

A Compendium of Data Sources for Use in SOTL-Based Inquiries –Doug Hamilton, Royal Roads University

(1a) Assessing Prior Knowledge, Recall and Understanding

Technique	Brief Description	Strengths	Limitations	Example
Minute Papers	Ask students at the end of a lesson or class to write down on index cards or scrap paper their responses to questions about the most important thing they have learned and/or questions they still have about the material introduced in the class .	<ul style="list-style-type: none"> • Can be used in a variety of teaching situations, e.g, lectures, seminars, lab sessions, field trips, exams, etc. • Provide timely data from a large group of participants • Is relatively quick and manageable to administer. • Can assist students in consolidating and synthesizing ideas. • Can be used at multiple points in a course to enable assessment over time. • Involve relatively little student effort to complete. 	<ul style="list-style-type: none"> • If over-used, can appear to be “gimmicky” to students • Care must be used to select questions that focus on assessing more than recall. 	Edwards (2006)

(1b) Assessing Critical Thinking

Technique	Brief Description	Strengths	Limitations	Example
Critical Thinking Rubric or Rating Scale	Develop a rating scale to measure selected dimensions and levels of critical thinking (e.g. recitation, exploration, understanding, and appreciation) of essays, online discussion postings, or journal entries. The reliability of the rating process can be enhanced by using “naive” raters to independently rate each posting or entry. Continue training of raters until desired inter-rater	<ul style="list-style-type: none"> • Can be used retrospectively to analyze existing postings, entries, and submissions. • Inter-reliability procedures and statistical techniques are well-established. • Provides independent analysis by a third party. • Rating and analysis process in non-intrusive. 	<ul style="list-style-type: none"> • Involves other trained analysts beyond the instructor. • Can be time-consuming because it is individually administered. • Without the use of a rigorous coding scheme, the results may not be reliably analyzed. • Adequate training time and clear instructions must be given to reach desired levels of reliability. 	Osborne et al. (2009) Keller (2008)

	reliability is reached.			
Peer Review and Calibrated Peer Review (CPR)	Use a web-based tool to assist students in authoring writing assignments and engage them in reviewing their peers' work. The process includes a "calibration phase" when students practise reviewing each other's work using an instructor-designed rubric as a guide.	<ul style="list-style-type: none"> • Repeated use of the CPR can provide instructors with evidence of growth in critical thinking and writing/reviewing skills. • Provides students with exemplars as well as guidelines for conducting peer review. • Can be used to assess skill development over time. • Data can be analyzed retrospectively. 	<ul style="list-style-type: none"> • Requires expertise in statistical data analysis. • Calibration process takes time to set up and implement effectively. 	Gunersel et al. (2008) Hachtmann (2005)

(1c) Assessing Synthesis and Creative Thinking

Technique	Brief Description	Strengths	Limitations	Example
Storyboards	Ask students to develop visual displays or maps that display their thinking over the length of a multi-day or multi-week project. Use participant-observation and ethnographic techniques to review the displays and students' reactions to the displays.	<ul style="list-style-type: none"> • Provides insight into the learning experience from a student's point of view in real time. • Can be documented by photographs and videos to aid in retrospective analysis. • Allows use of multiple media to communicate key learning insights. • Can be used by both individual and groups of students • Provides considerable freedom of expression of ideas and insights. 	<ul style="list-style-type: none"> • Without the use of a rigorous coding scheme, the results may not be reliably analyzed. • Instructions need to be sufficiently open-ended to enable creative displays of learning. 	Annerstedt et al., (2010)
Concept Maps	Ask students to use drawings or diagrams to illustrate the connections between concepts they are learning.	<ul style="list-style-type: none"> • Provides an observable or documented record of students' mental patterns of association. • Can be used to compare 	<ul style="list-style-type: none"> • Without the use of a rigorous and reliable coding scheme, the results may not be reliably analyzed. • Students with less developed 	Read (2008)

		<p>different students' representations and/or can be used to compare the same student's changes in mental representation over time.</p> <ul style="list-style-type: none"> • Easy to administer. • Can serve as valuable self-assessment techniques for students. • Assist in assessing deep learning because they can show the relationship between key concepts and prior knowledge. 	<p>graphic skills may not present maps that are as rich as others with more highly-developed skills.</p> <ul style="list-style-type: none"> • Students may require an example to clarify expectations of the "product". • Scoring protocols need be developed or selected judiciously to adequately document the richness of the representations. 	
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(1d) Assessing Problem Solving

Technique	Brief Description	Strengths	Limitations	Example
Think-Aloud Protocols	Ask students to say what they are thinking, doing, and/or feeling, as they complete a specific learning-related task.	<ul style="list-style-type: none"> • Provides insight into the learning experience from a student's point of view in real time. • Can be recorded via videos to aid in analysis. • Can be used retrospectively to replicate a learning experience. • Substantial research has documented effective administrative procedures and appropriate methodological processes. 	<ul style="list-style-type: none"> • Can be time-consuming because it is individually administered. • Without the use of a rigorous coding scheme, the results may not be reliably analyzed. • Expectancy issues and effects of reactivity may influence the quality of data provided by the participants. 	Bond (2006) Chaudhury (2004)

