JUSTICE INSTITUTE of BRITISH COLUMBIA

JIBC STUDENT RESEARCH SKILLS DEVELOPMENT FRAMEWORK

April 2015

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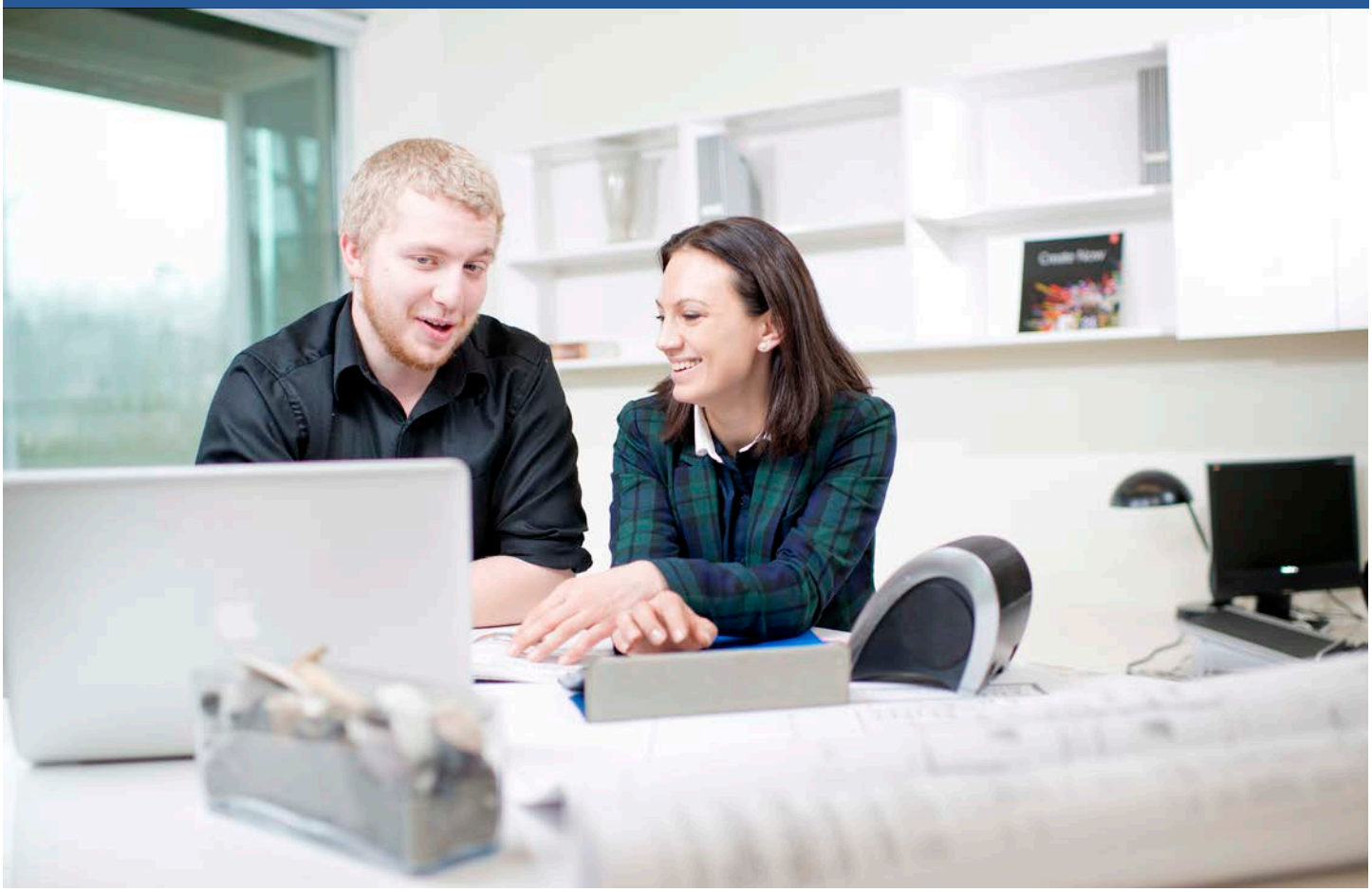
Office of Applied Research & Graduate Studies
Justice Institute of British Columbia



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Office of Applied Research & Graduate Studies

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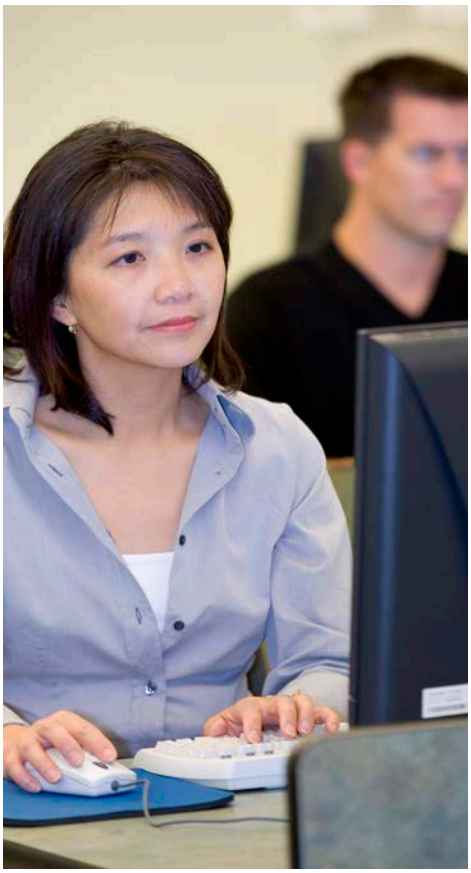


OVERVIEW

"Research is formalized curiosity. It is poking and prying with a purpose."

—Zora Neale Hurston

Teaching-intensive universities have a history of engaging undergraduates in pure and applied research. Following the report of the Boyer Commission on Educating Undergraduates in the Research University (Boyer, 1998), research-intensive universities have increased their focus on enhancing undergraduate opportunities for research, recognizing that undergraduate research experience leads to increased participation in postgraduate research (Lopatto, 2004) and also results in a higher likelihood of graduate credential completion (Bauer & Bennett, 2003). This proliferation of undergraduate research has led to divergent mechanisms for students to gain experiential learning and develop research skills. The approaches range from those that are patterned after traditional postgraduate research (i.e., a discrete project overseen by an academic supervisor) to models in which students work collaboratively with an instructor or other students on short-term research projects.

This paper outlines the Student Research Skills Development Framework developed for the Justice Institute of British Columbia for use in guiding the research skills development of its students, facilitating student learning, and promoting student success. The JIBC framework is informed by the conceptual model developed at the University of Adelaide by Willison and O'Regan (2006, 2007) — the Research Skill Development Framework — which incorporates "six facets of research skills into a continuum of student autonomy in the conduct of research" (Willison, 2009, p.10).

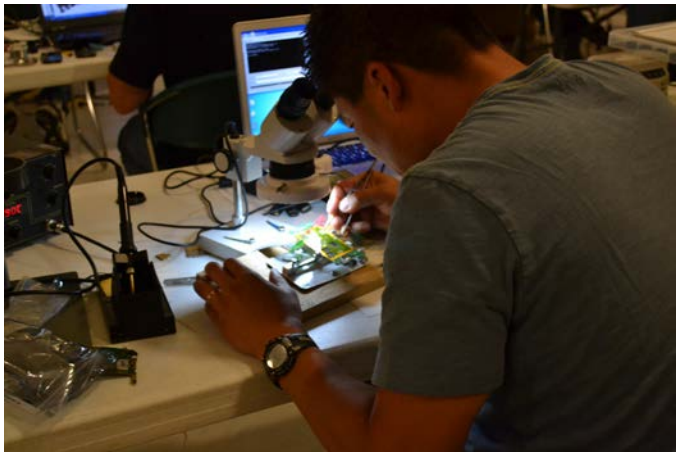
WHY UNDERGRADUATE RESEARCH?

