pedagogy to align with TLE aims</li> <li>• Fostering teacher development of technology-supported inquiry-based approaches</li> <li>• Generating evidence of improved student engagement and student learning</li> </ul>

Their 5-year plan follows the Stages of Implementation, as [outlined by the National Implementation Research Network](#): Exploration, Exploration and Installation, Initial Implementation, Partial Implementation, with Full Implementation in 2017-18.

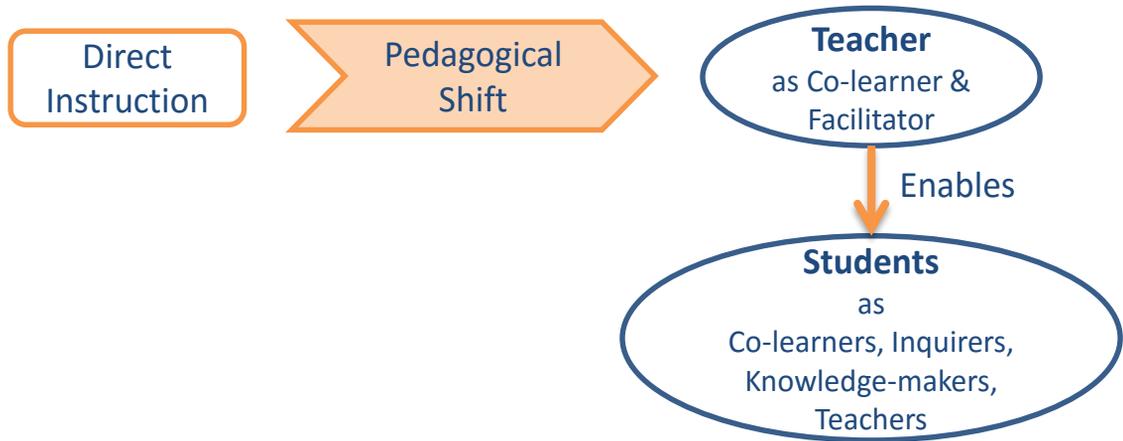
In the initiative's second year, it was nearing completion of the Initial Implementation phase, which focused on 4 projects:

- **North Digital Project** – grades 4-8 in a family of 7 elementary schools; all students and teachers given their own iPad, software, and support
- **Nora Frances Henderson Secondary School Project** – 900 students of 1 school; all students and teachers given their own iPad, software, and support
- **Mountain Secondary School Project** – smaller school where all students have an Individualized Education Plan; all students and teachers given their own iPad, software, and support
- **New Pedagogies for Deep Learning Project** – 24 schools in the western part of HWDSB

The information presented in this document is based on emergent findings from the North Digital Project.