(1e) Assessing Skills in Application and Performance

Technique	Brief Description	Strengths	Limitations	Example
Application Essays	Ask students to develop one page compositions describing a real-life event and to use a single concept from class to analyze that experience. Results can be subjected to content analysis or qualitative coding techniques.	<ul style="list-style-type: none"> • Provide insight into students' potential application of knowledge to real-life situations. • Permits learning experience to be described in students' own words. • Approach can be applied to wide variety of situations and contexts. • Is immediately relevant to student's work. • Is usually easy to administer and analyze. • Multiple essays collected over time can give rich picture of growth in application-related skills. 	<ul style="list-style-type: none"> • Some students may find it difficult to generate effective applications of specific knowledge and skills with some further guidance. • Will involve direct feedback from instructor to students to be fully meaningful. • Will require a well-developed coding scheme during the analysis process. 	Jones et al. (2005)
Course Grades	Use total points a student earned in a course based on marks assigned to various assignments, tests/exams, participation activities.	<ul style="list-style-type: none"> • Serves as an outcome measure usually related to cognitive or behavioural performance. • Point totals can be disaggregated to compare performance across individual assignments. • Is very likely to already exist and needs no modification. 	<ul style="list-style-type: none"> • Point totals need to be correlated or compared to other measures in order to be meaningful. • May provide limited data unless access is granted to review actual assignments and grade student work. 	Russo and Benson (2005)

(2) Assessing Learner Attitudes, Perceptions and Values

Technique	Brief Description	Strengths	Limitations	Example
Self-Developed Questionnaire	Ask students to complete a multi-item questionnaire to gauge their perceptions of the impact of a particular instructional intervention or approach (e.g. student-faculty conferences)	<ul style="list-style-type: none"> • By using random sampling, a smaller group of respondents can be considered representative of a larger group. • Provide a means of collecting broadly-based input. • Gives respondents time to think before answering questions. • Ensure some degree of uniformity of the information collected. • Is usually easy to administer and score. 	<ul style="list-style-type: none"> • May "force" people to make certain responses. • Usually non-interactive—respondents cannot always seek further clarification of meaning or intent • People generally express themselves better orally than in written language. • Persuading people to value their own involvement and/or to complete the survey can be difficult. • May require some expertise in data entry and data analysis. • Limited control over the "faking" of responses. • Response rates are not always satisfactory. 	Kaufka (2010)

(3) Assessing Self-Awareness and Metacognition

Technique	Brief Description	Strengths	Limitations	Example
End of Term Reflective Paper	Ask students to write a short paper that takes stock of their experience related to a particular learning activity.	<ul style="list-style-type: none"> • Approach can be applied to wide variety of situations and contexts. • Questions in the paper can be flexibly determined. • Permits learning experience to be described in students' own words. 	<ul style="list-style-type: none"> • Instructor expectations may influence student responses. • Extent of gap between learning activity and written reflection may result in selective recall. 	Milner-Bolotin & Svinicki (2000)
Diaries and Journals	Ask students to document their learning experiences and reflect on the process and/or outcomes of learning.	<ul style="list-style-type: none"> • Can often provide a record of reflective thinking over time. • Can provide a rich record of experience if focused on the 	<ul style="list-style-type: none"> • Require high trust, low risk learning situations. • Quality of entries can be variable. 	Brown et al (1997)

		<p>reflection related to specific tasks.</p> <ul style="list-style-type: none"> • Can permit the sampling of various entries. 	<ul style="list-style-type: none"> • Require clear guidelines for entries because some students are not naturally “reflective”. 	
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(4) Assessing Student Engagement and Motivation

Use of Published Questionnaires and Inventories	Ask students to complete an inventory or questionnaire that has been developed by a third-party to measure and assess a particular construct or group of constructs, or, alternatively, access data from a questionnaire administered for another purpose (e.g. Course Experience Questionnaire, Reflections on Learning Inventory, Approaches to Studying Inventory, Learning Objectives Questionnaire).	<ul style="list-style-type: none"> • Instruments are already developed; validity and reliability analyses have been performed; and scoring may be completed by a third-party. • Allows possible comparisons with other research that has used the same instrument. • May permit adaptation and modification to best fit own teaching context. 	<ul style="list-style-type: none"> • Publisher may have restrictions on the administration and use of data. • Purpose of the instrument may not be consistent with purpose of your SOTL research. • Validity and reliability may be threatened if administration processes differ from a rigorously-maintained process. • Some instruments require additional costs of purchase, administration and scoring. • There may be time lags in receiving the results of the scoring and analysis. 	Norton (2009)
Use of Outcome Measures (Exams)	Use a randomized block experimental design scheme featuring treatment and control groups in multiple sections of the same course. The use of pre-post comparison measures help to control for instructor differences across multiple sections.	<ul style="list-style-type: none"> • By using a quasi-experimental control group, it provides a means of comparing performance between students receiving an intervention and those who do not. • Enables the calculation and use of “improvement scores” (differences between pre and post performance) to assess differences between 	<ul style="list-style-type: none"> • Ensure that the treatment being studied is the only variable of significance that differs between class sections. • Requires the coordinated efforts of multiple faculty members. • Can only be implemented in subjects and courses amenable to the use of pre-post measures of knowledge or skill. 	Yourstone, Krave and Albaum (2008)

		treatment and control groups.		
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(5) Assessing Student Study Skills, Strategies, and Behaviours

