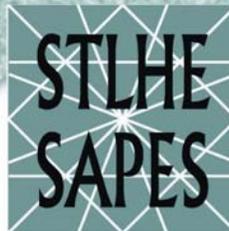


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A Grammar for Inquiry: Linking Goals and Methods in a Collaboratively Taught Social Sciences Inquiry Course

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Summary

This paper documents the experience of seven faculty members from six different social science disciplines at McMaster University who have come together to think deeply about the needs of first year students and to act directly on that thinking through the development and teaching of a first year *Inquiry* course. Over the past three years, as a collaborative group, we have experimented with the course, carefully monitoring the results and refining our approach accordingly. Ultimately, we have translated a set of ideals into very specific objectives, and then have tailored student activities in order to achieve those objectives in a way that can be both witnessed and, we believe, reproduced.

This paper also outlines a pedagogical model, a "grammar" for teaching *Inquiry*, and an *orientation* to learning, which is based on open-minded and critical exploration of complex, student-driven questions. The grammar, like that of a language, represents an "ideal" model—the intended learning outcomes and practical objectives for an introductory level course. The model has been abstracted from our collective experience in developing and teaching *Inquiry 1SS3*, a team-formulated and collaboratively taught course open to all first year social science students at McMaster University. Extensive time commitments outside the classroom were required by each instructor as we worked together to develop a common course outline, a core set of readings, a set of workshops, and appropriate ways of encouraging skill development. At the moment of writing, the course has undergone three years of development and five iterations of teaching, reflection and tinkering (and is now being adopted by a different group of instructors teaching *Inquiry* with a different substantive content). This interpretive analysis supplements the findings from our quantitative evaluation research designed to assess the effectiveness of these teaching methods on student learning (see Cuneo et al, 2000). Though we believe that *Inquiry* must be situated in a content area, and that our *Inquiry* project is inextricably linked to the theory and methods of the social sciences, we believe this Grammar of *Inquiry* is widely replicable.

The Institutional Context

Inquiry in the Social Sciences developed at a university with a reputation for innovative teaching in a climate of widespread and growing concern about the quality of undergraduate education (see, for example, Boyer Commission on Educating Undergraduates in the Research University, 1998). It benefits from an administrative environment that values interdisciplinary approaches.

In this context, the initiative for developing *Inquiry* courses emerged out of a number of "new direction" workshops on improving undergraduate education involving senior academic administrators, faculty, student, and staff. The perceived need was to provide first-year students with an opportunity to develop critical thinking and other skills for university studies, at the same time preparing them for career and employment opportunities. It was assumed that this would best be accomplished in a small class environment (many first year courses at the time exceeded 300 students), which would foster rapport between instructor and student, student-to-student interaction, and deeper levels of learning. These ideas resulted in a commitment by the three deans of Humanities, Science and Social Sciences to launch first-year inquiry courses beginning in 1998-99.

However, the idea to establish skills-oriented inquiry courses met with, and continues to meet with, some opposition. Objections have included: scarce teaching resources should not be diverted from disciplinary and other academic program offerings; an inquiry course is not necessary in a research-intensive university where inquiry is part of almost every course; and, limited enrolment first year inquiry classes divert attention from the need to reduce other first year class sizes.

On the other hand, McMaster has a history of, and reputation for, innovations in teaching, for example, problem-based learning in the health and medical sciences. *Inquiry* courses had already proved to be successful in such "elite" programs at McMaster as the Engineering and Society program and the interdisciplinary theme schools, which have rigorous admission standards. However, while we were building on a history of experimentation with *Inquiry* (e.g. Hudspith n.d., Hudspith and Jenkins, 2001), our inquiry initiative in the three largest Faculties was quite revolutionary in its intent to provide opportunities for a wider range of students to take a course that would teach them a broad range of intellectual and academic skills.

Goals of the Project

The instructors who volunteered to develop *Inquiry 1SS3* had a great deal of latitude in determining the broad learning goals, the type of course that would be offered to achieve these goals, and how its effectiveness would be monitored and measured. Over three years, through collaboration with the McMaster Centre for Leadership in Learning, an assessment of literature in teaching and learning, and attendance at workshops on problem-based and self-directed learning, we have come to see the following as the broad process-based learning outcomes for successful *Inquiry* students:

- an enhanced ability and proclivity to **learn deeply**, and thus appropriately, in a wide variety of learning environments and subject contexts;
- an enhanced ability and proclivity to **think critically** and reflectively about the production of knowledge, and their part in that production;
- an enhanced ability and the proclivity to take **active** control of their own learning processes, and to be **self-directed** and independent in expanding their understanding about a subject;
- an enhanced ability and proclivity to be **precise, accurate and clear** in communicating;
- an enhanced ability and proclivity to learn in a **participatory** fashion, working with, learning from, and fostering learning in others;
- an enhanced **openness** to embrace challenges to their preconceptions and an enhanced **enjoyment** of the pursuit of understanding.

