

I. Redesigning Online Deductive Logic to Improve Retention

A SOTL Grants Proposal submitted by:

Dr. Daniel R. Boisvert

Department of Philosophy

and

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Department of Philosophy

II. Abstract

PHIL 2105 Deductive Logic is a required course for a major in Philosophy and satisfies a Mathematics and Logical Reasoning requirement in the General Education program. Over the past three years, the Department of Philosophy has developed and implemented a fully online section of Deductive Logic. The central problem thus far in our online sections of the course is its high attrition rate (which we are defining as its DWF rate), which is twice that of comparable face-to-face sections of Deductive Logic (60% to 29%). After a brief review of the literature concerning the causes of attrition in online courses, we have hypothesized four factors contributing to our own high attrition rate: inadequate student-to-student and student-to-faculty interaction; unintuitive course web site design that also failed to adequately contextualize the course material; little sense of community; and unrealistic student expectations regarding the difficulty of online learning. We have since created and implemented a variety of course design and web site modifications (e.g. required group activities, several mandatory live sessions, more audio and video elements, orientation section of the course, and more). Using Moodle report data, student grades, Community of Inquiry course evaluations, and student interviews, we now aim to determine whether these modifications have led to increased interaction, more intuitive course navigation and conceptualization, a deeper sense of community, more realistic student expectations of what is required for successful online learning, and ultimately, higher retention.

Budget Request for SOTL Grant Year 2011-2012

Joint Proposal? X Yes No

Title of Project Redesigning Online Deductive Logic to Improve Retention

Duration of Project One academic year

Primary Investigator(s) Daniel R. Boisvert and Marvin J. Croy

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UNC Charlotte SOTL Grants Previously Received (please names of project, PIs, and dates) None

Allocate operating budget to Department of Philosophy

Account #	Award	Year One January to June
Faculty Stipend	Transferred directly from Academic Affairs to Grantee on May 15	\$ 3,850
911250	Graduate Student Salaries	1,000
911300	Special Pay (Faculty on UNCC payroll other than Grantee)	500
915000	Student Temporary Wages	
915900	Non-student Temporary Wages	
920000	Honorarium (Individual(s) not with UNCC)	
921150	Participant Stipends	
925000	Travel - Domestic	
926000	Travel - Foreign	
928000	Communication and/or Printing	
930000	Supplies	
942000	Computing Equipment	
944000	Educational Equipment	
951000	Other Current Services	
GRAND TOTAL		\$ 5,350

Attachments:

1. Attach/provide a narrative that explains how the funds requested will be used.

The requests highlighted in bold are essential to the project.

Faculty Stipend. One faculty stipend of \$ 3,850 is requested for Dr. Boisvert. Most of the data analysis, interpretation, and written results will be completed April 1-June 1, 2012.

Graduate Student Salaries. A salary of \$1,000 is requested for a Research Assistant, who will work with the study's co-authors throughout the Spring, 2012 semester to help research and develop an appropriate course evaluation survey and to collect, analyze, and interpret the raw data generated from these and the Moodle course reports. We anticipate that the Research Assistant would work approximately: 5 hours/week x 15 weeks x \$13.33 per hour = \$999.75.

Special Pay. A small stipend of \$500 is requested for the instructor of the online PHIL 2105 Deductive Logic course during the Spring, 2012 semester. This instructor, who is not one of this study's co-authors, will need to implement the modifications being made to the course, and then work with the study's co-authors to collect, analyze, and interpret the raw data collected from his or her course.

2. Has funding for the project been requested from other sources? ___ Yes ___X___ No. If yes, list sources.



Office of the Dean

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October 26, 2011

SOTL Grants Committee
Center for Teaching & Learning
ctl@uncc.edu

Dear Committee Members:

I am writing to support the proposal "Redesigning Online Deductive Logic to Improve Retention and Learning" submitted by Daniel Boisvert and Marvin Croy of our Philosophy Department. As the title suggests, the proposed project is focused on improving the learning and retention of students in the Deductive Logic course (PHIL 2105) that satisfies a Mathematics and Reasoning requirement in the University's general education curriculum and is required for all Philosophy majors.

