Ph.D. in Curriculum and Instruction with an Emphasis in Science Education

For additional information contact:

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The Purpose and Process of the Qualifying Exam in Science Education

The qualifying examination is taken at the end of the student’s coursework but prior to the dissertation proposal stage. (Note: All incomplete “I” grades for courses on the Planned Program of Study form must be removed prior to clearance for the qualifying examination.) The student is enrolled for at least 2 hours of graduate credit during the semester in which the qualifying examination will be taken. The student should also complete the Application for Doctoral Qualifying Examination (Form 3-C-1) and has it approved (signed) by the Major Professor. (Please refer to the most recent edition of the College of Education Graduate Handbook: Advanced Graduate Programs Policies and Procedures.)

The Science Education Program supports the implementation of “Option III” in the Graduate Handbook. In this context, the student develops a written document that should clearly demonstrate his or her ability to analyze, synthesize, and evaluate an area of major importance within the student’s field of study. The intent is for the student to show a comprehensive grasp of a substantive area within the field of science education. The resulting paper should approximate the quality of a paper found in recognized national journals for the field of science education.

Specifically, there are two paths a student may elect to take to fulfill this requirement in the science education program. One option is to select to construct an Analytical Paper to investigate an important area of discourse in the field. A second option is to conduct an Empirical Study using qualitative or quantitative procedures appropriate for the area under investigation. In either case, the student must work in conjunction with their Major Professor to develop a detailed contract, including specifications for the document as to the approach for the topic under investigation. This contract is then circulated to the other members of the Doctoral Committee for input and approval. The two options are described in more detail below:

Analytical Paper

The student identifies three propositional, argumentative statements that reflect theoretical conceptualizations of issues and/or problems in science education. These statements must reflect empirically and/or philosophically defensible ideas and represent novel positions based upon a synthesis of the existing literature. It is conceivable that these statements may ultimately serve as a foundation for the development of a dissertation proposal (although it is not the intent that this paper serves as a “stand alone” chapter for the dissertation). The student submits his or her statements to the Major Professor who reviews them and suggests possible modifications. The statements must include a rationale with appropriate references that correspond to that statement. This is an iterative process until the student and the Major Professor agree to distribute them to the other members of the program committee for input. The committee member rank orders the statements in terms of perceived importance to the field and may provide written feedback. The Major Professor, in conjunction with the student, then selects one final statement (the Major Professor will inform the committee as to the final statement that is under investigation). The student prepares a written paper on the selected statement. The student needs to gain unanimous support of the finished paper from all committee members. If consensus in not reached, the committee will suggest what specific issues need to be addressed and the student will be allowed to submit the paper a second and final time. Failure of the second exam will result in termination of degree candidacy.

The purpose of the Analytical Paper is to determine if the issues are appropriate for doctoral level investigation, if the student is aware of prevailing and alternative theoretical constructs which give rise to the selected issues, and to determine if the student is capable of performing an original synthesis of research. Other
than being written in APA format and being of quality (described above), there are no formal guidelines as to how to construct the presentation of ideas in the paper. While there is no specified length, the paper should be no less than approximately 25 manuscript pages prior to references. The main criterion is whether the student has demonstrated a readiness to move from the coursework phase of the program to the final development of a dissertation proposal. Much of that determination is based on evidence that the candidate is able to articulate researchable assertions or questions, develop a theoretically sound conceptual framework from the literature, make a compelling case for their arguments, describe the research or theoretical work that is needed to increase our understanding of the issue(s) under review, and draw explicit connections to practice.

Empirical Study

The student identifies a narrow and focused topic of inquiry that reflects an aspect of issues and/or problems in science education. It is conceivable that this inquiry might ultimately serve to raise more detailed or related questions from the inquiry for the development of a dissertation proposal (although it is not the intent that this paper servers as a “stand alone” chapter for the dissertation). In some cases, this may serve as a “pilot study” for an aspect of a potential dissertation. The student submits his or her topic to the Major Professor who reviews it and suggests possible modifications. This is an iterative process until the student and the Major Professor agree to distribute them to the other members of the program committee for input. The question(s) under consideration must include a rationale with appropriate references that correspond to that statement. The committee may provide written feedback. The Major Professor will inform the committee as to the final question(s) that are under investigation. The student prepares a written research report based on the focus of the inquiry. The student needs to gain unanimous support of the finished report from all committee members. If consensus in not reached, the committee will suggest what specific issues need to be addressed and the student will be allowed to submit the paper a second and final time. Failure of the second exam will result in termination of degree candidacy.

The purpose of the empirical study is for students to design and conduct a study to determine if the issue(s) of inquiry are appropriate for further doctoral level investigation, if the student is aware of prevailing and alternative theoretical constructs which give rise to the selected issues, and to determine if the student is capable of performing original research. The research paper must conform to APA guidelines and employ methodologies appropriate to the nature of the inquiry (i.e. quantitative and/or qualitative procedures). The overarching criterion is whether the student has demonstrated a readiness to move from the coursework phase of the program to the final development of a dissertation proposal. Much of that determination is based on evidence that the candidate is able to articulate researchable assertions or questions, develop a theoretically sound methodological framework, make a compelling case for their arguments, describe their research and relevant related work that is needed to increase our understanding of the issue(s) under review, and draw explicit connections to practice.