We realize that few would disagree with these principles. Traditionally, the promotion of critical thinking, deep learning and self-directed learning has been one of the goals of a liberal arts education. However, we believe that the link from guiding principles to the activities of learning is rarely made and that these goals are seldom explicitly linked to a series of learning objectives that act as intermediary steps toward methods of teaching, learning and assessment. *Inquiry 1SS3* is based on these linkages.

The use of critical thinking, analysis, and evaluation skills are characteristic of what has come to be called, in the research literature, a "deep" or "meaning orientation" to learning. There is a vast research literature on student approaches to studying and learning, published mostly in Australia, Hong Kong, the United Kingdom, and Scandinavia (see, for example, Ramsden, 1983; Marton, 1976; Richardson, 1995b; Richardson, 1992; Entwistle, 1988; Entwistle, 1995; Harper, 1989; Kember, 1990; O'Neil, 1984; Biggs, 1978; Watkins, 1986; Watkins, 1983).

Students enter a course with prior dispositions to study and learn in certain ways. At the same time, the disciplinary environment, instructors, and course design can alter somewhat a student's approach. Research has shown that it takes a long period of time for approaches to studying to change significantly (Watkins, 1986). Studies have also shown that approaches to studying can affect students' academic achievement outcomes (e.g. Richardson, 1995a; Biggs, 1979; Entwistle, nd). For complex knowledge domains, it has been argued that deep learning approaches, that emphasize understanding, questioning, and relating knowledge to experiences and to larger bodies of thought and literature, have positive outcomes on academic achievement. Surface learning, which emphasizes memorization, tends to result in poorer academic achievement if mastery of complex knowledge is required (Biggs, 1993; Cox, 1998; Evans, 1997). Yet memorization is appropriate for the mastery of large bodies of facts; different

styles of learning are appropriate for different contexts. Optimally, then, a student should develop skills appropriate to a wide variety of learning environments and subject contexts. However, our experience is that most first-year courses promote surface learning. The inquiry project thus has as a key goal to broaden students' skill sets by nudging students into a mode of **deep learning**.

Another goal of the *Inquiry* project is to enhance students' abilities and proclivities to take **active** control of their own learning processes and to be self-directed in expanding their understanding about a subject by asking good questions, critically seeking out evidence, and arriving at well reasoned conclusions. We concur with Knowles (1975) who suggested that self-directed learning occurs where students, either with or without the guidance of others, take the initiative to diagnose their learning needs, formulate learning goals, identify resources for learning, select and implement learning strategies, and evaluate learning outcomes. It is imperative for self-directed learning that students have an enhanced ability to **think critically** and reflectively about the production of knowledge and have developed a habit of asking "why?" as opposed to accepting facts. Further, it is crucial that students develop strong **communication skills**, which we equate with clarity of thinking and view as an enabling skill to life-long learning.

Finally, we are convinced that learning is most effective when it is an enjoyable, personally challenging and shared experience. We thus take as further learning goals that the inquiry project should enhance students' **enjoyment** of the pursuit of understanding, cultivate **openness** to embracing challenges to preconceptions, and develop abilities and proclivity to learn in a **participatory** fashion.

Hare (2000) speaks of "critical spirit" which comes about when the abilities of critical thinking are fused with a disposition to open-mindedness. Critical spirit, Hare argues, is the key to having the "wherewithal" to think for oneself in the spirit of inquiry, to be educated and not simply indoctrinated.

Project Description

Introduction to Inquiry and to the Course Inquiry 1SS3

Inquiry is an orientation to learning that is open and flexible, in which faculty and students are co-learners who guide and facilitate the student-driven learning experience, emphasizing the development of complex questions, critical thinking and assumption of responsibility. The roles of the instructor are to teach the skills of inquiry, to inspire interest, to model processes (e.g. critical thinking), and to act as a resource person (Hudspith and Jenkins, 2001).

