

**IPESL Grant Application**  
**(Initiative to Promote Excellence in Student Learning)**  
**Minnesota State University, Mankato**

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**Did we learn anything?**  
**An attempt to measure changes in critical thinking skills.**

Dr. Jeffrey Buchanan (Psychology Department)  
Dr. Steven Kipp (Astronomy Department)  
Dr. Melanie Frappier (Philosophy Department)

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**Dr. Melanie Frappier**

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Are you full-time faculty in 2006-2007?  
(fixed-term faculty are not eligible to apply)

Yes No

Do you plan to return to MSU in 2007-2008?

Yes No

e-mail : (melanie.frappier@mnsu.edu)

Campus Address: Armstrong Hall 218Q

Campus Phone: 389-2901

College: Arts and Humanities

Department: Philosophy

Spring Semester Schedule:

List times when available to participate in Learning Communities and workshops.

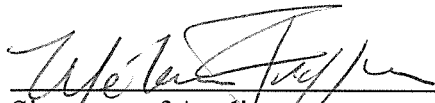
Mondays: all day

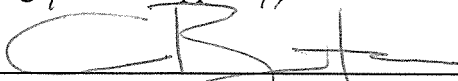
Tuesdays: not available \_\_\_\_\_


Wednesdays: all day \_\_\_\_\_

Thursdays: not available \_\_\_\_\_

Fridays: not available \_\_\_\_\_

  
\_\_\_\_\_  
Signature of Applicant

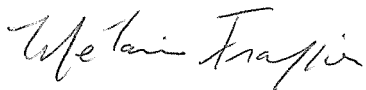
  
\_\_\_\_\_  
Signature of Department Chair/Director/Supervisor

  
\_\_\_\_\_  
Signature of College Dean/Vice President

Mankato, November 27, 2006

Professor Buchanan will follow-up with the page containing his signature and those of his Chair and Dean later today.

Apologies for the delay,

A handwritten signature in cursive script that reads "Melanie Frappier".

Melanie Frappier (melanie.frappier@mnsu.edu)

Assistant Professor

Philosophy Department

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**Dr. Jeffrey Buchanan**

Are you full-time faculty in 2006-2007?  
(fixed-term faculty are not eligible to apply)

Yes No

Do you plan to return to MSU in 2007-2008?

Yes No

e-mail : Jeffrey.buchanan@mnsu.edu

Campus Address: 23 Armstrong Hall

Campus Phone: 389-5824

College: Social and Behavioral Sciences

Department: Psychology

Spring Semester Schedule:

List times when available to participate in Learning Communities and workshops.

Mondays: 1-4 \_\_\_\_\_

Tuesdays: 2-4 \_\_\_\_\_

Wednesdays: 1-3 \_\_\_\_\_

Thursdays: 2-4 \_\_\_\_\_

Fridays: 1-3 \_\_\_\_\_

Jeffrey Buchanan  
Signature of Applicant

Rosemary Krawczyk  
Signature of Department Chair/Director/Supervisor

John C. O'Brien 11/27/06  
Signature of College Dean/Vice President

**Dr. Steven Kipp**

Are you full-time faculty in 2006-2007?  
(fixed-term faculty are not eligible to apply)

Yes    No

Do you plan to return to MSU in 2007-2008?

Yes    No

e-mail : [steven.kipp@mnsu.edu](mailto:steven.kipp@mnsu.edu)

Campus Address: 141 Trafton Science Center N

Campus Phone: 507-389-5912

College: Science, Engineering and Technology

Department: Physics and Astronomy

Spring Semester Schedule:

List times when available to participate in Learning Communities and workshops.

Mondays: 8-11 A.M.

Tuesdays: \_\_\_\_\_

Wednesdays: 8-11 A.M.

Thursdays: \_\_\_\_\_

Fridays: all day

Steven P. Kipp  
Signature of Applicant

[Signature]  
Signature of Department Chair/Director/Supervisor

[Signature]  
Signature of College Dean/Vice President

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## Proposal Details

**Title of Project:** Did we learn anything? An attempt to measure changes in critical thinking skills.

### Purpose

Little information is available as to the effectiveness of courses students are required to take to improve their critical thinking skills. The aim of this research is to evaluate the effectiveness of three critical thinking courses, namely PHIL 112: Logic of the Scientific Method, PHYS 115: Life in the Universe, and PSYC 103: Psychology Today.