The recently developed online sections of the course have exhibited higher DFW rates than the traditional face-to-face sections. Boisvert and Croy have hypothesized several important factors that they believe contribute to this difference. They also have begun to make modifications to the online course to address these problems. The results of the research will indicate if these improvements are on the right track and aid in strengthening the course. These results should also be of interest to a wider audience since this course plays a similar role in many general education curricula. I am pleased to recommend their proposal for your careful consideration.

Please let me know if you require further information. Thank you.

Sincerely yours,

Nancy A. Gutierrez, Dean
College of Liberal Arts and Sciences



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MEMORANDUM

To: Faculty Scholarship of Teaching and Learning (SOTL) Grants Committee

From: John Smail
Dean

Date: October 28, 2011

Re: Endorsement of SOTL Grants Proposal

I fully support the proposal "Redesigning Online Deductive Logic to Improve Retention and Learning," submitted by Dr. Boisvert and Dr. Croy. The PHIL 2105 Deductive Logic course satisfies a Mathematics and Logical Reasoning requirement in Part 1 of UNC Charlotte's General Education Program (*Development of Fundamental Skills of Inquiry*). Deductive Logic is also one of only several fully online courses available to our nontraditional students that satisfy this General Education requirement. Given that the results from the first online sections of Deductive Logic show a much higher DWF rate than the face-to-face sections of the course, I think there is an important University interest in supporting this effort to identify and resolve the issues in this online offering.

The intermediate steps they have already taken—increased student-student and student-faculty interaction (e.g. required discussion activities and live sessions), student-friendlier course layout (e.g. a separate learning unit for each week, important course information always available on the "navigation" menu), more personal "tone" (e.g. audio "welcome" messages for each week, video "think out loud" solutions for proof problems), and better-communicated expectations for the course (e.g. a Course Orientation unit, including links to Distance Education's "Are Online Courses For Me" and "Myths About Taking Online Classes")—seem to me exactly the kinds of interventions that needed to be made. It is important now to determine whether these interventions have in fact led to increased interaction, easier course navigation, deeper sense of online community, and more realistic expectations about the kind and quantity of work required for successful completion of the course. If so, then we also need to determine whether these interventions in turn have helped our students remain on course to graduation.

The implications I see for this project are long-term and widespread. The kinds of interventions implemented here can be embedded into almost every online course, including online courses that satisfy General Education requirements. Therefore, if successful, the retention rates for many of our courses—and the time-to-graduation rates for many of our students—could be improved.

V. Project Narrative

A. Specific Aims

The PHIL 2105 Deductive Logic course is required for all Philosophy majors and satisfies a Mathematics and Reasoning requirement in UNC Charlotte's General Education curriculum. Each semester since Summer, 2008, the Department of Philosophy has offered one section (60 students) of the online course alongside three or four comparable face-to-face sections (45 students) of the course. The central problem with the online sections of the course has been its attrition rate (defined as its DWF rate). For example, attrition in the online sections of Deductive Logic taught since Summer, 2010 is 60%, a rate twice that of the several face-to-face sections of the course that have been taught during the same time period by the same instructor (29%).

After briefly reviewing literature concerning the causes of attrition in online courses and participating in the five-week workshop *Planning Your Online Course*, offered by the Center for Teaching and Learning, we hypothesized four contributing factors to our own high attrition rate: inadequate student-to-student and student-to-faculty interaction; unintuitive course web site design that also failed to adequately contextualize the course material; little sense of community; and unrealistic student expectations regarding the level of commitment required for successful online learning in a college course. Accordingly, we have since created and implemented numerous course design and web site modifications. To select just a few examples, the online sections of the course now include required team discussion activities, mandatory and optional live Wimba sessions, audio "welcome" messages for each week, video "think out loud" solutions to logic proofs, one-week orientation to the nature of online learning (and our course), and others.