Further, *Inquiry 1SS3* is based on the assumption that learning is the process of making sense of the world by abstracting meaning from experience and synthesizing these abstractions into deeper ways of understanding and interpreting the world. In the context of evaluative critical reflection on both sources of information and one's own performance as a learner, we are essentially equating learning through inquiry with the higher cognitive domains of Bloom's taxonomy (Bloom, 1956): analysis, synthesis and evaluation.

We promise students that they will get three things from *Inquiry 1SS3*: practical knowledge of a replicable and reliable process to increase one's understanding and to develop and pass on knowledge; "enabling skills" necessary to support and facilitate this process; and a deepened understanding of a key area of social thought. To accomplish this, the course has three separate currents: tasks for building inquiry-related skills; opportunity and guidance for conducting an independent inquiry; and resources for understanding an aspect of the formation of social identity. We have concluded that the development of inquiry skills need be contextualized in a topical content that engages students and allows them room to find personal significance. By focusing students on an issue that is compelling to them and guiding them through a progressive process, the various inquiry skills are introduced at moments when they are most meaningful and relevant.

Research on the multicultural classroom suggests that teaching cultural diversity requires a restructuring of curriculum and pedagogical techniques (e.g., Evans, 1997; Henderson, 1996; Whitaker & Hill, 1998; Huang, 1996; Sedelow & Sedelow, 1994). We responded to this in our instructional design by structuring the course around a central question:

Why do images of ethnicity, race, gender, sexuality, age, class, or abilities help to create aspects of personal and community identity?

We chose this question because it compels students to examine core social science assumptions and leads to an enhanced understanding of social difference, which we consider paramount to our lives as citizens and social beings. The course question is also broad enough that students can explore a wide range of issues.

Inquiry 1SS3 meets for three hours a week for 13 weeks and is taught in sections of 20-25 students by one instructor. Within sections, students work in small groups of three to five, and sections are taught concurrently so that from time to time we can come together for large group activities. We begin the course with experiential exercises, including a specially adapted version of the cross-cultural awareness simulation, *BaFa BaFa* (Shirts 1977), designed to stimulate discussion on human difference. Weekly assigned readings dealing with social identity complement the practical experience. Early into the course, we begin to overlay the content with the building of skills that are central to conducting a self-directed inquiry. By the fourth week, students begin to focus on their own inquiries.¹

Linking Goals to Activities: A Grammar for Inquiry

The Grammar of *Inquiry* is a compendium of learning objectives that link course goals to the activities and processes of the course. The grammar is a theoretical, post facto analysis of the results of our collaborative effort. It is less a statement of the way any one individual teaches the course, more an extrapolation from a group of very similar and connected efforts, which developed—like a language—collaboratively. Like the grammar of a language, it now serves the purpose of informing the activity from which it emerged. This suggests how others might use the *Inquiry* Grammar; a grammar is of some importance in the learning of a language's structure and logic, but in practice, it permits variability in the language actually spoken. A synopsis of the Grammar outlining constellations of learning objectives and skills is given in the following list:²

Successful inquiry students:

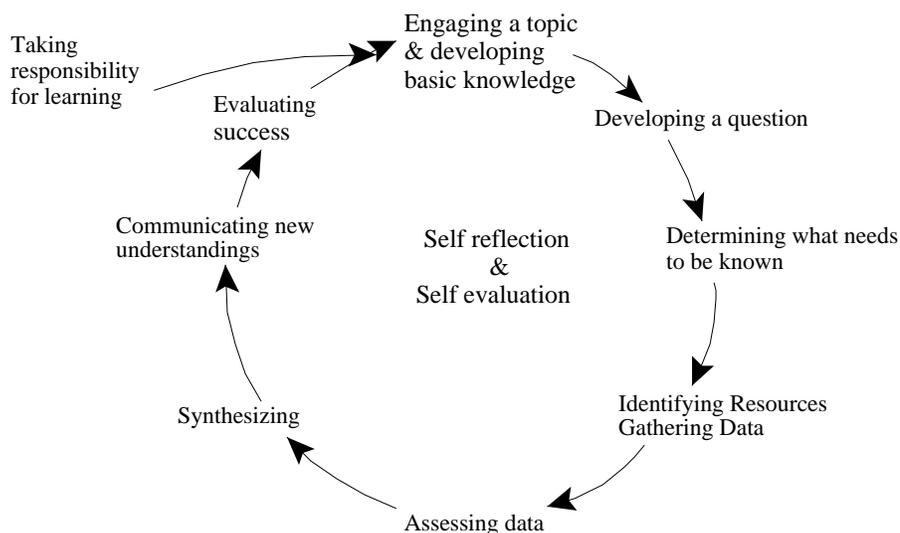
1. Take active responsibility for understanding course processes and their role as collaborative learners.
2. Gain a significant theoretical and substantive understanding of the course's topical focus and its personal significance (engage with the topic).
3. Develop a good question.
4. Determine the information needed to explore the question.
5. Access required information effectively and efficiently.
6. Evaluate information and its sources critically (and incorporate selected information into their knowledge bases and value systems).
7. Synthesize understandings and critical assessments of information.
8. Communicate the products and processes of their inquiries effectively to others.
9. Evaluate their success at progressing through the inquiry process.

