GUIDELINES FOR THE PH. D. QUALIFYING PROCESS IN MATHEMATICS EDUCATION

PURPOSE

Prior to beginning a doctoral dissertation and at or near the time of completion of all coursework, all Ph.D. students in the School of Education must pass a qualifying examination in their major and minor areas of study. For students in the mathematics education doctoral program, this examination takes the form of a qualifying portfolio and an oral examination[1]. Together, the qualifying portfolio and the oral are intended to meet these Graduate School requirements, as well as:

- demonstrate that the student is ready for doing independent research
- demonstrate that the student is prepared to support others (broadly defined) in mathematics learning and teaching
- demonstrate that the student has breadth of understanding across domains of mathematics education and depth in at least one area
- ensure that the student has the knowledge and skills to continue in the PhD program

The portfolio includes work that is produced during the program of studies, original work produced for the qualifying examination, a synthesis reflection and other documents that show engagement in practices of a scholar in the field of mathematics education.

Although the qualifying examination is a requirement of the University Graduate School, it does not specify what form this examination should take. The mathematics education faculty has chosen a format that also helps students prepare for similar reflective activities that they will undertake as professionals. It is not uncommon to find job postings that ask applicants to submit personal statements of teaching, philosophy of teaching/learning, and scholarship plans. Furthermore, when holding a faculty position, promotion and tenure reviews require the preparation of annual reports, pre-tenure portfolios, and promotion and tenure dossiers. Work on the synthesis reflection that is a part of the qualifying portfolio should provide good preparation for such future professional activities.

ELECTRONIC SUBMISSIONS

Qualifying portfolios **must** be submitted in electronic form. The length of the electronic portfolio should not exceed the equivalent of 160 double spaced pages. Electronic portfolios should be submitted as a single pdf file with appropriate bookmarks and hyperlinks. At a minimum, bookmarks and hyperlinks should be created for each item listed in the table of contents. We note that an electronic format allows highlighting connections that would be difficult to articulate in a linear style of writing. Therefore, students are encouraged to take full advantage of this format. However, the focus should continue to be the content of what is prepared, and we ask students to convey their understanding of mathematics education, rather than spend time on embellishments that have no added academic value.

[1] For minors inside the School of Education, the student's minor representative will decide what sort of qualifying process (test, portfolio, papers, etc.) suffices. For minors outside the School, the minor representative has the option of requiring some sort of qualifying process or waiving it

DUE DATE

A student will negotiate the due date for completion of the qualifying portfolio with members of her or his program advisory committee and in consultation with her or his advisor. ***The due date will be at least four weeks before the date of the oral examination***.

PORTFOLIO ASSESSMENT & ORAL EXAMINATION

All members of the faculty of the Mathematics Education Program will have the opportunity to read and provide comments on a student's portfolio. Mathematics education faculty members of the student's program advisory committee are expected to assess the portfolio using the relevant rubrics. Minor area representatives can read and assess the portfolio if they choose to do so. All faculty members who assess it will use the same rubric for the portfolio. The quality of a portfolio will be based on the following criteria: (1) breadth of familiarity with the literature in the areas included in the portfolio, (2) depth of understanding of the literature in the areas included in the portfolio, (3) ability to express oneself clearly, coherently, and in a convincing manner, and (4) insightfulness of reflections about development as a scholar and teacher educator.

After all faculty evaluations have been completed, an oral examination will always be held. The purpose of this part of the qualifying examination is for the advisory committee to discuss the written work in the qualifying portfolio, to request elaboration or clarification about entries that were poorly completed, and to ask the student in-depth questions over any or all contents of the portfolio and mathematics literature covered throughout the program. ***(Literature will be identified as starred readings on the reading lists of N716 seminars)***. The oral examination will always include discussion of concerns and questions about particular entries in the portfolio, as well as opportunities for the student to demonstrate an ability to "think on her or his feet." In the sections below we provide additional information on the oral examination.

FINAL EVALUATION

Upon completion of the oral examination, the student's program advisory committee will determine whether the quality of the student's portfolio and her or his performance on the oral examination warrant passing the student on the qualifying process. A pass will indicate that once the student has completed all necessary coursework, he or she will be admitted to candidacy. If the decision is that the student has not passed the qualifying process, the committee will select from among the following options: (1) ask the student to redo all or some potions of the qualifying portfolio, (2) ask the student to retake the oral examination on a future date after completing certain tasks, (3) a combination of options 1 and 2, and (4) inform the student that he or she is dismissed from the doctoral program.