Using Moodle report data, student grades, course evaluations adapted from the Community of Inquiry rubric, and student interviews, we now aim to determine whether these modifications have led to (i) increased student-student and student-teacher interaction, (ii) more intuitive course navigation and conceptualization, (iii) deeper sense of community, (iv) more realistic student expectations of what is required for successful online learning, and, ultimately, (v) higher retention.

B. Literature Review

When reviewing the literature concerning attrition in online courses, we were not surprised to find that such attrition rates were consistently higher than those for face-to-face courses (Simpson 2004; Wojciechowski and Palmer 2005). However, we were surprised to find that the attrition rate for our own course was much higher than the norm. For example, while Angelino *et al* (2007) found that attrition rates for online courses have consistently been reported as ten to twenty percent higher than face-to-face courses, our own attrition rate was close to one hundred percent higher than our comparable face-to-face sections of the course.

Isolating a single set of factors contributing to higher attrition in online courses appears to be difficult (Herbert, 2006). However, some of the more consistently cited factors for high attrition among such courses seemed to us especially salient when reflecting on our own course. For example, lack of student-student and student-teacher interaction (Swann 2010; Bliss and

Lawrence 2009; Rogers and Lea 2005; Swan and Shih 2005; Garrison 2003) seemed an obvious blunder on our part, since our course contained only individual activities, required no other type of student to student contribution to the course, and provided little incentive for students to respond to the instructor. The course was pretty much a self-paced learning manual with online exercises rather than a collaborative college course.

Another factor often cited as contributing to high attrition in online courses is the persistent perception among students that online courses are easier than face-to-face courses (Moody 2004, Nash 2005), which also seemed particularly relevant in light of our own course. For we provided no information to students about the unique nature of online learning, including the higher level of commitment and self-discipline required to stay on top of one's work in an online environment than in a face-to-face environment (Ko and Rossen 2010). Neither did we provide any information about or tutorials for using our course technology, another factor often cited as contributing to higher attrition in online courses (Moody 2004). For example, we provided no tutorials for using Moodle, the university's new Learning Management System, to which our University was transitioning. The lack of any sort of student orientation to the attitudes, behaviors, and technological familiarity required for successful completion of an online course seems, in hindsight, simply uncaring.

The course's cold, text-only web site design, which also failed to contextualize the content and activities for each lesson, also seemed to us to have reinforced a lower level of commitment and interaction and thereby to have contributed to the course's high attrition rate. For example, David Klein, as reported in ("Student Satisfaction" 2004), found that the most important factor in online learner satisfaction and community formation was the degree of structure in the course, where structure included elements such as clearly defined objectives, assignments, deadlines, and discussion tasks. Kiili (2005) found that strategically used audio, video, images, and other media can lead to "better understanding of course content, which [can lead to] improved student test scores and course retention." And over 90% of the students in another study said that course structure and multi-media elements were "of some substantial importance" to them (Haley 2008). Now although our course did contain a very large number of interactive logic activities, it lacked any other potentially useful multi-media elements, for example audio-video solutions to some logic proofs. The course also lacked clearly stated course objectives—these could only be found in the syllabus, to which students needed to navigate—and unit objectives; indeed, we had no clearly listed objectives for any weekly unit. Most importantly, the course web site failed to contextualize any of the content or activities. For example, although the content area for the first lesson contained links to the reading and some logic puzzles, it was not obvious to the students the lessons they should be drawing while doing these puzzles. (The lesson was that solving these requires one-step-at-a-time transitions of thought according to strict rules, the very kind of highly structured thinking required for deductive logic. This explanation was relegated to the textbook.)