Technique	Brief Description	Strengths	Limitations	Example
(Diagnostic) Learning Log	Ask students to keep an ongoing log of their reactions, responses, thoughts and/or feelings related what they are learning in specific classes or sessions. Students can be encouraged to use this information at regular intervals to reflect on their learning and to diagnose their own strengths and weaknesses.	<ul style="list-style-type: none"> • Provides insight into students' skills in identifying their own learning-related strengths and weaknesses. • Helpful for understanding and documenting students' meta-cognitive skills. • Can be used in a wide variety of learning situations. • Helpful for gathering information from students related to the synthesis of ideas across different courses, learning situations, etc. 	<ul style="list-style-type: none"> • Introduces another assignment for students; therefore it needs to be seen as meaningful and relevant. • Quality of entries can be variable. • Require clear guidelines for entries because some students are not naturally "reflective". 	Dannels et al. (2003) Cross (1998)

(6) Assessing Student Reactions to Instruction

Technique	Brief Description	Strengths	Limitations	Example
Focus Groups	Use interviews with a small gathering of people about their reactions, perceptions, and/or feelings about experiencing a particular instructional approach. A facilitator is used to engage participants in discussing their viewpoints about specific issues related to the instructional strategy.	<ul style="list-style-type: none"> • Participants can share their views while listening to the views of others. • Highly efficient at gathering detailed, qualitative data from several people at once • Provides an opportunity for a facilitator to seek clarification of views. • Is extremely flexible in 	<ul style="list-style-type: none"> • Demands strong facilitation and recording skills. • May be time-consuming to conduct and to analyze resulting information. • A limited number of questions can be asked in a reasonable length of time. • Discussion can be de-railed by overly-exuberant 	McGuire, Lay, and Peters (2009) Moustakim (2007)

		<p>terms of implementation.</p> <ul style="list-style-type: none"> • Allows a facilitator to preface the interview with rationale for the process to clarify information provided or to engage support from participants. • Relatively easy to assess the degree of support or consensus. • May be action-oriented (can provide immediate feedback). • Highly suitable for eliciting "off the cuff" perspectives. 	<p>participants or unanticipated group dynamics.</p> <ul style="list-style-type: none"> • To be most effective, interviews demand the involvement of two people: a facilitator and a recorder • Differences in group leaders or in group composition may lead to unanticipated differences in the results from separate groups. • Demands substantial time for the analysis of responses. 	
Participant-Observation	Use systematically collected direct behavioural evidence of what's happening in a specific setting such as a classroom, fieldwork, practicum setting, etc. Students could be actively involved as participant-observers as well.	<ul style="list-style-type: none"> • Gathers information on what actually in happening—not what people say is happening. • Takes into consideration the specific context of behaviours. • Can be used to check perceptions or intuitions to see if they match reality. • Data from observations can easily complement the data gathered from other sources. 	<ul style="list-style-type: none"> • Presence of observers can influence behaviour in the specific setting. • Often require the development of a detailed "guide" to ensure observations are valid and reliable, or as, in the case of various qualitative research methodologies, require protocols for ensuring authenticity and credibility. • Demand an intensive use of time for developing observation guides and the training of observers. • Demand substantial time for conducting sufficient numbers of observations. 	Langan & Davidson (2005)

(7) Assessing Teamwork and Collaborative Learning

Technique	Brief Description	Strengths	Limitations	Example
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Poster Sessions and Exhibitions	Ask students to develop a visual summary of their learning that can be used to document group work in projects, laboratories and studio work.	<ul style="list-style-type: none"> • Assessment can be accomplished quickly • Can be use for individual as well as group assessment • Permits peer-based assessment as well as instructor assessment. • Provide a succinct record of experiences, products and results. 	<ul style="list-style-type: none"> • Can over-emphasize presentation format compared to content. • Require physical space for presentation and review. 	Brown et al (1997)
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(8) Assessing Stages of Development in Learning

Technique	Brief Description	Strengths	Limitations	Example
One-to-One Interviews	Ask students to retrospectively reflect on their learning experiences over time in a practicum situation or other formalized learning process. Complement the interviews with other sources of evidence such as logbooks, course assignments, reflective journals, etc. Consider conducting multiple interviews with the same participants at pre-established intervals.	<ul style="list-style-type: none"> • Provides detailed and insightful information that would be difficult to obtain using other methods. • Allows for clarification of misunderstood questions. • Allows the researcher to explain in detail the purpose of the interview. • Permits central or key individuals to have input into the inquiry process. • May complement or supplement the data collected through other means. 	<ul style="list-style-type: none"> • Conducting individual interviews can be time-consuming. • Anonymity of participants can be compromised as a result of the specific nature of the information they possess. • Demands the involvement of at least one researcher who possesses effective interviewing skills. 	Gimbert (2002)

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