At traditional research-intensive universities, faculty research agendas have sometimes been in conflict with teaching time commitments because research output may have a greater value to the faculty and institution. The Boyer Commission recognized early efforts to develop undergraduate research (such as those at MIT in 1969) but concluded that research universities failed to incorporate research-based learning into the undergraduate curriculum. This critique, and the reconceptualization of "scholarship", reinvigorated the discussion around undergraduate research. The proliferation of undergraduate research, programs and models was evident by 2004 when Seymour et al. (2004, p.494) reported a "large number of programs and models" associated with undergraduate research.

"Tell me and I forget. Teach me and I remember. Involve me and I learn."

—Benjamin Franklin

The aim of an undergraduate research experience, according to Healey (2003), is to develop students' understanding of, and skills and abilities to carry out, research. However, defining undergraduate research remains elusive, with the term being used loosely for a wide range of varying experiential learning opportunities. For example, Bauer and Bennett (2003, p.215) define undergraduate research as "collaboration between undergraduates and their faculty research sponsors". After a review of more than 400 articles, Dominick et al. (2000) concluded that most articles simply "accepted the proposition that research was whatever a faculty member and student decided … it was" (p. 5). Childs et al. (2007, p.16) defined undergraduate research as "student engagement from induction to graduation, individually and in groups, in research and inquiry into disciplinary, professional and community-based problems and issues, including involvement in knowledge exchange activities".



Benefits of undergraduate research: The literature reports consistently positive findings on the benefits of student involvement in undergraduate research. Some of these findings are summarized in Table 1

TABLE 1: Benefits of undergraduate research

Reference	Benefits of undergraduate research
Reisberg (1998)	Researching was more exciting and academically rewarding than lecture-based approaches to teaching and learning.
Dominick et al. (2000)	Students gained a deeper understanding of their subject matter through research activities.
Ishiyama (2002)	Students gained the ability to analyze and synthesize ideas and to work independently.
Jonte-Pace (2003)	Undergraduate student research enabled staff to move forward with their own research agenda.
Bauer and Bennett (2003)	Undergraduate students engaged in research reported higher motivation to study than other students who were not engaged in reasearch.
Ward, Bennett, and Bauer (2003)	Students perceived that engaging in research facilitated learning to a greater extent than traditional courses.
Seymour et al. (2004)	Skill- and attitude-based benefits of undergraduate research exposure included personal/ professional gains, improved thinking as a scientist, clarification or confirmation of career plans and enhanced career/graduate studies preparation.
Lopatto (2004)	Students gained a better understanding of how research is done, and they improved their laboratory and field skills.
Carter et al. (2009)	The intensity of the undergraduate research experience correlated to the student's decision to complete a PhD.
Healy and Jenkins (2009)	Students improved their search strategies (including, library, web, and database searching).
Behar-Horenstein and Johnson (2010)	Students learned to take more responsibility for their own learning.
Willison (2012)	Students clearly perceived that they developed discipline-specific research skills and that these were useful for current or projected employment as well as for subsequent studies.

Steward et al. (2010), following an extensive literature review, reported a list of 12 research skills most frequently cited as being developed through participation in undergraduate research. Similarly, Behar-Horenstein and Johnson (2010) identified six primary benefits of undergraduate research participation (although presented as seven to match Steward et al). (2010) as noted in the literature. These lists are presented in Table 2.

TABLE 2: Most frequently cited skills developed through research participation

Steward et al. (2010)	Behar-Horenstein and Johnson (2010)
Developing improved communication (oral and written)	Developing communication skills
Improving search strategies (library, web, and others)	
Developing critical thinking/analysis	Developing problem-solving and creative-thinking skills
Developing lab and field skills	Increasing technical skills
Understanding how research is done in the discipline	
Developing a research question	
Becoming independent	Improving independent work habits
Becoming part of a research community	
Understanding research processes and methods	
Developing teamwork skills	Improving teamwork and collaboration
Understanding of the primary literature	
Improving persistence and tolerance for obstacles	Learning to deal with ambiguity and obstacles
	Developing increased self-confidence

Dimensions of undergraduate research: There are no consistent methods for engaging students in research and inquiry, but the most often reported method is through an independent research project that is mentored and supported by an individual faculty member. Beckham and Hensel (2009) defined several dimensions of undergraduate research that are relevant to institutions that wish to promote greater student involvement in research and inquiry across the curriculum (see Table 3).

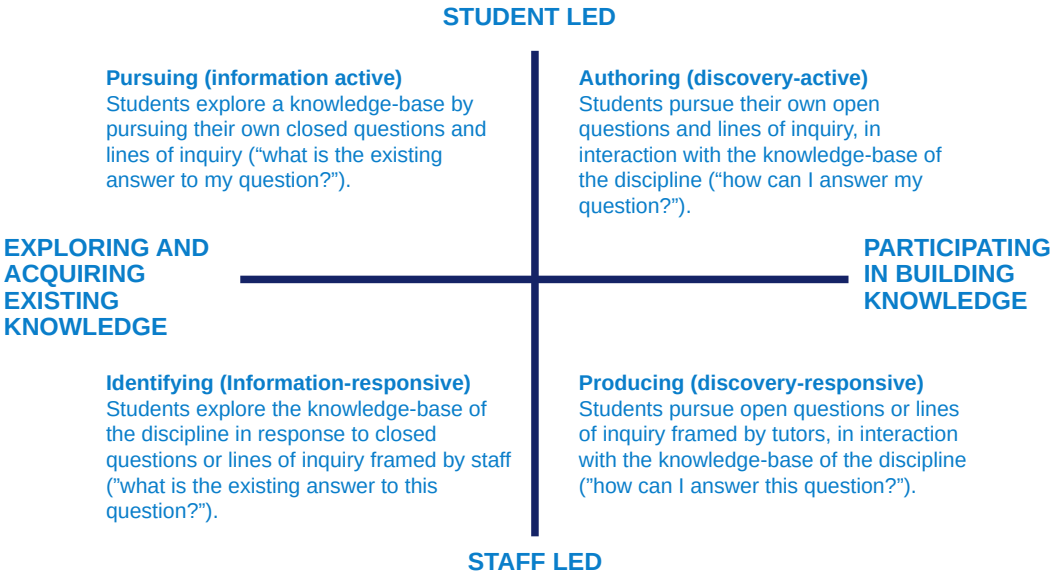
TABLE 3: Benefits of undergraduate research

Dimension and its continuum		
Original to the student	⟷	Original to the discipline
Student, process-centred	⟷	Outcome, product-centred
Collaborative	⟷	Individualistic
Faculty-initiated	⟷	Student-initiated
Curriculum-based	⟷	Co-curricular "fellowship" or opportunity
All students	⟷	Honours students or select students
Capstone project	⟷	Embedded in the curriculum across a the credential
Campus audience	⟷	Professional or external audience
Knowledge viewed as certain	⟷	Awareness of knowledge as contextual

Source: Adapted from Beckham and Hensel (2009)

Using an inquiry-based learning model, such as that presented by Levy (2009), student-based research and inquiry can be described along two axes: one axis describes the student involvement in the activity, ranging from being an observer (faculty-led) to actually performing the research (student-led); the other axis ranks the research activity as a range, from exploring existing knowledge (exploring and acquiring existing knowledge) to the generation of new knowledge (participating in building knowledge). This model is presented in Figure 1.