The diagram below illustrates our conception of the relationship between the constellations of objectives and skills. We envision the inquiry process as circular to the extent that an inquiry leads to new interests and more questions. Adopting an approach of active responsibility for learning and an understanding of the collaborative possibilities of knowledge production are the entry points. An attitude of self-reflection and evaluation is both a product of the inquiry process and an enabler of success at every stage.

¹ The *Inquiry 1SS3* course outline and schedule are available online at <http://socserv2.mcmaster.ca/Inquiry/Outline.htm>

² For the complete list of Inquiry Grammar objectives please contact Christopher Justice or visit our website at <http://www.learnlink.mcmaster.ca/inquiry/inquiry-grammar-objectives.htm>

Diagram 1: The Inquiry Process



What follows is an explanation of how the broad learning goals described earlier are operationalized through the learning objectives of the Inquiry Grammar, and through the learning context in which these objectives are translated into activities. These goals are, of course, interrelated and the sharp distinctions we draw between the groupings are heuristic.

Goal 1—An enhanced ability and proclivity to *learn deeply*, and thus appropriately, in a wide variety of learning environments and subject contexts.

We nudge students into deep learning or meaning orientation by encouraging them to understand what they study, to adopt a questioning attitude, and to relate knowledge both to their own experiences and to larger bodies of thought and scholarship.

From the beginning, we stress that there is no memorizing necessary in *Inquiry*—a point that is driven home for students as there are no exams in the course. Instead, we emphasize ***understanding*** concepts. Through small group discussions of readings aimed at exploring alternative views and experiential activities such as the BaFa BaFa cultural simulation, we demonstrate that concepts have multiple, shifting and situated meanings. Instead of being expected to regurgitate facts, students are encouraged to integrate their emerging understandings into assignments and papers.

In their own inquiries, we encourage students to ask analytical or explanatory "Why?" questions. We ask them to focus on exploring possibilities rather than finding a correct answer or a convincing conclusion. They are encouraged to develop a number of alternative answers, or hypotheses, and to weigh evidence for and against each. In the synthesis of their papers, we ask them to embrace the complexity of the issue and to not simplify for the sake of developing an argument. Further, in their conclusions, we encourage students to move toward new hypotheses and/or entirely new questions that require further inquiry.

Through in-class activities, we encourage a ***questioning*** attitude. For example, we urge students to be skeptical and to approach the texts they read not as collections of "facts" but as examples of positioned interpretation, analysis and research. We ask students to question and challenge each other in small group discussions. As instructors, we try to model an orientation to questioning by constantly interpolating knowledge, the value of concepts, and even the course process.

We take students through a process leading to the development of their own inquiry question that encourages students **to relate knowledge to their own experiences and to larger bodies of thought.**

We ask them to synthesize a focus for their inquiry out of their own experience but within the boundaries of the course topic (for which we provide theoretical and experiential understanding and links to relevant literature). We define a question as being "interesting" when it integrates understanding of a course topic with the student's personal interests.

Goal 2—An enhanced ability and proclivity to *think critically* and reflectively about the production of knowledge, and their part in that production.

From the first meeting of class, we encourage students to consider what it is about their own identity that leads them to think about the world in a particular way. We begin with an introductory exercise in which students interview each other with the objective of discovering qualities of the other's—and their own—identity. In the third week of the course, we run the cultural simulation, BaFa BaFa, to give students a visceral sense of how the world can be seen from an alternative perspective. In the subsequent week students reflect on and analyze this experience (and hand in their first assignment). From the base of their altered understanding, we then encourage them to understand that knowledge is situated.

We have developed a series of learning exercises to encourage students to evaluate information and its sources critically and to read and record information actively and systematically. However, in critical thinking development, the main activity is having students practice these skills through class discussions based on readings that are carefully selected for their degree of difficulty or level of theoretical content. The instructors' role in these discussions is to challenge students to critically reflect on authors' positions and ideas. Students are also given the opportunity to present a critical assessment of an article to the class and to receive feedback on a written version from the instructor.

