

Building an Infrastructure for Inquiry-Based Learning



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Where does inquiry fit at Queen's?

- Academic plan
- Strategic research plan
- External research review
- Provost's Advisory Committee on Teaching and Learning
Working Group on Undergraduate Research

Inquiry initiatives at Queen's

Inquiry Working Group:

- Environmental scan across undergraduate courses
- Interpretations of inquiry across disciplines
- Study on supports needed (in progress)

Inquiry@Queen's

- Annual conference to celebrate inquiry-based learning that showcases research projects from Queen's undergraduates



Undergraduate Research Conference

- Interdisciplinary conference 2007-present
- Students share the results of their inquiry
- Submit abstract for an oral presentation or poster
- Themed sessions – same topic, different disciplinary perspectives
- One keynote session with faculty guest speaker and students
- Poster session – with pizza!
- Held in Queen's Learning Commons in the library

What is inquiry-based learning?

Activity

How do you define inquiry-based learning?

- List some words and phrases that describe inquiry-based learning
- Group similar features

What is inquiry?

- Inquiry requires more than simply answering questions or getting a right answer. It espouses investigation, exploration, search, quest, research pursuit and study. (Kuhlthau, 2007)
- Queen's definition: "a dynamic, iterative, and developmental process where students engage in asking and researching questions of interest."

Inquiry & Undergraduate Research

- Engage in asking and researching questions of interest (new to them or even the discipline)
- Iterative process: finding, evaluating, organizing, analyzing, and disseminating information
- Developmental building of concepts and skills across a program
- Independent or group work
- Dissemination of results come in many formats (e.g., essay, poster, blog, presentation)
- Across the disciplines

How does inquiry support learning?

Positive impacts on student personal, academic, and professional development (Healey & Jenkins, 2009; Kuh 2009; Levy & Petrulis, 2012)

Many undergraduates feel they learn best when completing their own research projects (Turner et al., 2008)

Promotes “critical thinking, problem solving, taking responsibility for one’s own learning, and the desire for lifelong learning” (Lee, 2011)

Positive impact on learning involvement and academic performance (Zafra-Gómez et al., 2015)

Large-scale studies demonstrate significant learning gains and benefits to disadvantaged students (Hmelo-Silver et al., 2007)

Student Perspectives on Inquiry: Our Study

- How valuable do you think your undergraduate research/inquiry experience has been to your own self-development and interests? 61% - very valuable/valuable; 26% somewhat valuable; 16% not valuable
- Do you feel you learned skills that were valuable for other courses or projects? 65% identifying sources; 68% collecting data and useful information; 70% analyzing data/information; 68% organizing/managing sources and ideas; 57% evaluation of sources

Student perspectives on inquiry

Major themes reported:

- Better prepared to work with a team
- Taught me about myself, self-reflection, what I'm interested in
- Valuable skills important to employers - research, information skills, presentation skills, confidence, critical thinking skills
- Learn how to find, analyze, evaluate information
- Learn how to develop new ideas, support those ideas, think outside the box

Reframing Information Literacy

Activity:

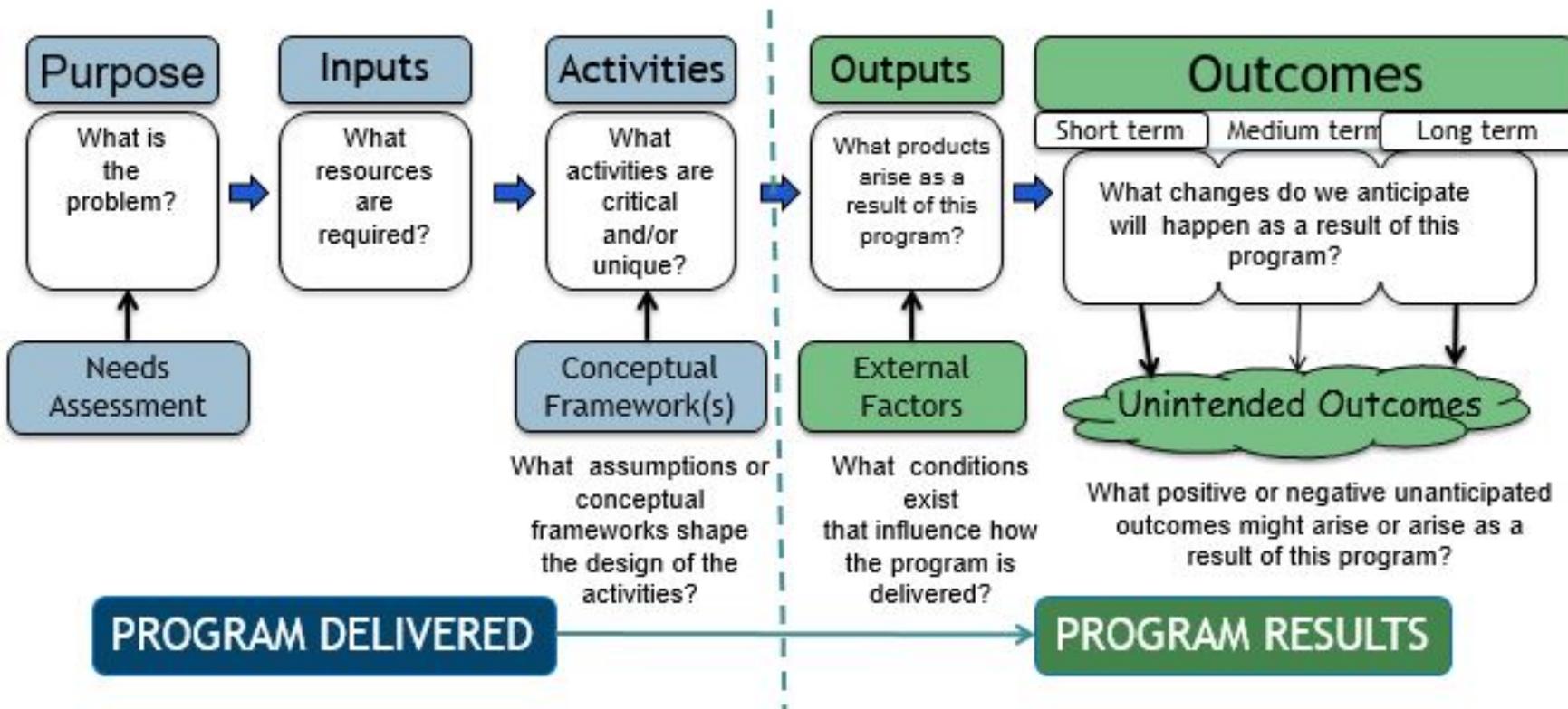
If you were to reframe your information literacy program around the concept of inquiry-based learning:

- How would this change what you're doing now?
- What challenges and benefits do you predict or have you experienced?

Inquiry as a Transformative Frame

Language more familiar to faculty	Viewed as a teaching approach
Crosses disciplines	Faculty are central to the process
Relates to threshold concepts	Seen as developmental
Aligns with institutional strategies	In faculty research literature
Valued by students	Linked to best teaching practices
Encompasses information literacy	Fosters inclusive classroom
Connects to K-12	Process is assessed
Holistic process	Can promote academic integrity

Using a Logic Model for Planning



Purpose and Needs Assessment

Purpose:

To enable undergraduate students to become competent in conducting inquiry and research projects over the duration of their program.

Needs assessment:

- Literature review
- Document analysis of university strategic priorities and plans
- Environmental scan of courses using inquiry in undergraduate programs
- Survey on student perspectives and needs related to inquiry

Resources

- Librarians!
- Research guides and information resources for students
- Professional development materials for instructors (such as examples of different types of inquiry assignments and assessment methods across disciplines)

Activities

What needs to be done to deliver a program?

- Perform a comprehensive inquiry assessment
- Define inquiry at institutional level
- Map existing inquiry pathways across programs
- Share findings and receive feedback from departments
- Share findings and receive feedback from student groups
- Develop faculty learning series on inquiry-based learning
- Strategize on a developmental approach to scaffolded inquiry across different programs

Conceptual frameworks

What shapes the model? What makes it work?

Constructivism:

- Construction of personal understanding through experience (Piaget, Vygotsky, Bruner, Gardner, Bereiter, Scardamalia)

Cognitive apprenticeship:

- Process by which learners learn from a more experienced person by way of cognitive and metacognitive skills and processes. Includes modeling coaching, scaffolding, reflection, exploration. (Collins, Brown, & Newman)

Outputs

What products can be easily measured as a result of the program?

NOTE: These don't describe quality.

- I@Q Undergraduate Research Conference participation
- Faculty and Teaching Assistant attendance at inquiry workshops
- Number of courses with an inquiry component
- Number of students completing an independent study
- Adoption of standard definition of inquiry in strategic documents
- Map of inquiry pathways on departmental and career websites
- Creation of clusters of generic undergraduate research skill courses

Examples of Outcomes

Outcomes measure a change and are indicators of quality.