FIGURE 1: An inquiry-based learning model



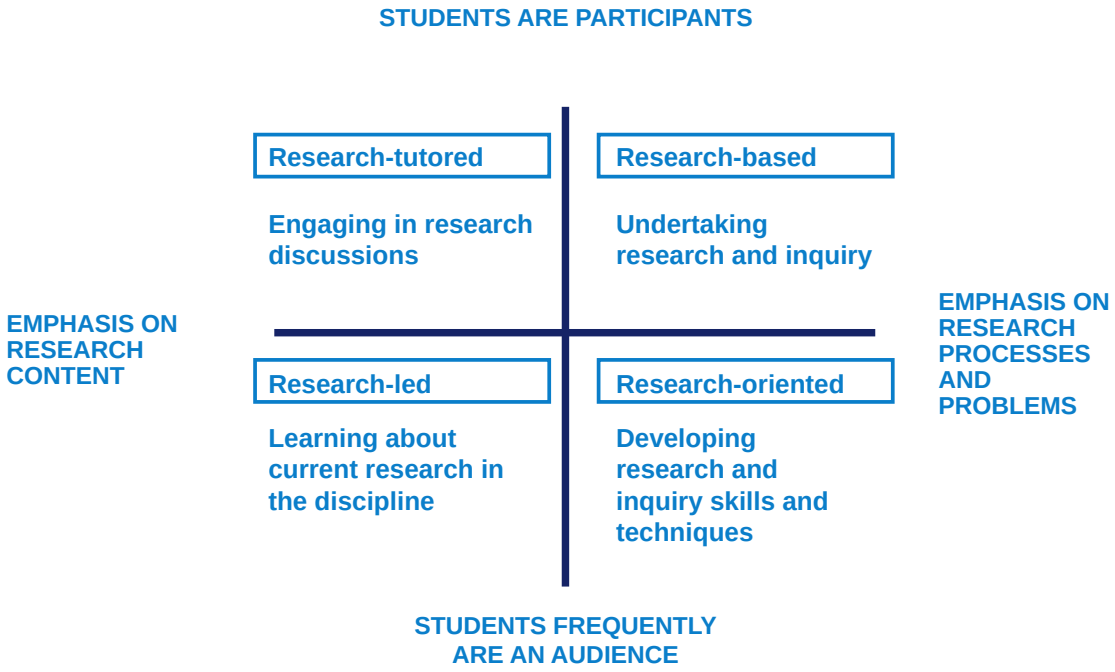
Source: Healy and Jenkins (2009, p.26)

Inquiry-based learning models have informed the development of a model describing the nature of undergraduate research and inquiry (Figure 2). Generally, students may engage in undergraduate research and inquiry in four primary ways (Griffiths, 2004; Healey, 2005; Healy & Jenkins, 2009):

- research-led: learning about current research in the discipline; research findings are embedded in curricular content and are delivered by the instructor; teaching that is informed by research — telling students about research results
- research-oriented: developing research skills and techniques; learning about the process through which knowledge is produced; teaching that emphasizes research methods telling students how to do research
- research-based: undertaking research and inquiry; teaching that involves inquiry-based learning activities with students engaged in research
- research-tutored (or research-informed): engaging in research discussions; small group discussions concerning research results; teaching that involves active participation and systematic inquiry.

Essentially, the four methods of engagement differ along two axes. One axis describes the student involvement in the activity, ranging from being an observer to being a participant. The other axis explores the research activity as a range, from an emphasis on research content to an emphasis on the research process and problems.

FIGURE 2: The nature of undergraduate research and inquiry



Source: Healy and Jenkins (2009, p.7)

RESEARCH SKILLS DEVELOPMENT

Research skills development appears in the literature to involve three broadly defined activities: telling students about research findings (often in course material and lectures), teaching students how to do the research (often in research methods courses), and having students engage in research (often in terminal projects or capstones). The first two can be done through traditional course-based instruction; the latter may require a different approach.

According to Jenkins (2008), support for undergraduate research experiences should actively promote the following:

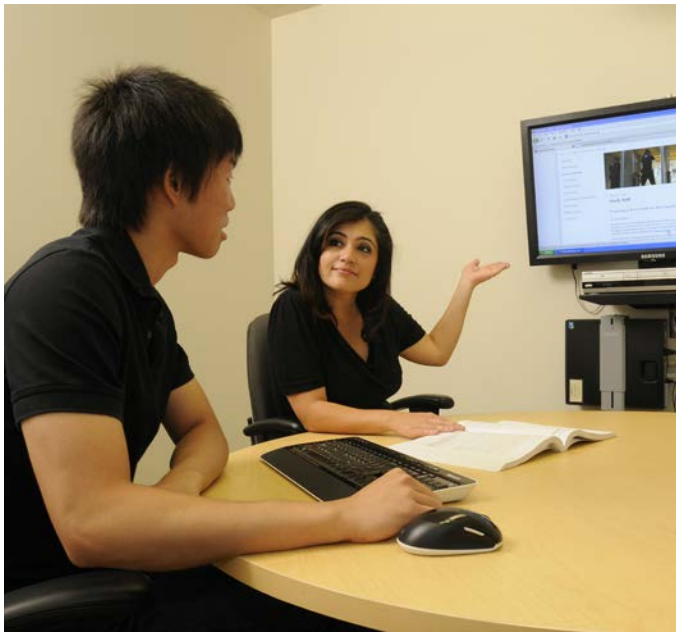
"I am neither especially clever nor especially gifted. I am only very, very curious."

—Albert Einstein

- Engage students with undergraduate research, community-based undergraduate research, or similar inquiries, and recast their understanding of student-centred or inquiry- or problem-based learning accordingly.
- Adjust the philosophy/values of programs to actively bring undergraduate students (along with others such as librarians and community activists) into the worlds of research.
- Encourage and enable students to learn in ways that parallel or reflect the ways faculty/staff themselves research and learn in their discipline or professional area.
- Build research opportunities into the formative processes and summative outcomes of course assessment for students to illustrate how faculty/staff develop and disseminate their own research and learning in their own discipline or professional area (e.g., through undergraduate research journals, student research conferences, exhibitions, recordings and broadcasts/narrowcasts).
- Ensure that the program is clearly visible and recognized as "undergraduate research" by the university communities (in particular students) and parents, the local community, and possible external sponsors and stakeholders.

To help ensure student success in such undergraduate research experience, it is important to develop the prerequisite skills for success. To help guide this process, JIBC developed a Student Research Skills Development Framework modelled on a similar framework created by John Willison from Adelaide University.

Willison and O'Regan identify the Research Skill Development Framework (RSDF) as a tool to help address "the lack of a conceptual framework from which to conceptualise undergraduate research across all disciplines" and the need to "promote lecturers' and students' awareness of the process of research skill development" (Willison & O'Regan, 2007, pp. 394, 404). The RSDF describes the development of undergraduate research skills and undergraduate research as part of a continuum. Students begin their post-secondary learning with skills related to exploring what is already known and progress through their academic studies to exploring what is totally unknown. The culture developed around research skill development within an educational institution should foster the development of enquiry and help students advance within



a community of practice (a scholarly community of disciplinary and multidisciplinary learners and researchers) from learning to use basic research skills to mastering advanced research skills.

The Adelaide RSDF was developed as "a conceptual tool for diagnosis and planning, promoting understanding and interpretation of both potential and realised student research skill development" (Willison & O'Regan, 2007, p.401). Its developers believed that "a holistic, consistent, explicit approach to developing research skills" would be of benefit to all those involved in the teaching and learning processes, including instructional designers, library staff, faculty and students (Willison & O'Regan, 2007, pp.394, 398).

The facets of research skill development can be viewed through a lens of Bloom's taxonomy to demonstrate that students move along a continuum in which they:

- embark on inquiry and so determine a need for knowledge/understanding
- find/generate needed information/data using appropriate methodology
- critically evaluate information/data and the process used to find/generate that information/data
- organize information collected/generated
- synthesize and analyze and apply new knowledge,
- communicate knowledge, understanding, and the processes used to generate it, with an awareness of ethical, social, and cultural issues.

Source: https://www.adelaide.edu.au/rsd/framework/explanation/

These facets of research make up the vertical axis on the Adelaide Research Skill Development Framework. The horizontal axis of the framework describes the level of student autonomy. In the original framework, this axis had five levels of student autonomy that were differentiated by the degree of "openness" of the process and the degree to which the resolution of questions integrates existing knowledge and generates new knowledge (Figure 3).