Students bring a critical attitude to their own inquiry by writing summaries in an *Inquiry Notebook*, an idea drawn from S.M. Hubbuch's (1996) text *Writing Research Papers across the Curriculum*. The purpose of the Notebook is for students to keep an ongoing record of all activities, thoughts, notes and other records associated with their thinking about their inquiries. The *Inquiry Notebooks* allow students to reflect on what they are reading, and document how they are thinking about their research question. We encourage students to analyze authors' methods and perspectives. In this way students begin to take positions and formulate analyses that diverge from the authors, or begin to create new ideas from different perspectives.

Of special note is an Internet workshop in which the instructors aid students in assessing on-line information for its usefulness on the basis of a set of evaluative criteria. Following this session, students are given the opportunity to assess sources of web-based information directly relevant to their inquiry question.

Goal 3—An enhanced ability and the proclivity to take *active control* of their own learning processes, and to be *self-directed* and independent in expanding their understanding about a subject.

Students take active control of the learning process in a number of ways. We start by asking students to study the course outline and guidelines for assignments carefully and to seek clarification from instructors. We stress the importance of scheduling key dates in calendars and "working backwards" to ensure adequate preparation time for assignments. From the first week, we ask students to start developing a schedule in their *Inquiry Notebooks*, mapping out their other courses and assignments, and ensuring that they have adequately accounted for the demands of inquiry.

We see self-evaluation as a significant aspect of active self-directed learning. We promote self-reflection using two specific tasks. First, we ask students to complete periodic "Self Assessment and Class Feedback" forms that ask students to assess their own contributions to the class and their skill development, and to make suggestions for improving the learning environment. We provide feedback on their assessments and encourage them to move to higher levels of self-evaluation. Students are also encouraged to write reflectively in their *Inquiry Notebooks* and to hand them in with their *Inquiry* papers at the end of course for assessment.

We encourage students to identify gaps in the information they retrieve, to determine if their search strategy should be revised, and to repeat the search using the revised strategy. In both the final paper and the presentation, we invite students to reflect on their new understandings, comparing them with prior understandings to determine the value added, contradictions, or other unique characteristics of the change.

We have assigned a schedule of substantive readings for only the first four weeks of the course. After this, students participate in defining the readings themselves either by bringing their own inquiry readings to the course or by choosing readings from the course kit. *Inquiry 1SS3* involves two progressive library workshops which involve optional on-site training and self-test assignments which are monitored, but not graded, by instructors as part of a student's assessment. Leading up to the Internet workshop, students are asked to appraise their level of competence in accessing and searching the Internet. We give students the access to a self-directed and self-paced Internet searching exercise that they can use to enhance their skills prior to beginning the workshop.

At a substantive level, we promote self-direction by not assigning topics, rather encouraging students to find their own meaning within the course. We provide readings and in-class exercises to give students the tools they need to develop an inquiry proposal, which functions in part as a self-directed learning contract. Students are asked to explain the question and its development in relation to their personal interest in the course and to articulate at least three possible answers to the central question that they have developed. Students are then encouraged to develop secondary questions that move toward testing each hypothetical answer and lead to the identification of potential sources for information. Students are also expected to assess the difficulty of finding relevant information and to demonstrate they have constructed a do-able task through the construction of an annotated bibliography.

Goal 4—An enhanced ability and proclivity to be *precise, accurate and clear* in communicating.

We contextualize communication skills in a theoretical perspective that sees writing as not only the product of thought but also as a process of thinking. As such, we encourage students to view the skills leading to precision, accuracy and clarity of thinking as useful in and of themselves, and also as ways of developing their abilities to think through complex ideas.

We help students develop their **writing skills** through a series of five written assignments (an analysis of the BaFa BaFa simulation experience, an *Inquiry* proposal, an Internet evaluation, a critical summary, and an *Inquiry* paper) on which students receive prompt feedback, usually within a week. This approach allows us to make recommendations for action that students might take in problem areas, and to see if students have acted to ameliorate the issue. We have readings and class discussions regarding the purpose of writing a research paper, the structure and purpose of proposals, and possibilities for constructing different types of writing. As well, we guide class exercises in referencing and editing. We encourage students to write drafts of their paper, have them edited and proofread by peers, and to include these edited drafts in their *Inquiry* Notebooks. Finally, we emphasize that clarity, accuracy and precision are important assessment criteria for all written work; that ideas and their expression are inextricably linked.