After reflecting on this literature and its relation to our own course, we developed and implemented a large number of modifications to the course, all designed to lead to (i) increased student-student and student-teacher interaction, (ii) more intuitive course navigation and conceptualization, (iii) deeper sense of community, and (iv) more realistic expectations of what is required to succeed in an online course. These, of course, are in turn intended to lead to (v)

higher retention. Here are several examples of the kinds of modifications made the course and the outcomes they were designed to improve:

- Orientation to online learning and our course. This one-week unit introduced students to the nature and unique challenges of online learning, clearly defined instructor and student expectations concerning time commitment, discussion procedures, and the like, as well as items for learning how to navigate and manage Moodle (including managing its discussion subscriptions). These elements were intended to lead to outcomes (i), (iii), and especially (iv).
- Required team discussion activities and mandatory and optional live Wimba sessions, intended to lead to outcomes (i) and (iii).
- More multi-media elements, including audio messages contextualizing each new unit's reading and activities, video "think out loud" solutions for logic proofs, live Wimba sessions and archives, and images, which were all intended to lead to outcomes (i), (ii), and (iii).

We are now aiming to determine the extent to which these modifications in fact led to their desired outcomes.

- Angelino, L.M., F. K. Williams, and D. Natvig, (2007). Strategies to engage online students and reduce attrition rates. *The Journal of Educators Online*, 4(2).
- Bliss, C. A., and B. Lawrence, (2009). From posts to patterns: A metric to characterize discussion board activity in online classes. *Journal of Asynchronous Learning Networks*, 13(2), 15-32.
- Garrison, D. R. (2003). Cognitive presence for effective asynchronous online learning: The role of reflective inquiry, self-direction and metacognition. In J. Bourne & J. C. Moore (Eds.), *Elements of quality online education: Practice and direction*. Volume 4 in the Sloan C Series, Needham, MA: The Sloan Consortium.
- Haley, K.L. and K. Heise (2008). *Building the successful online course*. Charlotte, NC: Information Age Publishing.
- Herbert, M. (2006). Staying the course: A study in online student satisfaction and retention. *Online Journal of Distance Learning Administration*, 9(4).
- Kiili, K. (2005). Participatory multimedia learning: Engaging learners. *Australasian Journal of Educational Technology* 21(3), 303-322.
- Ko, S. and Steve Rossen (2010). *Teaching online: A practical guide*, Third edition. New York: Routledge.
- Moody, J. (2004). Distance education: Why are the attrition rates so high? *The Quarterly Review of Distance Education*, 5(3), pp. 205-210.
- Nash, Robert D. (2005). Course completion rates among distance learners: Identifying possible methods to improve retention. *Online Journal of Distance Learning Administration*, 8(4).
- Rogers, P. and Lea. M (2005). Social presence in distributed group environments: The role of social identity. *Behavior & Information Technology*, 24(2), pp. 151 - 158.
- Simpson, O. (2004). The impact on retention of interventions to support distance learning students. *Open Learning*, 19(1), pp. 79-95.

- "Student Satisfaction Depends on Course Structure" (2004), *Online C@ssroom: Ideas for Effective Online Instruction*:
http://www.vcu.edu/cte/resources/newsletters_archive/OC0402.PDF. Accessed most recently October 27, 2011.
- Swan, K. and Shih, L. F. (2005). On the nature and development of social presence in online course discussions. *Journal of Asynchronous Learning Networks*, 9(3), pp. 115-136.
- Swann, J. (2010). A dialogic approach to online facilitation. *Australasian Journal of Educational Technology*, 26(1), pp. 50-62.
- Wojciechowski, A., and Palmer, L. B. (2005). Individual student characteristics: Can any be predictors of success in online classes? *Online Journal of Distance Learning Administration*, 8(2).