In the resulting rubric with six facets of research and five levels of autonomy, students can be viewed as moving from a low degree of autonomy (students working on a closed inquiry, requiring structure and guidance) to a high degree of autonomy (students working on an open inquiry). Inquiries prescribed by the instructor are "closed"; those that are directed by the student are "open".

FIGURE 3: The Adelaide Research Skill Development Framework

Research Skill Developme

A conceptual framework for the explicit, coherent, incremental and spiralling

Extent of Students' Auton

What characterises the difference between 'search' and 'research'? More searching and more data generation is just a 'biggasearch'! Research is **when students…**

Facet of Research

		Level 1 (Prescribed Research) Highly structured directions and modelling from educator prompt student research	Level 2 (Bounded Research) Boundaries set by and limited directions from educator channel student research	Level 3 (Scaffolded Research) Scaffolds placed by educator shape student independent research
a. Embark & Clarify Respond to or initiate research and clarify or determine what knowledge is required, heeding ethical/cultural and social/team considerations.	Curious	Respond to questions/tasks arising explicitly from a closed inquiry. Use a provided structured approach to clarify questions, terms, requirements and expectations.	Respond to questions/tasks required by and implicit in a closed inquiry. Choose from several provided structures to clarify questions, terms, requirements and expectations.	Respond to questions/tasks generated from a closed inquiry. Choose from a range of provided structures or approaches to clarify questions, terms, requirements and expectations.
b. Find & Generate Find and generate needed information/data using appropriate methodology.	Determined	Collect and record required information or 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.
c. Evaluate & Reflect Determine and critique the degree of credibility of selected sources and of data generated, and reflect on the research processes used.	Discerning	Evaluate information/data and reflects on inquiry process using simple prescribed criteria.	Evaluate information/data and reflect on the inquiry process using given criteria.	Evaluate information/data and inquiry process using criteria related to the aims of the inquiry. Reflect insightfully to improve own processes used.
d. Organise & Manage Organise information and data to reveal patterns and themes, and manage teams and research processes.	Harmonising	Organise information/data using prescribed structure. Manage linear process provided.	Organise information/data using a choice of given structures. Manage a process which has alternative pathways.	Organise information/data using recommended structures. Manage self-determined processes with multiple possible pathways.
e. Analyse & Synthesise Analyse information/data critically and synthesise new knowledge to produce coherent individual/team understandings.	Creative	Analyse and synthesise information/data to reproduce existing knowledge in prescribed formats. **Ask emergent questions of clarification/curiosity*.*	Analyse and synthesise information/data to reorganize existing knowledge in standard formats. **Ask relevant, researchable questions emerging from the research*.*	Analyse and synthesise information/data to construct emergent knowledge. **Ask rigorous, researchable questions based on new understandings*.*
f. Communicate and Apply Write, present and perform the processes, understandings and applications of the research, and respond to feedback, accounting for ethical, social and cultural (ESC) issues.	Constructive	Use mainly lay language and prescribed genre to demonstrate understanding for lecturer/ teacher as audience. Apply to a similar context the knowledge developed. Follow prompts on ESC issues.	Use some discipline-specific language and prescribed genre to demonstrate understanding from a stated perspective and for a specified audience. Apply to different contexts the knowledge developed. Specify ESC issues.	Use discipline-specific language and genres to demonstrate scholarly understanding for a specified audience. Apply the knowledge developed to diverse contexts. Specify ESC issues in initiating, conducting and communicating.

… spiral through the facets, adding degrees of rigour and discernment as they dig and delve.

Research Skill Development (RSD), a conceptual framework for Primary school to PhD, developed by John Willison and Kerry O'Regan ©, October, 200

** Framing researchable questions often requires a high degree of guidance and modelling for students and, initially, may need to be scaffolded as an out*

initiate research (Facet A, Levels 4 & 5).* The perpendicular font reflects the drivers and emotions of research. Framework, resources, learning r

ent Framework

www.rsd.edu.au

development of students' research skills

omy

Level 4 (Student-initiated Research) Students initiate the research and this is guided by the educator	Level 5 (Open Research) Students research within self-determined guidelines that are in accord with discipline or context.
**Generate questions/aims/ hypotheses framed within structured guidelines*.*	**Generate questions/aims/ hypotheses based on experience, expertise and literature*.*
Collect and record self-determined information/ data from self-selected sources, choosing an appropriate methodology based on structured guidelines.	Collect and record self-determined information/data from self-selected sources, choosing or devising an appropriate methodology with self-structured guidelines.
Evaluate information/data and the inquiry process comprehensively using self-determined criteria developed within structured guidelines. Reflect insightfully to refine others' processes.	Evaluate information/data and inquiry process rigorously using self-generated criteria based on experience, expertise and the literature. Reflect insightfully to renew others' processes.
Organise information/data using student-determined structures, and manage the processes, within the parameters set by the guidelines.	Organise information/data using student-determined structures and management of processes.
Analyse and create information/data to fill knowledge gaps stated by others.	Analyse and create information/data to fill student-identified gaps or extend knowledge.
Use discipline-specific language and genres to address gaps of a self-selected audience. Apply innovatively the knowledge developed to a different context. Probe and specify ESC issues in each relevant context.	Use appropriate language and genre to extend the knowledge of a range of audiences. Apply innovatively the knowledge developed to multiple contexts. Probe and specify ESC issues that emerge broadly.

6/November, 2012. Facets based on: ANZIIL (2004) Standards & Bloom's et al (1956) Taxonomy.
come of the researching process (Facet E, Levels 1-3). After development, more students are able to
modules and references available at http://www.rsd.edu.au. For info: john.willison@adelaide.edu.au

According to Willison and O'Regan (Willison & O'Regan, 2007; Willison, 2009), the RSDF may be used pedagogically for:

Making explicit the development of undergraduate research skills

- The RSDF clearly explains to teachers, instructional designers, and students what research skills are being taught.

Diagnosing research skill competence

- The RSDF provides a framework to evaluate assignments with which students may be having problems — have the required skills been scaffolded into previous courses?

Strengthening student research skill development and consequently academic competence and performance by

- improving students' discipline-specific skills
- improving students' generic skills
- raising students' understanding and awareness of the importance of research

Assessing the efficacy of pedagogical techniques by evaluating

- improvement in students' discipline-specific skills
- how former students, now in the workforce, perceive their research skills

Adapted from: https://www.adelaide.edu.au/rsd/framework/explanation/

JIBC STUDENT RESEARCH SKILLS DEVELOPMENT FRAMEWORK

The JIBC Student Research Skills Development Framework was developed for the Justice Institute of British Columbia to help guide the research skills development of its students, facilitate student learning, and promote student success.

Student research and the development of student research skills are increasingly important components of JIBC courses and programs. The intent of this initiative is to provide guidance to JIBC course developers and instructors who are creating and implementing student research activities.

Under the direction of Dr. Greg Anderson, a working group developed the JIBC Student Research Skills Development Framework to be adopted across all relevant programming at JIBC. The working group consisted of instructors and curriculum development personnel from all JIBC schools as well as Graduate Studies, Applied Research, and the Centre for Teaching, Learning and Innovation. The group analyzed existing student research projects and examined student research frameworks from various sources. The JIBC framework is based on a very popular research skills framework from the University of Adelaide.

The JIBC Student Research Skills Development Framework identifies expectations and criteria for assessment at the individual course level, diploma level (second year), and bachelor's degree level (fourth year). The framework sequences and provides experiential scaffolding that ensures that students effectively develop research skills appropriate to their academic level and course outcomes. The model provides guidance on overall structure, development of research questions, finding and generating knowledge, evaluating and reflecting, organizing, analyzing, synthesizing, and communicating research findings. In lower-level courses, students function within a fairly controlled environment with the goal of gaining experience in using relevant research skills and approaches. In upper-level courses, students exercise more autonomy in developing their topics and choosing resources, approaches, and methods of dissemination.