Inquiry 1SS3 is designed to help students progress in their ability to give **oral** presentations. For example, we discuss common problems with presentations, issues of organization and technique, and presentation anxiety. At a practical level, we move students from informal presentations in small groups, to more formal, large-group presentations, and then to a final formal, though interactive, presentation of about 20 minutes. We encourage peer and self-evaluation of all levels of presentation. For the formal presentation, in addition to instructor feedback, students receive a written formative evaluation from every other student in the audience.

All good communication is built upon a range of **skills helping to assure accuracy**. We have assigned readings and class discussions on reading and recording information actively and systematically. We discuss reading strategies, such as techniques for dealing with difficult or jargon-laden readings. We also discuss management of resources and students are expected to demonstrate in their *Inquiry* Notebooks that they have experimented with a system for organizing information. We also

discuss issues such as the fair use of copyrighted material and the citing and acknowledging of sources in written and oral presentations.

Goal 5—An enhanced ability and proclivity to learn in a *participatory* fashion, working with, learning from, and fostering learning in others.

We actively encourage students to work with, learn from, and foster learning in others. Participatory learning is 'built in' to many aspects of the course process; several of our methods for encouraging collaborative learning and peer evaluation have been previously mentioned. A great deal of class time is devoted to small group work where three to five students discuss readings, brainstorm ideas for each others' inquiries, and critically assess each others' inquiry questions and information sources. We talk to students about group process and encourage and model respectful listening, sharing of information and resources, giving of constructive criticism, and questioning and challenging each other's ideas. We encourage students to use each other as resources for all aspects of the inquiry process.

Goal 6—An enhanced *openness* to embrace challenges to their preconceptions and an enhanced *enjoyment* of the pursuit of understanding.

We hope that a natural bi-product of the inquiry process is an enhanced enjoyment of the pursuit of understanding. Both the process of the course and the structure and substantive content are designed to enhance openness to embracing new ways of perceiving the world and enhanced enjoyment of learning. As previously discussed, many of the activities associated with the first two goals (of deep learning and critical thinking) require students to examine their preconceptions. For example, the substantive reading and experiential exercises of the early part of the course are designed to move students to see things from alternative perspectives, and thus to allow students to identify their own point of view. These issues are developed through class discussion and critical analysis of readings. The readings cover such diverse issues as the representation of aboriginal peoples, the meaning of deaf culture and the creation of national identities. We build on this by encouraging students to develop questions that emerge from their own interests but that embody ambiguity, and numerous possible answers. In addition to developing alternative hypotheses we encourage students to search for evidence against, as well as in favour of, the hypotheses they will explore.

Impact on Student Learning

As a team, we have taken a great interest in monitoring and assessing the impact the course is having on students. In addition to the Faculty course rating instruments, we have developed a comprehensive questionnaire that is administered at the beginning and end of each inquiry offering. In the past year, we have developed a benchmarking pre- and post- test of a number of the key inquiry skills. We acknowledge the complexity of statistical evaluations of learning goals and of marshaling objective data on learning outcomes. *Inquiry 1SS3* does not seem to benefit everyone equally. As instructors, we have been struck by the variation in the educational maturity of students within each of our individual sections. However, the evidence is compelling that the inquiry project is having the desired results *for those students who engage in the process*.

The following short summary complements our recent quantitative analyses (Cuneo et al, 2000, 2001) and adds a layer of interpretive analysis. It is based on:

- i) our evaluation of student assignments, their research notebook, and their oral and written presentations of their inquiry papers;
- ii) the oral and written feedback students regularly give us as an integral part of their participation; and,
- iii) informal reports from students.

As instructors, we believe *Inquiry ISS3* achieves much of what we set out to do. In the activities of teaching, we witness significant developments in intellectual maturity and academic approach. For example, we have seen students' writing improve, and have noticed a correlation between reflective writing in the *Inquiry* Notebook and the quality of the final paper, which convinces us of the value of our process. Student assessments lead us to conclude that students grow significantly in their ability to self-

criticize, and in their willingness to give and receive constructive criticism. In the questionnaire, they routinely rank most highly those components of the course that involve self-directed learning. However, they also rate very highly the collaborative classroom activities, and large group simulations, such as *BaFa BaFa*. Students tend to achieve higher grades in the *Inquiry* course than in other Social Sciences first year courses and to rate the course as considerably more demanding in terms of workload. Students both report and demonstrate improvement in the skills taught and in the value they place on those skills, as well as increased confidence in their abilities. We see changes in the valuing of skills as having a significant impact on student learning, since students who recognize the importance of skills early in their university career are likely to continue developing these skills in other courses and subsequent years. The value students placed on developing hard, tangible skills increased somewhat more than on soft, intangible skills. The largest and most positive changes in self-confidence occurred for students in those sections that offered direct, personalized, and hands-on training (compared to incidental training or no training conditions). This is a testament to the strength and consistent effects of our training workshops in library, computer, and Internet skills.