C. Methods

The study consists of the following steps, the first four of which have already been completed or are in progress:

1. Dr. Boisvert will do preliminary, background research on retention in online courses and participate in the five-week workshop *Planning Your Online Course*, offered Fall 2010 through UNC Charlotte's Center for Teaching and Learning, to identify what appear to be the most important contributing factors for the high attrition rate. (*Completed*)
2. After reflecting on the background research, lessons from the workshop, and their possible application to our course, Dr. Boisvert will begin creating new learning resources and redesigning the course and its web site. (*Mostly completed*)
3. The redesigned course will be offered and tweaked for several semesters, including Fall, 2011 and Spring, 2012. (*In progress*)
4. General evaluation strategies, both quantitative and qualitative, will be made more concrete. As described in Section D, we will be using a combination of Moodle report data, student grades, course evaluations adapted from the Community of Inquiry rubric, and student interviews. At this stage, then, we will determine more precisely what would be the most useful Moodle report data (e.g. the percentage of students who actually listened to the audio messages, watched the video tutorials, and participated in the discussion activities), student grade data (e.g. percentage of students who received at least a 'C' for their discussion grade, percentage of students who scored at least a 'C' on an Orientation quiz), subset of questions from the Community of Inquiry rubric (e.g. all of the questions evaluating the quality of Social Presence), and student interview questions (e.g., "Talking out loud, can you explain how you would find the required activities in Chapter 8?"). We will also need to define more precisely what would constitute success for each element of evaluation (e.g. What percentage of students receiving a grade of at a 'C' constitutes successful student-to-student interaction? What overall student rating would need to be achieved for the various Social Presence questions would indicate a "deeper sense of community"?).
5. The necessity for IRB approval will be determined and, if required, commence.
6. The course will be assessed accordingly for at least the Fall, 2011 and Spring, 2012 semesters.
7. Data will be compiled, analyzed, and interpreted to determine the extent to which the modifications led to outcomes (i)-(iv) listed in Sections A and B above.

8. Comparisons will be made of the retention rates of this course with "pre-modified" sections of the course, other UNC Charlotte fully online courses and, if possible, with other meaningful categories of courses (e.g. fully online math courses).
9. Further modifications to the course will be implemented accordingly.
10. Results will be disseminated as described in Section E.

D. Evaluation

We will evaluate the following:

- (i) quantity and quality of student-student and student-teacher interaction;
- (ii) ease of course navigation and effective contextualization of content and activities;
- (iii) students' sense of community or belonging;
- (iv) clarity of expectations, both of the requirements for successful online learning and of our course objectives; and
- (v) retention rate.

We will evaluate these using a combination of Moodle report data, student grades, course evaluations adapted from the Community of Inquiry rubric, and student interviews.

The relationships among the desired outcomes, strategies, and evaluation methods are as follows:

<i>Outcomes</i>	<i>Modifications/Intervention Strategies</i>	<i>Evaluation</i>
Level of student-student and student-teacher interaction	<ul style="list-style-type: none"> • Required team discussion activities with instructor feedback • Mandatory and optional live group Wimba sessions with instructor 	<p><u>Moodle report data</u> specifying percentage of students who listened to the audio welcome message, viewed video tutorials, attended Wimba sessions, etc.</p> <p><u>Student grades</u> specifying percentage of students receiving at least a 'C' for their discussion grade (which accounts for both quantity and quality of discussion activity).</p> <p><u>Course evaluation</u> questions (e.g. 'Instructor actions reinforced the development of a sense of community among course participants')</p>
Intuitive course navigation and contextualization	<ul style="list-style-type: none"> • Weekly units • Clearly defined objectives, assignments, and activities for the course and for each learning unit 	<p><u>Student interviews</u> asking students to "find the learning objectives for Week 11," "find your grades," "find the discussion participation rubric,"</p>