The use of this framework (Table 4) will ensure consistency in the development of student research skills and expectations across all JIBC program areas. The framework also provides a foundation for further development of research capabilities when students enter graduate-level programs.

TABLE 4: JIBC Student Research Skills Development Framework

	Course-based assignments	Lower-level capstone	Upper-level capstone
	Prescribed research Highly structured directions and models for student research are provided by the instructor. Topic and process is instructor driven.	**Bounded research** Boundaries for topics and processes are set by the instructor limiting the student research, although students maintain some autonomy.	**Scaffolded research** Guiding structure is provided from the program area while the lead faculty shapes the independent student research.
Embark and Clarify	Respond to questions/tasks arising explicitly from a closed inquiry. Use a provided structured approach to clarify questions, terms, requirements, and expectations.	Respond to questions/tasks required by and implicit in a closed inquiry. Choose from several provided structures to clarify questions, terms, requirements, and expectations.	Generate questions/aims/hypotheses within structured guidelines. Choose from a range of provided structures or approaches to clarify questions, terms, requirements, and expectations.
Find and Generate	Collect and record required information or data using a prescribed methodology from a prescribed source in which the information/data is clearly evident.	Collect and record required information/data from self-selected sources using one of several prescribed methodologies.	Collect and record required information/data from self-selected sources using one of several prescribed methodologies.
Evaluate and Reflect	Evaluate information/data and reflect on inquiry process using simple prescribed criteria.	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 inquiry process using criteria related to the aims of the inquiry. Reflect insightfully to improve own processes used.
Organize and Manage	Organize information/data using prescribed structure. Manage linear process provided.	Organize information/data using a choice of given structures. Manage a process that has alternative pathways.	Organize information/data using recommended structures, with some student-determined choice of structures. Manage self-determined research process with multiple possible pathways within the parameters set by the structures.
Analyze and Synthesize	Analyze and synthesize information/data to reproduce existing knowledge in prescribed formats. Ask emergent questions of clarification/curiosity.	Analyze and synthesize information/data to reorganize existing knowledge in standard formats. Ask relevant, researchable questions emerging from the research.	Analyze and synthesize information/data to construct emergent knowledge. Ask rigorous, researchable questions based on new understandings.
Communicate and Apply	Use mainly lay language and prescribed genre to demonstrate understanding for lecturer/instructor as audience. Apply the knowledge developed to a similar context. Follow prompts on ethical, social, and cultural issues.	Use some discipline-specific language and prescribed genre to demonstrate understanding from a stated perspective and for a specified audience. Apply the knowledge developed to different contexts. Specify ethical, social, and cultural issues.	Use discipline-specific language and genres to demonstrate scholarly understanding for a specified audience. Apply the knowledge developed to diverse contexts. Specify ethical, social, and cultural issues in initiating, conducting, and communicating the research.

Appendix A (for diploma courses) and Appendix B (for bachelor's level courses) provide an overview of the model with respect to students and faculty to help guide instructors and curriculum developers who are creating research-based courses and activities.

- The column "What this means to the instructor" advises how to apply the criteria in the JIBC Student Research Skills Development Framework to create assignments at different levels (certificate, diploma, and undergraduate degree).
- The column "What this means to the student" explains what the student should do.

All of this information can be incorporated into student instructions or grading rubrics as parts of a course syllabus or a course outline.

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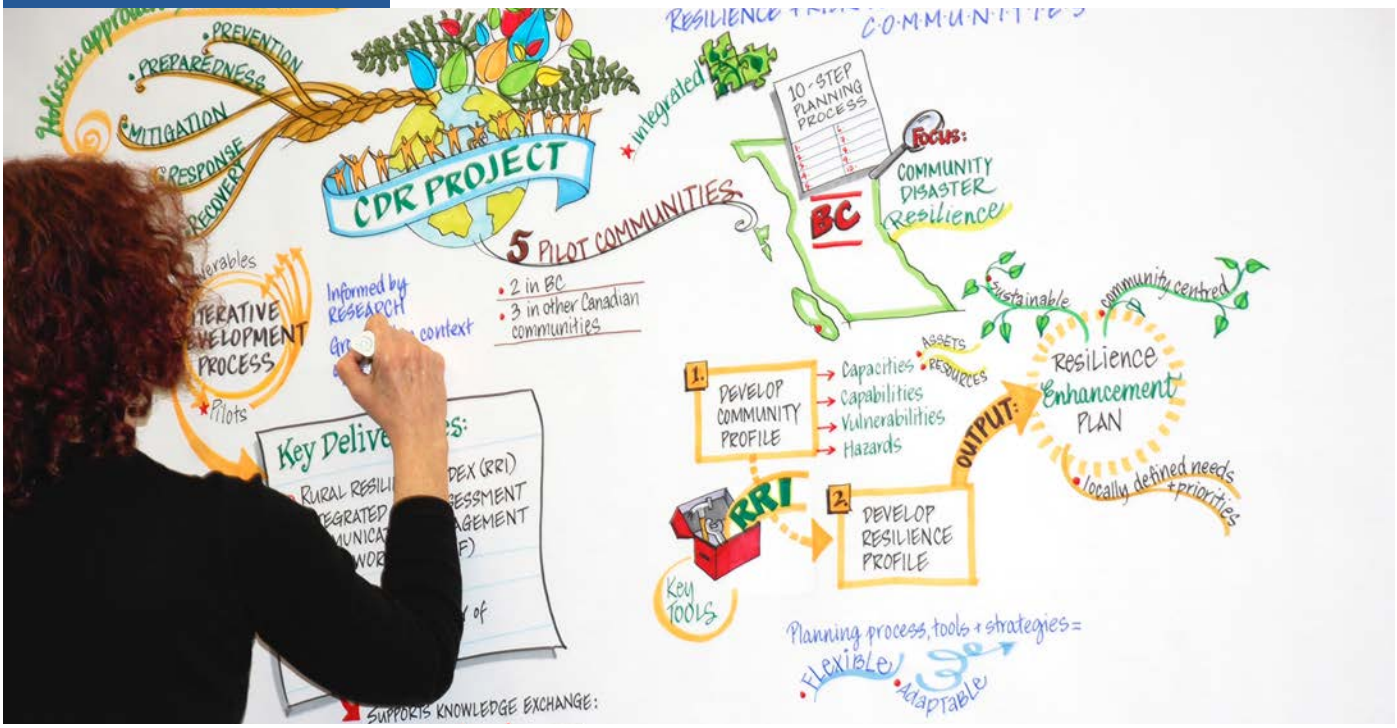
APPENDIX A: LOWER-LEVEL APPLIED RESEARCH PROJECT CAPSTONE: INSTRUCTOR/STUDENT EXPECTATIONS

	Criteria	What this means to the instructor	What this means to the student
	Boundaries set by educator, with limited directions to channel student research	Assignments should provide sufficient structure for students to focus on PRACTICE DOING research rather than FIGURING OUT how to do the research itself. Channel the students' efforts into applying knowledge gained in one context to answer questions or provide context to problems within their own discipline or area of study.	At this level, you are learning how to follow standard research processes and write within expected formats and structures. Your goal is to apply knowledge from a variety of sources to answer a problem or explore and answer questions within your own discipline or area of study. You will be provided with a considerable amount of structure to guide your efforts.
Embark and Clarify	Respond to questions/tasks required by and implicit in a closed inquiry. Choose from several provided structures to clarify questions, terms, requirements, and expectations.	Provide the main body of the question to the students. You may provide more than one option and allow the students to modify the questions to suit their context. At this level, the intent is to provide or limit the breadth and depth of the question (closed inquiry). You may provide an overall structure or a choice of structures to the students.	Assignments at this level are "closed inquiries". You will be given topics or questions to explore, but you will be able to adapt or modify the questions to suit your own discipline or area of study. The assignment will ask you to work within a common research and reporting structure.

