

I PRO 301

# Final Report

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Summary of accomplishments, methodology and  
future of I PRO 301

11/30/2007

## 0.1 Introduction

We are IPRO 301, officially titled “Undergraduate Research on Interprofessional Education.” Our purpose is to better the IPRO program here at IIT. The IPRO program is a program that exists to fill the gap between lectures and the workplace, where students take a course in which they encounter a problem with no clear solution and must develop a solution and possibly implement it in a multidiscipline project team. This semester, we began or continued work on the following topics: learning objectives, groupware, inter-rater reliability between judges, reflective thinking, and ethical awareness.

## 0.2 Background

The IPRO program was initiated in 1995 as an outcome of the IIT Planning Process; we all recognized that we needed to enhance our students abilities to communicate effectively, work in multi-disciplinary (and multi-cultural) teams, make ethical decisions, and be the best professionals they can be. After the IPRO program was accepted as a "signature program" requirement for all undergraduate students, systematic evaluation was begun. Over the past five years, we have been systematically evaluating the ways in which the IPRO program defines the learning objectives and meets those objectives. We have also investigated strategies for improving the learning outcomes. We are basing our research on current evidence about how undergraduate students develop the complex competencies needed to be competitive in our global economy. The work we are reporting on this semester is part of an ongoing program of evaluation research designed to improve the learning experiences of all undergraduate students at IIT.

## 0.3 Purpose

Each topic listed above has its own unique purpose; however, we also share a common purpose: to improve the way students learn within the IPRO program, which, in this case, involves what they’re learning, how they learn it and how they are evaluated.

The learning objectives sub-team set out to find new learning objectives and improve the current learning objectives. The groupware sub-team set out to discover what previously has been used to aid learning online and hoped to discover what our students felt about our current suite for online communication. The inter-rater reliability sub-team set out to discover how IPRO day judging may be able to be improved and how this could be implemented. The reflective thinking sub-team would like to discover how to develop reflective thinking (coming to a conclusion based on current information) in college students. Finally, the ethical awareness sub-team set out to increase ethical awareness among IPRO students using interventions.

## 0.4 Research Methodology

The learning objectives sub team started a literature review by browsing online databases offered through Galvin library, including several trips to look at bound journals. Professor Huyck also passed along papers she'd seen that were relevant. Carolyn, the undergraduate involved in the learning objectives sub-team, attended the FIE2007 conference, read their papers, and contacted several presenters there about potential collaboration and relevant research results. Previous articles located by other IPRO Scholars were also included. Emails were sent to professors in relevant departments (ex. Chris Conley from the institute of design) to help us locate bodies of knowledge (textbooks) or papers that would help.

Once the learning objectives sub-team identifies a suitable body of knowledge, it is thoroughly read, definitions, sub domains, and measureable skills/behaviors identified. These are then broken down into the Purdue EPICS model for learning objective definition and questions for our four versions of the LO test are drawn up. These are all run by our identified "experts" in the field: for instance a faculty knowledgeable in the field.

The groupware sub-team began by searching literature available through Galvin Library and later moved on to other sources including general online sources. Articles that looked promising to contain a study were read and the (proposed) methodology was taken down. Authors who's name came common in the literature were researched more deeply, and a book concerning groupware in the classroom was uncovered, as well as several well-published authors in the field. A literature review, commenting on articles found, is currently being compiled.

The groupware sub-team also ran very superficial statistics in an attempt to correlated IPRO outcomes with usage of the iGroups groupware suite. Finally, a survey was completed in an attempt to get a feel for how our students felt about the IPRO program, this survey will be made available online near the end of the semester.

For inter-rater reliability, we started with a literature review of currently known information. After a thorough literature review was conducted, and the relevant data was collected from Candice Say and the IPRO Staff, different reliability coefficients were calculated in Microsoft Excel. These coefficients were compared to expected values.

The reflective thinking sub-team developed a valid measure of reflective thinking, established inter-rater reliability for that measure of reflective thinking and designed interventions that may stimulate the ability to think reflectively. Interventions investigated in fall 2007 include a handout including tips for giving more thorough answers to reflective thinking questions, the inclusion of project or problem-specific questions on the individual reports for each participating IPRO team, and a 4-hour ethics workshop which encourages students to consider a problem from multiple perspectives; typically 1-4 students from each participating IPRO team will have also attended the ethics workshop.

Reflective Thinking was measured by 1 question on the individual plan report, and will be measured by 2 questions on the individual final report, resulting in 3 data points for each individual at 2 separate times of measurement.

Individual plan reports were submitted for most students on participating teams between the dates of October 1<sup>st</sup> and October 25<sup>th</sup>; individual submission dates varied widely, as discussed later in the obstacles section.

The research methodology for ethical awareness began with the question “How are ethics taught?” Using the required class text, *Conducting Research Literature Reviews From the Internet to Paper*, 2<sup>nd</sup> Ed., as a guide academic journals and publications were searched for information on teaching ethics. Search terms were ethics, undergraduate, and teach/taught. The Academic Source Premier (EBSCO) was the primary database at this point.