	<ul style="list-style-type: none"> • Overview and audio welcome message for each learning unit that explains how the material for that unit relates to the overall course goals and to other the material for other units • Clear sidebar navigation for one click access to all important information about the course (instructor information, course goals, expectations, quizzes, forums, Moodle navigation handouts, etc.) • Clear one click access to any weekly unit 	<p>and the like.</p> <p><u>Course evaluation</u> questions, especially many of the questions evaluating for "Teaching Presence" (e.g. 'The instructor clearly communicated important course goals') and some for "Cognitive Presence" (e.g. 'Combining new information helped me answer questions raised in course activities')</p>
Deeper sense of community	<ul style="list-style-type: none"> • Required team discussion activities • Mandatory and optional live group Wimba sessions • Audio welcome messages for each weekly unit • Instructor video "think out loud" tutorials • Instructor "encouragement emails" sent immediately upon a student's failure to complete a weekly assignment. 	<p><u>Course evaluation</u> questions, especially many questions evaluating for "Social Presence" (e.g. 'Getting to know other course participants gave me a sense of belonging in the course', 'I was able to form distinct impressions of some course participants') and some for "Teaching Presence" (e.g. 'Instructor actions reinforced the development of a sense of community among course participants.')</p>
More realistic expectations about the nature of and requirements for successful online learning	<ul style="list-style-type: none"> • One-week Orientation unit 	<p><u>Moodle report data</u> specifying percentage of students who viewed the orientation resources</p> <p><u>Student grades</u> specifying percentage of students who scored at least a 'C' on an orientation quiz.</p> <p><u>Course evaluation</u> questions (e.g. 'By end of orientation, I had a clear sense of the time commitment often required to do well in the course')</p>
Retention		Student grades

E. Knowledge Dissemination

Results of this study will be presented to the campus community in the form of a public talk to the Department of Philosophy and during UNC Charlotte's Teaching Week. They may also be made available to members of the UNC community during its annual Teaching and Learning with Technology conference. They may also be disseminated more broadly in the form of a journal article (e.g. *Journal of Online Learning and Teaching*) or conference (e.g. SLOAN-C).

F. Human Subjects

We have met with Cat Runden, IRB Compliance Specialist. It was determined that Dr. Boisvert and Dr. Croy should apply for IRB approval more as a precautionary measure. The schedule we've worked out with Ms. Runden for receiving IRB approval for this project is as follows:

- Dr. Boisvert will complete IRB training by November 11, 2011 (Dr. Croy has completed training within the past three years);
- IRB application will be turned in to Ms. Runden by November 11, 2011;
- Dr. Boisvert and Ms. Runden will meet by November 18, 2011 to work together to modify the application if necessary;
- IRB application will be turned in for approval by November 21, 2011.

G. Extramural Funding

If this work is accepted at a national conference (e.g. SLOAN-C), we will be requesting travel funding from the Philosophy Department/College of Liberal Arts and Sciences in the amount of \$2,000.

H. Timeline

Prior to Fall, 2011

1. Fall 2010. Dr. Boisvert will do preliminary, background research on retention in online courses and participate in the five-week workshop *Planning Your Online Course*, offered through UNC Charlotte's Center for Teaching and Learning.
2. Fall, 2010. In light of the background research and workshop, Dr. Boisvert and Dr. Croy will begin creating new learning resources and redesigning the course and its web site.
3. Spring and Summer, 2011. The revised version of the course will be offered Spring and Summer, 2011, and minor revisions and tweaks will be made to the course as necessary.

Fall, 2011

1. One online section of the course (60 students per section) will be taught and assessed.
2. General evaluation strategies, both quantitative and qualitative, will be made more concrete, as described in Section C.
3. IRB approval process will begin.
4. Assessment data from this section will be collected.

Spring, 2012

1. Online section of the course (60 students per section) will be taught and assessed.
2. Assessment data from this section will be collected.
3. Data from the Fall, 2011 and Spring, 2012 sections will be analyzed and interpreted to determine the extent to which the modifications led to outcomes (i)-(iv) listed in Sections A, B, and D above.
4. Comparisons will be made of the retention rates of this course with "pre-modification" sections of the course, other UNC Charlotte fully online courses and, if possible, with other meaningful categories of courses (e.g. fully online math courses).

After Spring, 2012

1. Findings will be disseminated as described in Section E.