	Criteria	What this means to the instructor	What this means to the student
Find and Generate	Collect and record required information/data from self-selected sources using one of several prescribed methodologies.	Provide one or more methodologies for the students to work from, but these should be forms they are familiar with. Allow them to choose their own sources and search strategies, but you may provide guidance and suggestion to them. Students will be using sources that may not be directly related to their topic and will be interpreting the data within the context of their question.	You are expected to practice using one of the research methodologies you have studied or that you been provided with. You should look for resources outside the material supplied in the course materials and readings. You will be expected to relate and adapt the information you find to the context of your research question.
Evaluate and Reflect	Evaluate information/data and inquiry process using criteria related to the aims of the inquiry. Reflect insightfully to improve own processes used.	Expect students to justify their choices of data and information and explain the relationship of the data and information to the research question. Ask them to identify the strengths and weaknesses in their approach and what they might do differently in the future.	You will be expected to document and justify your process for obtaining, assessing, and choosing information and data. You should be ready to identify what worked and what you would do differently in the future.
Organize and Manage	Organize information/data using a choice of given structures. Manage a process that has alternative pathways.	Provide one or more processes for structuring, analyzing, and presenting the information. The intent at this level is for students to practise using common/accepted strategies, so give them models to work from.	You are expected to apply a process or format given to you by your instructor for structuring, analyzing, and presenting your information and findings.
Analyze and Synthesize	Analyze and synthesize information/data to reorganize existing knowledge in standard formats. Ask relevant, researchable questions emerging from the research.	At this level, expect students to do more than present relevant information. They should organize, analyze, and synthesize the information in a way that answers and addresses the research question. They are not expected to generate new insights or address knowledge gaps, but they should be able to evaluate the existing knowledge on the topic.	Your analysis should go beyond simply listing the information that you find. You are expected to analyze and synthesize the existing knowledge about the topic in relation to your research question. You should be able to describe and evaluate what is known about your object of study.
Communicate & and Apply	Use some discipline-specific language and prescribed genres to demonstrate understanding from a stated perspective and for a specified audience. Apply the knowledge developed to different contexts.	Specify the context for which the students are writing — who their audience is, what the audience's background/knowledge is of the topic, and what perspective the students should be working from.	You are writing to a defined audience with a known background. This means that you can assume that the audience has some knowledge of the discipline/area of research and that you can use terminology and language common in the field. Your work should be written so that it is understandable and useful to your defined audience.



APPENDIX B: UPPER-LEVEL APPLIED RESEARCH PROJECT CAPSTONE: INSTRUCTOR/STUDENT EXPECTATIONS

	Criteria	What this means to the instructor	What this means to the student
	Guided structure from the program area and the lead faculty shapes independent student research.	Your assignments should provide sufficient structure for students to focus on transitioning from the PRACTICE of DOING research to FIGURING OUT how to do the research itself. Your goal is to channel the students' efforts into applying selected research practices to knowledge gained in one context to answer questions or provide context to problems within their own discipline or area of study.	At this level, you are learning how to apply standard research processes and write within varied project format choices and structures. Your goal is to apply knowledge from a variety of sources to answer a problem or explore and answer questions within your own discipline or area of study. Although you will be provided with structure to guide you, it will require you to have some input on originality of topic and research focus.

	Criteria	What this means to the instructor	What this means to the student
Embark and Clarify	Generate questions/aims/ hypotheses within structured guidelines. Choose a range of provided structures or approaches to clarify questions, terms, requirements, and expectations.	Provide a number of different research questions for students to choose from. Allow students to modify or completely change the questions to suit their topic area. The intent is to provide or enable a breadth and depth of research questions. You may provide an overall structure or a choice of structures to the students.	Assignments at this level are semi-structured inquiries — you will be given some ideas or opportunities to think of topics in your area of interest. You will be able to adapt or modify the questions to suit your own particular discipline or area of study. The project will ask you to work within a selection of common research and reporting structures.
Find and Generate	Collect and record required information/data from self-selected sources using one of several prescribed methodologies.	Ensure that common research methodologies are available to and understood by students. Allow them to choose their own sources and search strategies, but you may provide guidance and suggestions to them. The students will be using sources that may not be directly related to their topic and will be interpreting the data within the context of their question.	Adopt one of the research methodologies you have studied or are provided with. You will be expected to explain the rationale for your decision. You should look for resources outside the material supplied in the course materials and readings. You will be expected to relate and adapt the information you find to the context of your research question.
Evaluate and Reflect	Evaluate information/data and inquiry process using criteria related to the aims of the inquiry. Reflect insightfully to improve own processes used.	Expect students to justify their choices of data and information and explain the relationship of the data and information to the research question. Ask them to identify the strengths and weaknesses in their evaluative approach and what they might do differently in the future.	You will be expected to document and justify your process for obtaining, assessing, and choosing information and data. Identify what worked or did not work and what you might do differently in the future.
Organize and Manage	Organize information/data using recommended structures, with some opportunity for student-determined choice of structures. Manage a self-determined research process with multiple possible pathways within the parameters set by the structures.	Provide students with a select range of processes for structuring, analyzing, and presenting the information. Ask students to explain how using different processes would affect research results.	You are expected to apply a process or format you have discussed with your instructor for structuring, analyzing, and presenting your information and findings. As well, you will be required to explain how using alternative processes would affect your research results.

	Criteria	What this means to the instructor	What this means to the student
Analyze and Synthesize	Analyze and synthesize information/data to construct emergent knowledge. Ask rigorous, researchable questions based on new understandings.	Ask students to organize, analyze, and synthesize the information in a way that answers and addresses the research question(s) and builds or develops ideas and knowledge. Tell students that they are expected to generate unique, new, or supported insights or address knowledge gaps, but they are not expected to generate completely new knowledge or theory on the topic.	Your analysis should go beyond simply listing the information that you find. You are expected to analyze and synthesize the existing knowledge about the topic in relation to your research questions. Your analysis and synthesis will generate new questions or reveal gaps in knowledge and explore new ideas or ideas that have been supported or explored elsewhere.
Communicate and Apply	Use discipline-specific language and genres to demonstrate scholarly understanding for a specified audience. Apply the knowledge developed to diverse contexts. Identify issues related to initiating, conducting, and communicating the research.	Specify the interpretive and theoretical contexts for which the students are writing — who their audience is, what their background/knowledge of the topic is, and what perspective the students should be working from. Ensure that students have critically examined their own research process and writing in their presentation.	You are writing to a defined audience with a known background. This means that you can assume that they have some knowledge of the discipline/area of research and that you can use terminology and language common to the field. Your report should be written so that it is understandable and useful to your defined audience. Also, you will need to critically evaluate your research process and identify potential new ideas and areas for further research.

APPENDIX C: LOWER-LEVEL APPLIED RESEARCH PROJECT CAPSTONE: EVALUATION RUBRIC

This rubric provides a basis for capstone report evaluation. It also provides information related to the components of a well-crafted report. All source references should conform to the JIBC APA reference style. The rubric reflects the requirements of the JIBC Student Research Skills Development Framework.

	Exceptional (____ marks)	Well done (____ marks)	Meets expectation (____ marks)	Needs improvement (____ marks)
Embark and Clarify Overall impression and question clarification	Student directly and competently addresses main question or issue within the context provided (closed inquiry). Student complies fully and works within the common research and reporting structure as directed. Student completely integrates and applies the skills, knowledge, and concepts developed throughout the program.	Student competently addresses main question or issue within the context provided (closed inquiry). Student adequately integrates and applies the skills, knowledge, and concepts developed throughout the program.	Student addresses main questions or issues within the context provided (closed inquiry). Student attempts to integrate and apply the skills,knowledge, and concepts developed throughout the program.	Student report does not address main question or issue within the context provided (closed inquiry). Student has not applied knowledge acquired from the program.