Once methods of teaching ethics had been established, finding examples of teaching ethics by having students create codes of ethics became the focus. Academic Source Premier yielded no fitting results. With the help of the Center for the Study of Ethics in the Profession (CSEP) a suitable database, SCOPUS, was found and search terms were modified to be: “code(s) of ethics,” “generate,” and “undergraduate.”

A grading rubric, guidelines and sample code of ethics were developed to explain and demonstrate the requirements of the assignment. Teams produced the codes and submitted them by October 17<sup>th</sup>. All thirty-four teams submitted a code of ethics. The submitted codes of ethics were collected, graded and returned to the teams. Lastly, a basic analysis of the scores was performed.

## 0.5 Assignments

The learning objectives sub-team has been responsible to help produce IPRO deliverables, create rough versions of the BoK and test questions, as well as update surveys, for the new LOs (design, process improvement, and innovation). They then started working on finalizing these forms, identifying final BoKs, create test questions, break down each sub domain, etc. They also created a lit review, recruited for IPRO301, created and updated surveys, and were in charge of creating the IPRO day abstract.

Next semester they will finalize 1-2 of the new learning objectives, including implementing at least one intervention. Abstracts for papers will be submitted. Some data analysis (probably a factor analysis comparing spring '07 with fall '06 after we changed the positive questions) will be done, and more survey updates/creations. They may also be working on increasing student and faculty awareness of IPRO301 and what it does for the IPRO program.

Along with completion of IPRO deliverables, the groupware team reviewed the literature, uncovered relevant articles and eventually was charged with the creation of a literature review. The team began analyzing outcome and usage data provided by the IPRO office. Finally, the team created a survey to develop a subjective evaluation by the students of the iGroups suite.

Next semester, the team will analyze the usage and outcome data more carefully, along with the survey results, possibly submit abstracts and finally make recommendations on what needs to be implemented or changed to improve the usefulness of the iGroups suite.

Reflective thinking abstracts and papers submitted to conferences during the Fall 2007 semester were written and edited jointly by Margaret Huyck, Daniel Ferguson, and Elizabeth Howard. Final versions of abstracts and papers were submitted by Margaret Huyck. Review of reflective thinking abstracts and papers submitted to conferences during the Fall 2007 semester was conducted jointly by Daniel Ferguson, Margaret Huyck, Elizabeth Howard, Zeenatroohi Rahman, Phil Kalata, Jonathan Beagley, Carolyn Wood, and Kory Woods. Individual plan reports grading and scoring for reflective thinking levels was completed by Elizabeth Howard. Grading of Individual final reports and scoring for reflective thinking levels will be completed by Elizabeth Howard. The overall final report on the Fall 2007 individual reporting and reflective thinking measurement process will be completed by Elizabeth Howard.

Ethical awareness sub-team was given the task of implementing and judging the effectiveness of the new ethical awareness intervention. Specifically, tasks given to the team were: research teaching methods for ethics, research code of ethics creation, create all support documents for the intervention, act as facilitators during the ethics workshop, grade submitted codes, analyze the intervention's results. Members included Philip Kalata (sub-team leader) and Elizabeth Howard (graduate student assistant).

## 0.6 Obstacles

Some of the largest obstacles occurred by the learning objectives sub-team were while working on the literature review. The search results returned very few relevant results, and even fewer of these were actually obtainable. It was not until the end of the semester that the learning objectives sub-team actually found the papers used by Abhinav, who was in charge of the learning objectives research in previous semesters. Though the learning objectives team contacted several faculty members, none of them ever responded to the emails. Only a few weeks before the end of the semester, the learning objectives assignment was abruptly switched from the design learning objectives to the innovation learning objective because we could not find a suitable BoK. This obviously set the sub-team many weeks behind schedule.

The groupware team had a similar obstacle in finding relevant literature; however overcame it by searching for literature by specific authors rather than continue to search the Galvin Library databases. The other major obstacle for the groupware team was the lack of knowledge about statistics; this has not yet been overcome, but will hopefully be in the coming semester with the help of the graduate research assistants. Performing both the literature search and beginning the data analysis earlier would have been a good idea in order to possibly more effectively run the data.

Similarly, the inter-rater reliability sub-team had difficulty finding relevant articles. Also, choosing a measure of reliability was another difficulty, which was overcome through the review of the literature and finding the most effective method. Finally, putting IPRO day data into the correct format was difficult and time-consuming due to how the data was delivered.