Assessing the development of such skills is difficult. Following Paul and Nosich, we understand critical thinking as “conceptualizing, applying, analyzing, synthesizing, or evaluating information gathered from [...] observation, experience, reflection [...] as guide to belief and action”<sup>1</sup> This means that critical thinking assessments should not focused on students’ correct answers, but on how they achieve these correct answers. As Facione writes: “The challenge of CT assessment is not to let what is easily measured restrict our sense of the fullness of CT. It would be shameful if those assessment instruments [...] drove our CT curricular design and caused the dispositional components of good CT to be neglected.”<sup>2</sup>

Yet, evidence suggests that among the different instruments proposed to evaluate critical thinking skills (e.g. The California Critical Thinking Skills Test, the Watson Glaser Critical Thinking test, The Cornell Critical Thinking Test, etc.), few capture both cognitive *and* dispositional critical thinking abilities. This research will therefore initially focus on identifying (and/or modifying) an appropriate psychometric instrument to evaluate both cognitive and dispositional attitudes of students, before evaluating and comparing the effectiveness of each course.

### Project Description

This two-year project will evaluate the effectiveness of the three courses part of the GenEd cluster “Science, Aliens, and the Paranormal: Developing Critical Thinking Skills” that specifically aims at enhancing students’ critical analysis of the scientific and pseudo-scientific information found in everyday media. The specific courses are Astronomy 115: Life in the Universe, Philosophy 112: Logic of the Scientific Method, Psychology 103: Psychology Today.

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<sup>1</sup> Paul, R. and Nosich, G. M. “A Model for the National Assessment of Higher Order Thinking” ([criticalthinking.org/resources/articles/a-model-nal-assessment-hot.shtml](http://criticalthinking.org/resources/articles/a-model-nal-assessment-hot.shtml), last Accessed November 17, 2006).

<sup>2</sup> Facione, P. A. (1990). *Critical Thinking: A Statement of Expert Consensus for Purposes of Educational Assessment and Instruction. Executive Summary. “The Delphi Report”*. Millbrae, California: The California Academic Press, p.17.

The project has four goals:

1. Identify the specific critical thinking cognitive and dispositional skills develop in these courses.
2. Determine which of the psychometric instruments currently available is best adapted in evaluating the effectiveness of these courses through a survey of the literature. If no test is satisfactory, we plan to modify one.
3. Compare the effectiveness of the three courses with the effectiveness of others courses that are not devoted to critical thinking. (The tests' cost will be financed from the IPSEL grant)
4. Measure whether students taking these courses in conjunction (whether as part of a future learning community (that will be proposed in 2008) or the cluster) significantly improve their critical thinking abilities.

Identifying the specific skills these courses aim to develop will help professors develop more effective class activities. Determining which psychometric assessment is best suited to evaluate the effectiveness of these courses will enable other professors, at MSU and other institutions, to evaluate the quality of similar courses. Evaluating the courses' effectiveness will help determine the pertinence of offering them as part of a cluster or learning community.

### **Project Assessment**

#### Effectiveness of the courses

The effectiveness of the three courses will be evaluated through proper statistical analysis of the data obtained through the administration of the selected psychometric instrument. There is a possibility that, given the size of the classrooms involved in this research, there could be a false negative (i.e. the courses could be effective, but no statistically significant effect measured).

#### Validity of the psychometric instrument

A literature review of the available instruments will be conducted in order to determine which instrument best measures the abilities thought to be developed in the three courses (e.g. ability to ask questions, ability to evaluate sources, ability to question one's own beliefs).

### **Results dissemination**

We expect to communicate the results obtained at the different stages of the project at different professional conferences (e.g., Society for the Teaching of Psychology, American Association of Philosophy Teachers) and in professional and non-professional journals (*Informal Logic*, *Teaching Philosophy*, *Educational Vision*, *Skeptical Inquirer*, etc.) as well as through the IPSEL website.\

## **Departments and University Goals**

Knowledge of the effectiveness of these courses will help faculty improve their class activities and help determine the value for student learning of the GenEd Cluster and Learning Community integrating these courses. Finally, the results thus obtained will be an essential part of more accurate program assessments.