	Exceptional (____ marks)	Well done (____ marks)	Meets expectation (____ marks)	Needs improvement (____ marks)
Find and Generate Rationale for selecting sources and quality of information brought as evidence	Student clearly identifies and documents the methods used to locate a variety and range of sources of information — scholarly journals, books, websites, etc. Detailed explanation provided for the rationale used for selecting the sources, including currency, authority, scholarly work, appropriate licensed databases, etc. (for reliability, accuracy, and validity).	Student documents and provides evidence from a variety and range of sources of information — scholarly journals, books, websites, etc. Some explanation provided for the rationale used in selecting the sources, including currency, authority, scholarly work, appropriate licensed databases, etc. (for reliability, accuracy, and validity).	Student uses an adequate number and variety of sources but provides no rationale for selecting the sources used.	Student uses only minimal sources or only Internet sources and provides no rationale for selecting the sources used.
Evaluate and Reflect	Student competently discusses the quality of information brought as evidence, interprets the data within the context of the project, and fully integrates the evidence to address the research question in details. Student identifies and justifies criteria for evaluating the information found and explains the procedure used for analyzing the sources. Student reflects insightfully to improve approach used.	Student provides adequate discussions of the quality of evidence, interprets the data within the context of the project, and shows how the evidence is integrated to address the research question. Student provides justification for selecting and choosing information and data. Student identifies strengths and weakness of approach used.	Student provides some discussion of the quality of evidence presented and includes brief interpretation of the data; however, the reader needs to reconstruct the interpretation from the text. Student provides some justification and criteria for selecting and evaluating information.	Student makes little or no attempt to interpret the data nor integrate the evidence to address the research question. No criteria for selecting and evaluating information provided.
Organize and Manage	Research report follows the recommended model for structuring, analyzing, and presenting the information. In addition to meeting the requirements, the report excels in organization and presentation of ideas related to the research topic. Writing flows smoothly from one idea to another. Transitions help establish a sound scholarly argument and aid the reader in following the writer's logic.	Research report follows recommended model for structuring, analyzing, and presenting the information.	Research report somewhat follows the recommended model for structuring, analyzing, and presenting the information.	Research report does not follow the recommended model for structuring, analyzing, and presenting the information. The report is poorly organized and difficult for the reader to follow.

	Exceptional (____ marks)	Well done (____ marks)	Meets expectation (____ marks)	Needs improvement (____ marks)
Analyze and Synthesize Ask emergent questions for clarification and curiosity	Student considers counter-evidence, or alternative interpretations of evidence, that could be used to refute or weaken his or her argument, and thoughtfully responds to it by providing comprehensive explanations. Student demonstrates an outstanding level of creativity. Student asks relevant, thoughtful, and researchable questions emerging from the research for clarification and curiosity.	Student acknowledges that counter-evidence or alternative interpretations exist, lists them fully, and provides effective and detailed explanations as to why his or her argument still stands. Student demonstrates some level of creativity, and presentation of analysis flows very well.	Student acknowledges some of the most obvious counter-evidence and alternative interpretations and provides adequate explanations in response to them. Student demonstrates a minimal level of creativity, but presentation of analysis flows fairly well.	Student offers little or no acknowledgement of counter-evidence or alternative interpretations. Presentation of analysis lacks creativity and flow.
Communicate and Apply	Report and other forms of communication (e.g., posters) have been spell-checked and contain no errors. All sentences are grammatically correct and clearly written. Technical terms are always explained. All information is accurate and up to date.	Report and other forms of communication (e.g., posters) have been spell-checked and contain no more than a few minor errors that do not adversely affect the reader's ability to understand the report. Technical terms are used and explained. All information is accurate and up to date.	Report and other forms of communication (e.g., posters) have been spell-checked but contain a few errors that do not affect readability. Technical terms are used but not fully explained.	Report and other forms of communication (e.g., posters) contain numerous grammatical errors and poor writing. Several words are misused, and technical terms are rarely explained.
Citations follow APA style	Student cites all evidence correctly and follows APA style of referencing.	Student cites most evidence correctly and follows APA style of referencing.	Student cites some evidence correctly and generally follows APA style.	Some sources are unreferenced, incomplete, or inaccurately cited.

References

JIBC Student Research Skills Development Framework 2015.

Bloom, B.S., and Krathwohl, D.R. (1984). Taxonomy of Educational Objectives. Boston, MA: Allyn and Bacon.

APPENDIX D: UPPER-LEVEL APPLIED RESEARCH CAPSTONE PROJECT: EVALUATION RUBRIC

This rubric provides a basis for capstone report evaluation. It also provides information related to the components of a well-crafted report. All source references should conform to JIBC APA reference style. The rubric reflects the requirements of the JIBC Student Research Skills Development Framework.

	Exceptional (____ marks)	Well done (____ marks)	Meets expectation (____ marks)	Needs improvement (____ marks)
Embark and Clarify Overall impression and question clarification	The question selected was appropriate and reflects the student's passion and interest. Student directly and competently addresses main question or issue and generates unique, new, or supported insights or addresses knowledge gaps in the focus area. Student integrates and applies the skills, knowledge, and concepts developed throughout the program. Student is able to synthesize knowledge in ways that draw meaningful conclusions.	The question selected was appropriate and reflects the student's passion and interest. Student directly addresses main question or issue and generates unique, new, or supported insights or addresses knowledge gaps in the focus area. Student integrates and applies the skills, knowledge, and concepts developed throughout the program and the integration of information was well done.	The question selected was appropriate and reflects the student's interest. Student addresses main question or issue and supported insights or addresses knowledge gaps in the focus area. Student attempts to integrate and apply the skills, knowledge, and concepts developed throughout the program.	Research report does not address main question or issue, and it is obvious that student has not applied knowledge developed throughout the program.

	Exceptional (____ marks)	Well done (____ marks)	Meets expectation (____ marks)	Needs improvement (____ marks)
Find and Generate Rationale for selecting sources and quality of information brought as evidence	Student clearly identifies and documents the methods used to locate a variety and range of sources of information — scholarly journals, books, websites, etc. Detailed explanation provided for the rationale used in selecting the sources, including currency, authority, scholarly work, appropriate licensed databases, etc. (for reliability, accuracy, and validity).	Student documents and provides evidence from a variety and range of sources of information — scholarly journals, books, websites, etc. Some explanation provided for the rationale used in selecting the sources, including currency, authority, scholarly work, appropriate licensed databases, etc. (for reliability, accuracy, and validity).	Student uses an adequate number and variety of sources but provides no rationale for selecting the sources, including currency, authority, scholarly work, appropriate licensed databases, etc. (for reliability, accuracy, and validity).	Student uses only minimal sources or Internet sources and provides no rationale for selecting the sources.
Evaluate and Reflect	Student competently discusses the quality of information brought as evidence, interprets the data within the context of the project, and fully integrates the evidence to address the research question in detail. Student provides detailed documentation and justification for the process for obtaining, assessing, and choosing information and data. Student reflects on the process for self-selecting sources and explains what worked, what did not work, and what could be done differently in the future.	Student provides adequate discussion of the quality of evidence, interprets the data within the context of the project, and shows how the evidence is integrated to address the research question. Student provides documentation and justification for the process for choosing information and data. Student includes some reflection on the process for selecting sources.	Student provides some discussion of the quality of evidence and includes brief interpretation of the data; however, the reader needs to reconstruct the interpretation from the text. Documentation and justification for the process for choosing information and data were adequate and included some reflection.	Student makes little or no attempt to interpret the data nor integrate the evidence to address the research question. Minimal documentation and reflection provided.