Our approach is also successful in heightening students' awareness of issues of social, cultural and ethnic diversity. Our data suggest that, from the beginning to the end of each course offering, there was a positive change in students' understanding of the importance of these issues to their learning and development. In most cases, the changes were statistically significant, at least at the 0.05 level, despite the rather small number of students. Students who value critical thinking skills are more likely to have a greater understanding of inter-cultural group and individual differences. This suggests a relationship between the way skills were taught in the course and the learning of the substantive content of the course. Students who rated highly the learning quality of the "social identities" component of the course also came to a greater understanding of cultural diversity. Developing an understanding of these factors (cultural diversity, critical skills, and the course theme) depends on students adopting a deep approach to studying. Significantly, students' scores on deep learning were higher than national norms for the social sciences, although our measures of changes in meaning orientation over the term have proved difficult to interpret. Certainly, deep learners performed better academically in the *Inquiry* course, and as expected, reproducing meaning orientation had a negative effect on grades.

More generally, the *Inquiry* course is highly regarded by the vast majority of students. Despite the fact that students report the workload in *Inquiry* to be much heavier than that of other courses, the enrollment has increased with every offering. Currently about one third of all first year Social Science students enroll in *Inquiry*. We believe the increase relates to the long-term positive benefit of *Inquiry* for at least some students. Most of us have had students visit us after a year or more to tell us how valuable the course was for them. Some students still refer to themselves as "inquiry students" two years after completing the course.

Concluding Thoughts

The Grammar for *Inquiry* is a collection of learning objectives that link learning goals to activities and processes. We call it a grammar because it is an "ideal" model of a complex enterprise and because the term suggests its potential relationship to practice: a grammar is of some importance in the learning of a language but in practice allows for variability in discourse and expression. We believe that our Grammar for *Inquiry* allows for wide replication in a variety of teaching contexts. It is likely less important what the topical focus is, and more important that there is room for students to find something that is personally compelling. We have tried to show in this paper that the learning objectives are inextricably linked to pedagogical processes. The desired goal of enhancing deep learning, for example, is as we see it partly accomplished through the objective of having students consider alternative evidence and multiple possible answers to their questions. However, this objective is in large part accomplished, for example, through instructors modeling in class discussions and by asking students in small group discussions to challenge each other to consider alternative perspectives. Finally, it is worth stating that the Grammar for *Inquiry* is a work in progress; we will continue to respond to our ever-changing perception of failure and success by adjusting the way we teach the course and refining our objectives. We imagine others might see it likewise as a beginning not an ending.