- Short:

Departments identify pathways for inquiry within programs

- Medium:

Models for developing inquiry articulated in academic departments

Inquiry: Ontario Model K-12



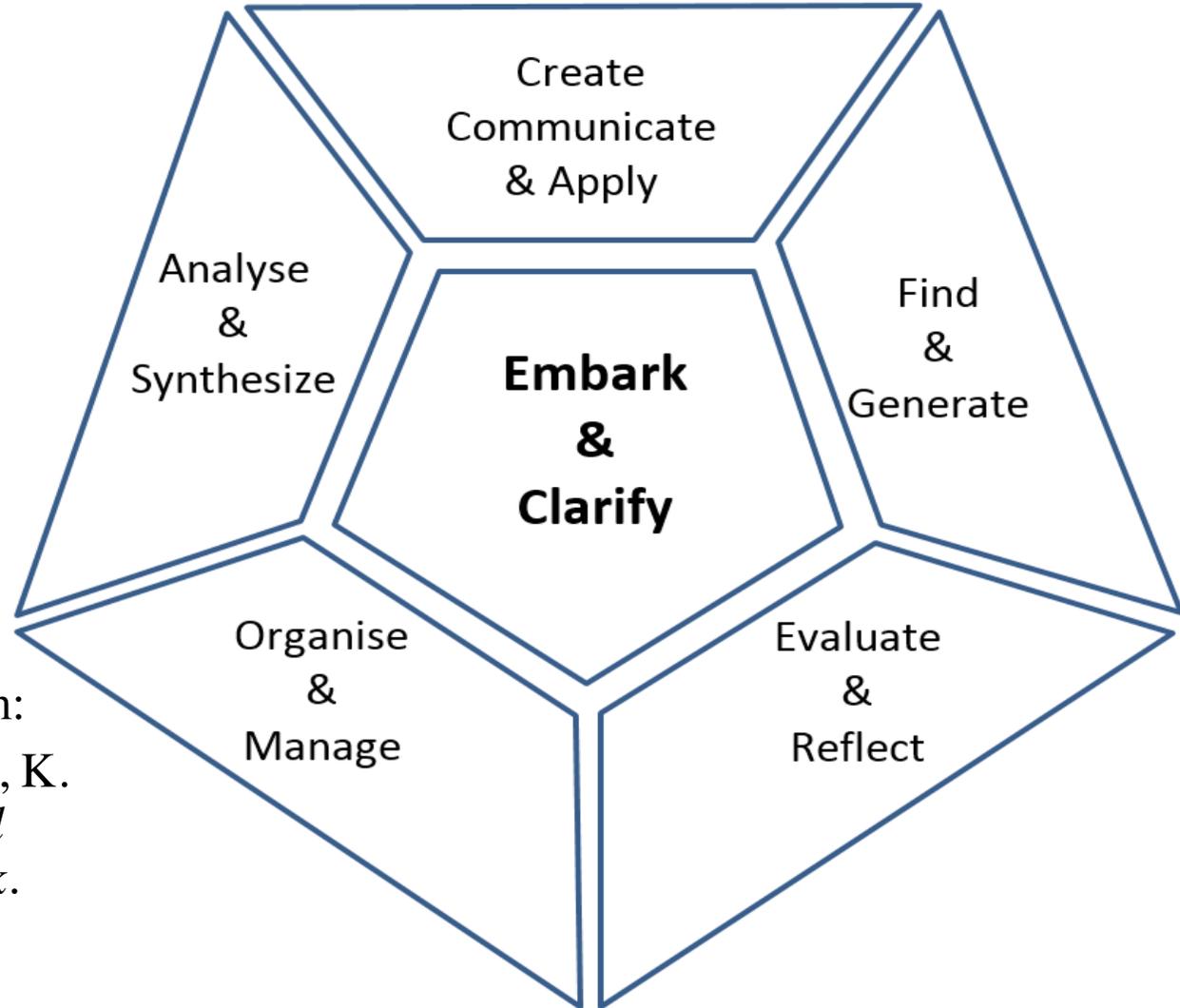
The essence of inquiry ...

"Inquiry ... requires more than simply answering questions or getting a right answer. It espouses investigation, exploration, search, quest, research, pursuit, and study. It is enhanced by involvement with a community of learners, each learning from the other in social interaction."

(Kuklthau, Maniotes & Caspari, 2007, p. 2)

From Inquiry-based Learning. (2013). Capacity-Building Series. Student Achievement Division to support leadership and instructional effectiveness in Ontario schools.