	Exceptional (____ marks)	Well done (____ marks)	Meets expectation (____ marks)	Needs improvement (____ marks)
Organize and Manage	Research report follows the recommended model for structuring, analyzing, and presenting the information and findings. Introduction/background lays out main argument and gives an outline of what the reader can expect in the research report. The discussions and findings bring everything together, acknowledge potential shortcomings of the report, and give the reader a sense of what further work might be done to advance the subject matter described in the research report. Student competently explains alternative models and processes.	Research report follows recommended model for structuring, analyzing, and presenting the information. The introduction/ background lays out the main argument and provides enough information to give the reader an adequate idea of what to expect. The discussion and findings summarize the main argument and evidence well. Student explains alternative models and processes.	Research report somewhat follows the recommended model for structuring, analyzing, and presenting the information The introduction/ background gives the reader an idea of what to expect in the report, and generally lays out the main argument. The discussions and findings are clear and sufficient. Student briefly explains alternative models and processes.	Research report does not follow the recommended model for structuring, analyzing, and presenting the information. Report is poorly organized and difficult for the reader to follow. Student provides little or no explanation regarding alternative models and processes.
Analyze and Synthesize Ask rigorous, researchable questions based on new understandings	Student provides comprehensive and thoughtful analysis and synthesis of information and data to construct emergent knowledge in relation to the research question. Student provides compelling and accurate evidence and discusses the relevance of all pieces of evidence. Student demonstrates an outstanding level of creativity and generates unique and supported insights explored elsewhere in relation to the research question. Student reveals and addresses knowledge gaps and asks researchable questions based on new understandings. Presentation of analysis flows extremely well, and there are no gaps in reasoning.	Student provides thoughtful analysis and synthesis of information and data to construct emergent knowledge in relation to the research question. Student provides accurate evidence and clearly states the relevance of all pieces of evidence. There are no gaps in reasoning. Student demonstrates creativity and generates unique insights supported and explored elsewhere in relation to the research question. Student reveals and addresses knowledge gaps and asks researchable questions based on new understandings. Presentation of analysis flows very well.	Student analysis and synthesis of information and data is adequate and student is able to construct emergent knowledge in relation to the research question. Student provides evidence and identifies the relevance of some evidence. There are some gaps in reasoning. Student generates insights supported and explored elsewhere in relation to the research question. Student reveals and addresses some knowledge gaps and asks some researchable questions based on new understandings. Presentation of analysis flows fairly well, but the level of creativity is minimal.	Student analysis and synthesis of information and data is inadequate and student cannot construct emergent knowledge in relation to the research question. Student provides evidence but does not identify the relevance of some evidence to the research question. There are gaps in reasoning. Student demonstrates no insights supported and explored elsewhere in relation to the research question and does not address knowledge gaps nor ask researchable questions based on new understandings. Presentation of analysis lacks creativity and flow.

	Exceptional (____ marks)	Well done (____ marks)	Meets expectation (____ marks)	Needs improvement (____ marks)
Communicate and Apply	Student uses appropriate discipline-specific language to demonstrate scholarly understanding for specific audience. Report and other forms of communication (e.g., posters) have been spell-checked and contain no errors. All sentences are grammatically correct and clearly written. Technical terms are always explained. All information is accurate and up to date.	Student uses appropriate discipline-specific language to demonstrate scholarly understanding for specific audience. Report and other forms of communication (e.g., posters) have been spell-checked and contain no more than a few minor errors that do not adversely affect the reader's ability to understand the report. Technical terms are used and explained. All information is accurate and up to date.	Student generally uses discipline-specific language to demonstrate minimum scholarly understanding for specific audience. Report and other forms of communication (e.g., posters) have been spell-checked but contain a few errors that do not affect readability. Technical terms are used but not fully explained.	Student does not use discipline-specific language and demonstrates minimum scholarly understanding for specific audience. Report and other forms of communication (e.g., posters) contain numerous grammatical errors and poor writing. Several words are misused, and technical terms are rarely explained.
Citations follow APA style	Student cites all evidence correctly and follows APA style of referencing.	Student cites most evidence correctly and follows APA style of referencing.	Student cites some evidence correctly and generally follows APA style.	Some sources are unreferenced, incomplete, or inaccurately cited.

References

JIBC Student Research Skills Development Framework 2015

Bloom, B.S., and Krathwohl, D.R. (1984). Taxonomy of Educational Objectives. Boston, MA: Allyn and Bacon.

APPENDIX E: ENGAGING THE LIBRARY IN STUDENT RESEARCH SKILL DEVELOPMENT

The following guidelines provide instructors and students with a framework for incorporating library knowledge and research skills into their courses.

	Criteria	What this means to the Instructor	What this means to the Student
Lower Level Capstones	Boundaries set by and limited directions from educator channel student research	Your assignments should provide sufficient structure for the learner to focus on PRACTICE DOING research, rather than FIGURING OUT how to do the research itself. Your goal is to channel the students' efforts into applying knowledge gained in one context to answer questions or provide context to problems within their own (disciplinary) context.	At this level, you are learning how to follow standard research processes and write within expected formats and structures. Your goal is to apply knowledge from a variety of sources to answer a problem or explore and answer questions within your own context (the area or discipline within which you are studying). You will be provided with a fair bit of structure to guide your efforts.

	Criteria	What this means to the Instructor	What this means to the Student
Library	**Certificate Program, Year 1 Term 1**	The library collaborates with an instructor of ONE course which reaches all students in the Program.	Students are provided with a framework/guide in which to do their research. Students & Library build a relationship.
	Students attend orientation customized to subject area (in-class or webinar).	Instructors are encouraged to initiate this session with the Library. Students are aware of Library resources available to them specific to their subject area. Students are aware of the Learning Commons site for help with Writing/Study Skills	
	Diploma Program, Year 1 Term 1	See above, plus:	See above, plus:
	Students attend hands-on Library research session.	Librarian/Instructor work to make the Library research session relevant to a specific assignment/essay.	Student success is fostered as students get hands-on practice using the Library resources which are most relevant to their studies.
	Library APA Subject Guide is online.	Students are learning APA citation in their English course requirement. Instructors will receive essays with properly credited sources. Instructors can point students to Library and to Subject Guide for help.	Students receive consistent information on importance of citation & crediting sources. Students have the Library & Subject Guide for reference.

	Criteria	What this means to the Instructor	What this means to the Student
Library	**Diploma Program, Year 2, Term 1**		
	Information Literacy Tutorial (LIB 110) is required as part of participation mark.	LIB110 (Info Literacy Tutorial) is included in the Research Methods BlackBoard course as part of the participation mark. The Instructor & Library work together to ensure classes are enrolled in LIB110 and that students complete the tutorial. Instructors are supported by Library staff as students are introduced to concepts such as proper search strategies, evaluating sources, identifying differences between scholarly/ popular journal articles	Students learn key concepts that support their research and emphasize the importance of evaluating and crediting sources.
	Refworks: Citation Management Tool: hands-on session for students	Instructors receive essays with proper citation.	Students are provided with a tool (RefWorks) to organize their references for multiple assignments in folders. Using the basics of APA learned earlier, they can evaluate their RefWorks reference list for accuracy.
Upper Level Capstone	Guided structure from the program area and the lead faculty shapes independent student research.	Your assignments should provide sufficient structure for the learner to focus on transitioning from the PRACTICE of DOING research to FIGURING OUT how to do the research itself. Your goal is to channel the students' efforts into applying selected research practices to knowledge gained in one context to answer questions or provide context to problems within their own (disciplinary) context.	At this level, you are learning how to apply standard research processes and write within varied project format choices and structures. Your goal is to apply knowledge from a variety of sources to answer a problem or explore and answer questions within your own context (the area or discipline within which you are studying). While you will be provided with structure to guide you, it will require you to have some input on originality of topic and research focus.
Library	Courses link to LIB110- Information Literacy – FREE Online BB Tutorial.	Instructors will work with Library staff to incorporate tools such as the Research Methods Subject Guide into course work. Highlight LIB110 in Research Methods Subject Guide.	Students will utilize Research Methods resources in the Library that will provide practical and applicable guidance to students.
	Customized Library Review session for all CAPSTONE courses.	Instructors include a "value-added" service by providing this option to their students.	Student success is fostered by providing a review session specifically tailored to the CAPSTONE project.

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