# Shifting Pedagogy to Enable Student Agency in IBL

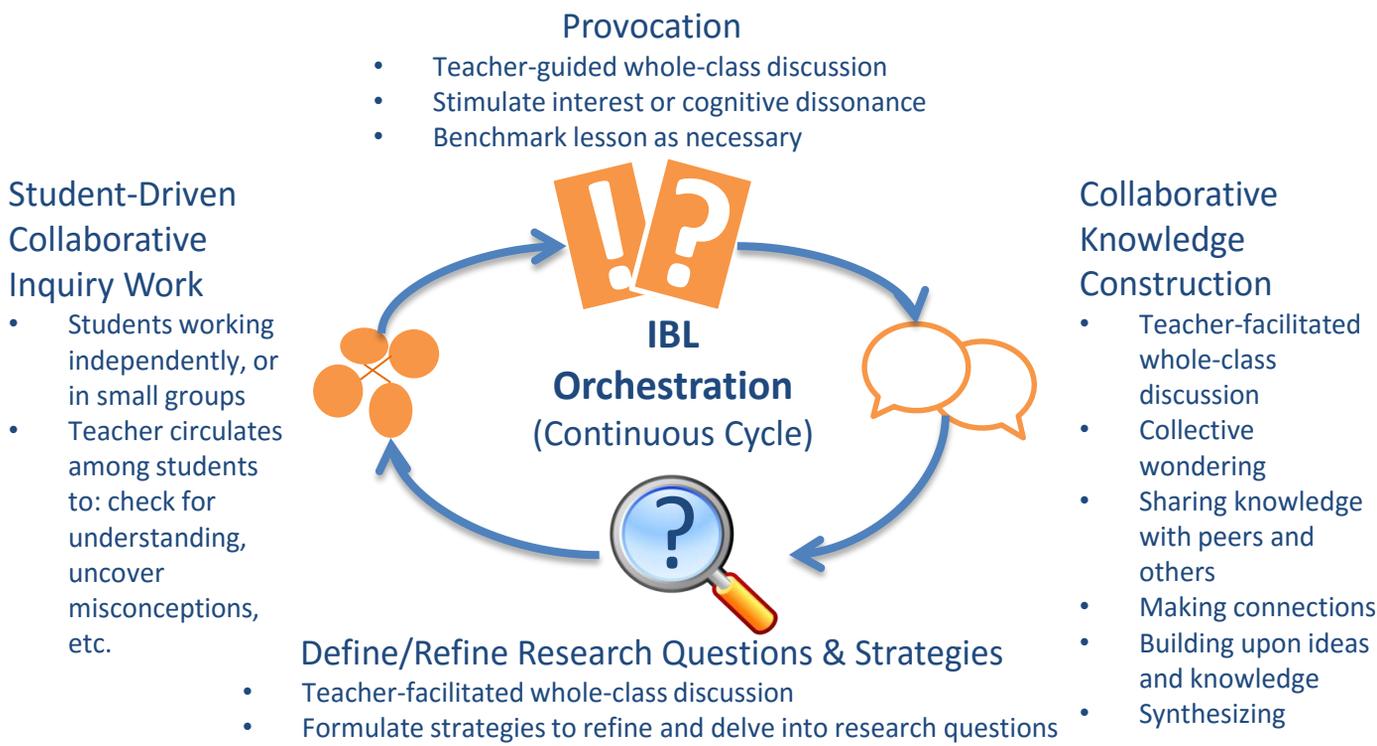
It was observed that when TLE teachers implement inquiry-based learning (IBL), their pedagogical shift from traditional direct instruction (i.e. sage on the stage), to teacher as co-learner and learning facilitator, enables students' roles to shift towards "knowledge-makers, and sometimes as teachers" (Owston et al., 2016; p. x); leading to increased student engagement, autonomy, tenacity, and agency. This also increases student collaboration and continuous sharing of work in-progress for discussion, as well as final project peer critique.



## Teacher Orchestration of IBL

A teacher's design and real-time management of multi-layered classroom activities, multiple learning processes, and numerous teaching actions, is referred to as "orchestration" (Dillenbourg & Jermann, 2010).

Orchestration of IBL experiences by TLE teachers typically follows a continuous cycle over multiple class periods, beginning with a teacher-guided provocation/hook activity to stimulate interest and collective wondering (e.g., videos, images, texts, newspaper articles, etc.). This is followed by teacher-facilitated class discussion where students wonder aloud and share their emergent meaning-making. With guidance from the teacher, students formulate research questions and strategies to investigate these. Students are then given time to carry out these investigations collaboratively. Periodically, the teacher uses various provocations – including emergent student questions, ideas, and theories – to spur class discussion or to introduce a benchmark lesson (i.e. direct instruction); nudging the student-driven inquiry toward productive directions.



# IBL Connections to the Curriculum

TLE teachers played a critical role in facilitating student-driven inquiry toward connections with curriculum “big ideas” that intersect with real-world issues (i.e. ecology, global warming). It was observed that heavily pre-constrained/pre-defined inquiry boundaries and heavily teacher-managed student inquiry could counter the spirit of IBL experiences and environments.

Teacher-directed

Student-driven



IBL is student-driven inquiry that is teacher-facilitated.

Students engaged in IBL have agency in driving:

- Initial work planning
- Ongoing refinement of research questions throughout inquiry-learning cycle (i.e. notice, wonder, ask questions)
- Determination of ongoing inquiry trajectories; deepening inquiry scope beyond teacher-provided templates, and for authentic purposes
- Collaborative knowledge construction that is cognitively collaborative, and fosters deep interdisciplinary learning; wherein new knowledge is connected to the real-world
- Innovative tool use
- Research strategies

Facilitation of IBL via:

- Phases of provocation
- Conceptualization
- Selection of research resources and technology
- Scaffold: analysis of evidence/data/information/ideas, making connections, drawing conclusions, determining implications
- Collaborative sharing of student-constructed knowledge
- Critical reflection on inquiry processes and products of learning

