

MSSE 575 Capstone Paper and Symposium in Science Education

Course Description

Each Master of Science in Science Education (MSSE) student, with the cooperation of her or his graduate committee, identifies and completes a science education capstone project. Each project is designed to provide experience and information that aids our understanding of science teaching-learning or science curriculum. The capstone project topic is identified during the student's graduate program and relates to science education in the student's educational setting, linking multiple courses in the student's program of study in both the core and science content areas.

The results of each student's capstone project are summarized in a written, professional paper completed by May of the summer of planned completion of the Capstone Project. In addition, during the final summer session of the graduate program each student presents the capstone project to his/her committee, classmates, and other interested persons at the *Symposium in Science Education*.

Learner Outcomes

At the end of the course, students will:

- Complete the implementation of a personalized and professional capstone project aligned to the mission of the Masters of Science in Science Education program
 - Mission: To provide an exemplary, accessible, responsive, and student-centered science and applied science education master's degree resulting in enhanced teaching and learning of science for educators and their students.
- Successfully compose a science-based or science pedagogy focused professional paper as approved by the MSSE project advisor and the project science reader.
- Utilize professional formatting guidelines and accessibility standards set by MSU and the MSSE program.
- Effectively communicate their capstone project findings and learnings through multiple mediums and technologies (i.e., capstone presentation and capstone poster) to an audience of peers and other interested MSU staff and faculty.
- Attend the presentations of peers, reflect in writing on the work of peers in light of their own practice, and provide feedback to their peers on presentations attended.
- Complete all participation requirements of the D2L Capstone Preparation Forum course and maintain contact with project advisors

CAPSTONE PAPER

SECTION	STANDARD MET
Introduction and Background	<ul style="list-style-type: none">• Provides the background needed to understand the educational context and demographics of the community, school, and teaching environment, including data-based descriptions.• Articulates a purpose of the study that helps the reader assess the importance of the study relative to individual values.• Provides a clear and aligned rationale for the research questions studied during the capstone project.• Includes a clearly stated and measurable focus question and sub questions, if needed.
Conceptual Framework	<ul style="list-style-type: none">• The body paragraphs provide a clear overview of the research literature published in support of the research question(s).• Organizes themes in the literature using section headings which clearly connect to the research question(s).• Paragraphs provide evidence to support the theme using diverse perspectives from peer-reviewed literature, include analysis of the evidence, and a rationale and connection for the current study.• Paragraphs include a mix of parenthetical and in-text citations to provide evidence to support a claim.
Methodology	<ul style="list-style-type: none">• The introductory paragraph clearly and briefly summarizes the purpose of the study and research questions, and their alignment to the research design.• A clear description of the total number of participants (sample size), the demographics, and grouping information.• Includes information to determine the appropriateness of a comparison group or data.• Includes a clear statement that the project has been approved by IRB and references the IRB approval in the Appendices.• A clear description of the research design and the treatment (what did you do differently?) implemented with the research participants is included.• Includes clear descriptions of the strategies implemented during the study.• Includes clear descriptions of the qualitative and quantitative measures used during data collection and how the data was collected and analyzed.

	<ul style="list-style-type: none"> • Includes a data triangulation matrix which clearly identifies multiple data sources for each research question.
Data Analysis	<ul style="list-style-type: none"> • Includes a clear synthesis of the themes and patterns for each research question based on the collected quantitative and qualitative data across instruments during the treatment. <ul style="list-style-type: none"> ○ at least one claim for each research question is included and aligned. ○ evidence from multiple sources are used to support each claim. ○ a mix of quantitative and qualitative data (i.e., quotes) are used to support each claim. • Appropriate tables and figures are included to illustrate the intervention plan. Tables and Figures are properly formatted and include alternative text so they are accessible to all readers.
Claim, Evidence, and Reasoning	<ul style="list-style-type: none"> • Clearly provides further explanation of the claims shared in the data and analysis section and synthesizes 2-3 major findings. • Makes clear connections between the study, personal experience, and the literature. • Effectively utilizes the claims, evidence, reasoning format throughout the paragraphs. • Provides a clear description of the values of the study on science pedagogy (i.e., student impact, teaching practice) and its connection to the research. • Provides a clear description of the opportunities for further research. • Makes clear and strong connections back to the action research literature. • Describes how you changed through the action research process.

Creativity and Innovation	<ul style="list-style-type: none"> • The action research project explores a creative and innovative approach to teaching and learning based on the needs of the researcher and their students.
Writing Guidelines	<ul style="list-style-type: none"> • The writing is clear, coherent, and unambiguous. It includes all required elements and communicates effectively to the intended audience. Paragraphs contain a topic sentence and 3-4 detail sentences (claims – evidence – reasoning). • The writing is free of grammatical, spelling, and other errors. • When incorporating literature or discussing data, multiple sources are used throughout the paragraphs and represent diverse perspectives.
Formatting Guidelines	<ul style="list-style-type: none"> • The formatting expectations outlined on the Capstone Guidelines page are demonstrated throughout the capstone paper.
Revisions	<ul style="list-style-type: none"> • Completes revisions as requested by the graduate committee.

Section Standards Met out of 31 ____ Weighted score 35%