References

- Biggs, J. (1993). What do inventories of students' learning processes really measure? A theoretical review and clarification. *British Journal of Educational Psychology*, 63, pp. 3-19.
- Biggs, J. (1979). Individual Differences in Study Processes and the Quality of Learning Outcomes. *Higher Education*, 8, pp. 381-394.
- Biggs, J. (1978). Individual and Group Differences in Study Processes. *British Journal of Educational Psychology*, 48, pp. 266-279.
- Bloom, B. S. et al. (1956). *Taxonomy of educational objectives*. New York: David McKay.
- Bosworth, K., & Hamilton, S. J. (1994). *Collaborative learning: Underlying processes and effective techniques*. San Francisco, California: Jossey-Bass Publishers.
- Boyer Commission on Educating Undergraduates in the Research University. (1998). *Reinventing undergraduate education: A blueprint for America's research universities*. [online <http://naples.cc.sunysb.edu/Pres/boyer.nsf/>]
- Cox, K. C. D. (1998). The use of formative quizzes for deep learning. *Computers Education*, 30(3/4), pp. 157-167.
- Cuneo, C., Inglis, S., Justice, C., Warry, W., Lee, B., Miller, S., Rice, J., and Sammon, S. (2000). *Turning the Page*, unpublished manuscript, McMaster University.
- Cuneo, C., Inglis, S., Justice, C., Warry, W., Miller, S., Rice, J., and Sammon, S. (2000) *Critical Thinking under Fire*, unpublished manuscript, McMaster University.
- Entwistle, N., J. Nisbet., D. Entwistle, and M. Cowell (1971). The Academic Performance of Students: 1-Prediction from Scales of Motivation and Study Methods. pp. 258-267.
- Entwistle, N., & Tait, H. (1995). Approaches to studying and perceptions of the learning environment across disciplines. *New Directions for Teaching and Learning*, 64(Winter), pp. 93-103.
- Entwistle, N., & Waterston, S. (1988). Approaches to studying and levels of processing in university students. *The British Journal of Educational Psychology*, 58, pp. 258-265.
- Evans, B.H.L. (1997). Getting inside knowledge: The application of Entwistle's model of surface/deep processing in producing open learning materials, *Educational Psychology*, 17(1 and 2), pp. 127-139.
- Hare, Wm. (2000). Teaching and the barricades to inquiry. *The Journal of General Education* 49 (2), pp. 88-109. [online http://muse.jhu.edu/journals/journal_of_general_education/v049/49.2hare.html]
- Harper, B.K.D. (1989). Interpretation of factor analyses from the approaches to studying inventory. *British Journal of Educational Psychology*, 59, pp. 66-74.
- Henderson Lyn. (1996). Instructional design of interactive multimedia: A cultural critique, *Educational Technology Research and Development*, 44(4), pp. 85-104.
- Hudspith, Bob n.d. *Teaching the Art of Inquiry*. [online <http://socserv2.mcmaster.ca/~fss/inquiry/artofinq.htm>]
- Hudspith, B., & Jenkins, H. (2001). *Teaching the Art of Inquiry (Green Guide #3)*. Halifax, Nova Scotia: Society for Teaching and Learning in Higher Education.

- Justice, Christopher, Wayne Warry, Carl Cuneo, Sue Inglis, Stefania Miller, James Rice, and Sheila Sammon n.d. *Inquiry 1SS3 Grammar of Inquiry Objectives* [online <http://www.learnlink.mcmaster.ca/inquiry/inquiry-grammar-objectives.htm>]
- Kember, D. G. L. (1990). Cultural specificity of approaches to study. *British Journal of Educational Psychology*, 60, pp. 356-363.
- Knowles, M. (1975). *Self-directed learning: A guide for learners and teachers*. Englewood Cliffs, New Jersey: Cambridge Adult Education, Prentice-Hall Regents.
- Marton, F. S. R. (1976). On qualitative differences in learning: I--Outcome and process. *British Journal of Educational Psychology*, 46, pp. 4-11.
- O'Neil, M. J. C. D. (1984) Biggs' SPQ: A British study of its internal structure. *British Journal of Educational Psychology*, 54, pp. 228-234.
- Ramsden, P. (1983) *The Lancaster Approaches to Studying and Course Perceptions Questionnaire*. Oxford Polytechnic: Education Methods Unit.
- Richardson, J. T. E. (1992) A critical evaluation of a short form of the Approaches to Studying Inventory, *Psychology Teaching Review*, 1(1), pp. 34-45.
- Richardson, J. T. E. (1995a). Mature students in higher education: II. An investigation of approaches to studying and academic performance. *Studies in Higher Education*, 20(1), pp. 5-17.
- Richardson, J. T. E., Landbeck, R., & Mugler, F. (1995b). Approaches to studying in higher education: A comparative study in the South Pacific. *Educational Psychology*, 15(4), pp. 417-432.
- Sedelow W. A., & Sedelow, S. Y. (1994) Multicultural/Multilingual Electronically Mediated Communication. *Social Science Computer Review*, 26(3), p. 336.
- Shirts, R. Gary. "BaFa' BaFa': A Cross Cultural Simulation." Del Mar, California: Simile II, 1977.
- Watkins, D., Hattie, J., & Astilla, E. (1986) Approaches to studying by Filipino students: A longitudinal investigation. *The British Journal of Educational Psychology*, 56, pp. 357-362.
- Watkins, D., Hattie, J., & Astilla, E. (1983). The validity of the four subscales of the Inventory of Learning Processes for a sample of Filipino freshman college students. *Educational and Psychological Measurement*, 43, pp. 531-514.
- Whitaker, E. E., & Hill, E. N. (1998), Virtual voices in "Letters Across Cultures": Listening for race, class, and gender. *Computers and Composition*, 15(3), pp. 331-346.

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