For the reflective thinking sub-team, the 10 total teams that originally elected to participate in the individual reporting process, 8 teams completed the individual plan report and 2 did not submit any individual plan reports at all. For the 8 teams that did participate in submitting individual plan reports, the faculty advisor for several of the teams delayed the deadline for the individual plan report by about two weeks, and many students that did submit reports submitted their reports much later than the due date, so grading was a continuous process rather than an all-at-once, week-long occurrence as originally intended. The inclusion of project-specific questions was challenging and impractical. Project-specific questions were used on the individual plan reports, but it was difficult to submit questions to faculty advisors in time for them to review their appropriateness to the project, and some questions were consequently used that did not apply very well to the project as it evolved over time. Project-specific questions will not be included in the individual final reports. Some students appeared to have difficulty writing effective answers to the questions; one student in particular felt that he had answered the questions thoroughly and honestly, but received a very low score due to ineffective answers. This student re-submitted his individual plan report and received a revised grade, but clearer communication of the expectations in terms of grading are still a major concern. Due to time constraints, no handout was distributed to students to facilitate better performance on the reflective thinking questions or on the individual reports overall. This may have contributed to some of the confusion that was observed about the expectations for these assignments.

Major obstacles encountered were a lack of centralized information for scholarly articles on ethics and finding the proper search terminology. In both cases the obstacles were overcome with the assistance of the CSEP librarian, Kelly Laas.

## 0.7 Results

The learning objectives sub-team created rough copies of each of the new learning objectives; this means a definition, sub-domains, measurable skills/behaviors, and grading rubrics. Finalized copy of innovation will be done and ready to be implemented by the beginning of next year.

Implication: we can test our new learning objective with results from spring 2008, have an intervention, and have a benchmarking process for the other new learning objectives.

Surveys have been updated to reflect these new learning objectives. A textbook was passed out to be evaluated as a teamwork BoK. From these results we will have a preliminary evaluation of the book; a better process will be implemented next semester. Based on the scores from the LO pre and post tests, students have a reasonable understanding of design, innovation, and process improvement - certainly more than we had expected.

The groupware sub-team has created a student survey that will be available for student to fill out at the end of fall 2007 at both Auburn and IIT. A literature review was completed that included seven articles that evaluated or had a method of evaluation for groupware in education. Also, IPRO outcome data (in the form of grades and IPRO day scores) was compiled with iGroups usage data obtained from the IPRO systems administrator. The compiled spreadsheets will be used for later analysis and the survey will reveal what students like, dislike and would like to see changed in the iGroups suite. The literature review contains a plethora of previously successful and unsuccessful evaluations of groupware suites.

The inter-rater reliability sub-team similarly completed a literature review as well as a complete analysis of previous years' judging data to show what type of inter-rater unreliability currently exists within our own IPRO program.

The reflective thinking sub-team had a total of 91 students across 8 IPRO teams provided reflective thinking data on the individual plan report; of these responses, 12 did not provide enough information to be scored with an adequate level of confidence. These 12 responses were entered as missing scores. The average reflective thinking level for the remaining 79 responses was 2.00, pending review of the responses by an additional rater. Presented results from previous semesters at the frontiers in education conference in Milwaukee, Wisconsin on October 12<sup>th</sup>, 2007. Results were shared with colleagues at other universities who are doing similar work and made some useful contacts for future collaboration. Individual final reports will be submitted on December 5<sup>th</sup> for most remaining teams; responses will be scored by December 12<sup>th</sup>, and a final report on the entire fall 2007 individual reporting process will be completed by December 21<sup>st</sup>. The final report will include a summary and quantitative analysis of the differences between semesters, as well as a qualitative discussion of the effectiveness of the process used during the fall 2007 semester.

The ethical awareness sub-team's search revealed that most universities teach ethics in the context of philosophy courses or as a part of an existing required course, the latter being more popular in graduate schools. The standard for teaching codes of ethics is to teach a code of ethics relevant to the field of study. Two universities were found to use similar methods as our intervention, which is to have the students generate a code of ethics. Both universities also use this method in multi-disciplinary courses. Articles supporting deep learning were found and used as validation for our method.

The sample code of ethics that was posted for the benefit of the students has been modified to better exemplify the grading criteria after the students gave feedback. The submitted codes have been graded and returned. The average score for all teams was 78%.

## **0.8 Recommendations**

The learning objectives sub-team suggests the project go on to improve the awareness of IPRO301 and what it does for the IPRO program among students and faculty; publish what we do and why we do it so the changes don't appear so 'random' to the student body. Having a better organized

system for passing along papers and literature reviews between predecessors, IPRO400, and IPRO301 would also help immensely.

The groupware sub-team suggests looking deeper into iGroups usage and outcome measures, and how all these measures relate. The groupware sub-team also suggests greater awareness be made as to why these changes are taking place in the IPRO program. Finally, the groupware sub-team would strongly suggest more active communication between all members of IPRO 301.

The inter-rater reliability sub-team makes the suggestion of improving judge's training in future semesters and to continue to analyze the inter-rater reliability of the scores judges give on IPRO day.

In reflective thinking, project-specific questions were an attractive idea in theory, but were too unrealistic to implement; they will not be continued in future semesters of reflective thinking research. Calling the assignments "individual reports" rather than "reflections" did not seem to affect perceptions one way or the other; students still seem to resent being asked to write about their experiences and perceive it as pointless "extra work" for them to do. Other avenues of assessment may be better to pursue, but it is not clear what the options might be or how difficult it would be to implement options such as small-scale interviews or survey adaptations of the current reflective thinking measurement process.

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