Inquiry model that extends across post- secondary



Facets of Research from:
Willison, J. & O'Regan, K.
(2015). *Researcher skill
development framework*.
www.rsd.edu.au



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Researchers...

Facets of Research

- a. Embark & Clarify**
Respond to or initiate research and clarify or determine what knowledge is required, heeding ethical, cultural, social and team (ECST) considerations.
- b. Find & Generate**
Find and generate needed information/data using appropriate methodology.
- c. Evaluate & Reflect**
Determine and critique the degree of credibility of selected sources, information and of data generated. Metacognitively reflect on processes used.
- d. Organise & Manage**
Organise information and data to reveal patterns and themes, and manage teams and research processes.
- e. Analyse & Synthesise**
Analyse information/data critically and synthesise new knowledge to produce coherent individual/team understandings.
- f. Communicate & Apply**
Discuss, listen, write, present and perform the processes, understandings and applications of the research, and respond to feedback, accounting for ethical, cultural, social and team (ECST) issues.

	← supervisor instigated	↔ researcher instigated	→ discipline leading	
	Prescribed Research Level 1 Highly structured directions and modelling from supervisor prompt the researcher(s) to...	Bounded Research Level 2 Boundaries set by and limited directions from supervisor channel the researcher(s) to ...	Scaffolded Research Level 3 Scaffolds placed by supervisor enable the researcher(s) to independently...	Self-initiated Research Level 4 Researcher(s) initiate and supervisor guides.
	Open Research Level 5 Researcher(s) determine guidelines that are in accord with discipline or context.	Adopted Research Level 6 Researcher(s) inform others' agendas	Enlarging Research Level 7 Researcher(s) enlarge the field of inquiry.	
Curious	Respond to questions/ tasks provided explicitly. Use a provided approach to clarify questions, expectations and ECST issues.	Respond to questions/ tasks implicit in directions. Choose from several provided structures to clarify questions, expectations and ECST issues.	Respond to questions /tasks generated from instructions. Choose from a range of provided structures or approaches to clarify salient elements including ECST issues.	Generate questions/aims/ hypotheses framed within structured guidelines. Anticipate and prepare for ECST issues.
Determined	Collect and record required information/data using a prescribed methodology from a prescribed source in which the information/data is clearly evident.	Collect and record required information/data using a prescribed methodology from prescribed source/s in which the information/ data is not clearly evident.	Collect and record required information/data from self-selected sources using one of several prescribed methodologies.	Collect and record self-determined information/ data, choosing an appropriate methodology based on structured guidelines.
Discerning	Evaluate sources/ information/data using simple prescribed criteria to specify credibility and to reflect on the research process.	Evaluate sources/ information/data using a choice of provided criteria to specify credibility and to reflect on the research process.	Evaluate information/data and inquiry process using criteria related to the aims of the inquiry. Reflect insightfully to improve own processes used.	Evaluate information/data and the inquiry process using self-determined criteria developed within structured guidelines. Refines others' processes.
Harmonising	Organise information/data using prescribed structure. Manage linear process provided (with pre-specified team roles).	Organise information/data using a choice of given structures. Manage a process which has alternative pathways (and specify team roles).	Organise information/data using recommended structures. Manage self-determined processes (including team function) with multiple pathways.	Organise information/data using self-or-team-determined structures, and manage the processes, within supervisor's parameters.
Creative	Interpret given information/data and synthesise knowledge into prescribed formats. <i>Ask emergent question.</i>	Interpret several sources of information/ data and synthesise to integrate knowledge into standard formats. <i>Ask relevant, researchable questions.</i>	Analyse trends in information/data and synthesises to fully integrate components specified. <i>Ask rigorous, researchable questions.</i>	Analyses information/data and synthesises to fully integrate components, consistent with parameters set. Fill knowledge gaps that are stated by others.
Constructive	Use prescribed genre to develop and demonstrate understanding from a specified perspective. Apply to a similar context the knowledge developed. Follow prompts on ECST issues.	Use discipline-specific language and prescribed genre to develop understanding, and demonstrate it to a specified audience. Apply to different contexts the knowledge developed. Clarify ECST issues.	Use discipline-specific language and genres to demonstrate scholarly understanding for a specified audience. Apply the findings to diverse contexts. Specify ECST issues that emerge.	Use appropriate language and genre to address gaps of a self-selected audience. Apply innovatively the knowledge developed to a different context. Probe and specify ECST issues in each relevant context.

Table 1: Researcher Skill Development Framework

A conceptual framework for the explicit, coherent, incremental and cyclic development of the skills associated with researching. ©Willison & O'Regan, August 2008/October 2015



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