As defined by the TLE initiative and Ontario Ministry of Education's [Capacity Building Series](#) on IBL

# The IBL Cycle and Technology

Through all phases of the IBL cycle, TLE students and teachers use digital technology for various learning and teaching processes, including:

Student Technology Use in IBL	Teacher Technology Use in IBL
<ul style="list-style-type: none"> <li>Facilitate collaborative information sharing, meaning-making, and knowledge construction; through peer-to-peer response and cross-commenting</li> <li>Track collaborative learning and work processes</li> <li>Access online multimedia resources and reference material</li> <li>Ubiquitously access assistive tools (i.e. translation “read aloud”, speech-to-text, etc.), and leveled digital resources</li> <li>Create multimedia knowledge artefacts</li> </ul>	<ul style="list-style-type: none"> <li>Provide timely feedback to support ongoing learning processes – assessment <i>for</i> and <i>as</i> learning (e.g., via Google Drive suite’s commenting feature)</li> <li>Record pedagogical documentation (e.g., via Sesame Snap app for observational notes and video)</li> <li>Co-/Develop shareable assessment checklists and rubrics</li> <li>Amplification/display of multimedia, including student-created knowledge artefacts, to spur whole-class or small group knowledge building discussion</li> </ul>

## Assessing IBL

The following table offers some considerations for assessment of IBL:

Formative Assessment	<ul style="list-style-type: none"> <li>Assessment for and as learning can be used by teachers to gently nudge student-driven inquiry toward productive trajectories</li> </ul>
Success Criteria	<ul style="list-style-type: none"> <li>Ideally, co-created by teachers and students, then incorporated into rubrics and checklists</li> <li>Used by students throughout IBL to plan, monitor, and self-assess learning processes and artefacts of learning</li> </ul>
Process	<ul style="list-style-type: none"> <li>Expand focus from assessment of student artefacts, to focus on: student learning processes, thinking, and work processes</li> </ul>
Evidence	<ul style="list-style-type: none"> <li>Include: observational evidence, descriptive feedback, whole-class sharing and discussion (i.e. conversation, online discourse), peer assessment, artefacts</li> </ul>
Culminating Projects + Community	<ul style="list-style-type: none"> <li>Culminating projects are a key element in IBL</li> <li>Class presentations are opportunities for peer- and teacher-assessment and constructive critique</li> <li>How might student inquiry spur community action?</li> </ul>

For information on Ontario’s policy for assessment and evaluation, please refer to *Growing Success* (2010) and *Growing Success – The Kindergarten Addendum* (2016), available at <http://www.edu.gov.on.ca/eng/policyfunding/success.html>

# References

Dillenbourg & Jermann. (2010). Technology for Classroom Orchestration. In M.S. Khine & I.M. Saleh (Eds.), *The New Science of Learning: Computers, Cognition and Collaboration in Education*, Berlin: Springer (pp. 525-552). New York, NY, USA: Springer. Retrieved from [https://link.springer.com/chapter/10.1007%2F978-1-4419-5716-0\\_26](https://link.springer.com/chapter/10.1007%2F978-1-4419-5716-0_26)

National Implementation Research Network (NIRN). *Implementation Stages*. Chapel Hill, North Carolina, USA: NIRN. Retrieved from <http://nirn.fpg.unc.edu/learn-implementation/implementation-stages>

Ontario Ministry of Education. *Capacity Building Series*. Toronto, Ontario, Canada. Retrieved from <http://www.edu.gov.on.ca/eng/literacynumeracy/inspire/research/capacityBuilding.html>

Ontario Ministry of Education (2010). *Growing Success*. Toronto, Ontario, Canada: Queen's Printer for Ontario. Retrieved from <http://www.edu.gov.on.ca/eng/policyfunding/success.html>

Ontario Ministry of Education (2010). *Growing Success*. Toronto, Ontario, Canada: Queen's Printer for Ontario. Retrieved from <http://www.edu.gov.on.ca/eng/policyfunding/success.html>

Ontario Ministry of Education (2016). *Growing Success – The Kindergarten Addendum*. Toronto, Ontario, Canada: Queen's Printer for Ontario. Retrieved from <http://www.edu.gov.on.ca/eng/policyfunding/success.html>

Owston, Wideman, Thumlert, Malhotra, & Smith. (2016). *Transforming Learning Everywhere: A study of the second year of implementation*. Toronto, Ontario, Canada: Council of Ontario Directors of Education.