AREAS OF COMPETENCY

The portfolio must document competency in each of the following areas:

- Substantial work with inquiry in education (e.g., via a paper based on the early research experience, documentation of involvement with research during an internship, a research paper from a course).
- Work that demonstrates breadth and depth of knowledge in mathematics education by

focusing on at least three different domains in mathematics education (e.g., papers written for N716 seminars, an original paper written since taking a seminar but related to the topic of the seminar)
    - Domains include *student learning, teacher education, assessment, curriculum, technology, equity*
- Substantial work done in the area of teacher education—either K – 8 or K – 12, depending on the student's program emphasis (e.g., instructional material that demonstrates design of a course or professional development workshop, a paper related to theoretical or philosophical issues in teacher education).
    - For the inclusion of instructional material, these documents should be accompanied by a description of the conceptual foundations for the course, sources upon which the course is designed, possible plans for future development
- Conceptualization of an independent line of research through the inclusion of an overview of their dissertation.

PORTFOLIO CONTENTS

The portfolio will consist of the following nine main (9) documents of which seven (7) should be original or written solely by the student. Below, "**[SA]**" will indicate those documents that should be sole-authored and "**[MA]**" will indicate those documents that may have multiple authors. For entries that may have multiple authors **[MA]**, the following guideline applies:

- It is preferable if the student is the first author. If not, the student should include a statement explaining his or her contribution to the paper

1. **[SA] Current curriculum vitae.** The CV should show evidence of engagement in the work of academicians. It should include:
    - at least 2 conference presentations;
    - at least one manuscript that has been submitted or accepted for publication (include evidence of this product in the portfolio);
    - evidence that the student has been involved in teaching activities that align with the work of teacher educators (e.g. involvement in professional development for in-service teachers, teaching a course for PSTs or in-service teachers)
2. **[SA] Synthesis reflection *(max. 15 double-spaced pages – 3600 words – excluding references)***. In the synthesis reflection the candidate should (a) tie together all of the candidate's work to date, stating clearly how she/he has grown as a scholar and teacher educator over her/his time in the program and connecting it to the candidate's professional goals, (b) situate her/his work and orientation within the professional literature and present a coherent account of the candidate's vision of herself or himself as a member of the professional mathematics education community, (c) explicitly address breadth and depth of knowledge, referencing the pieces included in the portfolio, and (d) conclude with a discussion of the candidate's professional plans and intended contributions to the field of mathematics education.
    - When writing the synthesis reflection, keep in mind that in contrast to reflections that share one's feelings about a topic, the goal of the synthesis reflection is to document knowledge, skills, and dispositions. The best documentation comes from examples of what the candidate has accomplished in terms of scholarship

rather than chronological list of activities the candidate has done. To put this another way, ***while documenting classes and activities the candidate has participated in can be helpful, the real goal is to show how those classes and activities made a difference in helping the candidate transition into becoming a scholar***. The portfolio is an opportunity to demonstrate one's strengths and high quality portfolios take advantage of this opportunity.

3. **[SA] Section descriptions *(max. 2 double-spaced pages each – 500 words)***. Section descriptions should include information on each major artifact in the portfolio and the purpose of the entries included in each section. The descriptions should include explanations of how each artifact is relevant and provide information on the knowledge, skills, or dispositions of the candidate.
4. **[SA] Teaching Philosophy *(max 4 double-spaced pages – 1000 words).*** The philosophy of teaching or of teacher education should clearly articulate the teaching ideals to which the candidate is committed and how these ideals will be visible in her/his teaching. The candidate should support her/his perspective with a strong theoretical framework and draw from the breadth of literature on mathematics teaching.
5. **[SA/MA] Three (3) pieces of writing (*max 20 double-spaced pages - 5000 words – each, excluding tables and references*).** Papers in this section should address at least three different domains in mathematics education. These may come from N716 seminars, whose topics are: *Student learning, Teacher learning/education, Assessment, Curriculum, Technology, Equity*. Alternatively, the candidate may select from papers completed as coursework or from work on a research project. Papers included in this section should align with the following guidelines:
    - <u>All three papers should demonstrate the candidate's best work</u>
    - [One may be **MA**] Two of the three papers ***must*** be the revised products of the seminars.
    - **[SA]** The third paper should be selected as the area of study for which the candidate will show depth of knowledge. (*This third paper may also be a revised seminar paper)*. The content of this paper should align with the candidate's research interests and be developed following consultation with a faculty member with expertise in that area. ***Consultation means that the candidate will receive guidance on the specific topic or question to pursue; however, the faculty member will not actively guide the writing or give feedback on drafts***.
        - The candidate should expect to substantially revise the initial paper to show depth and breadth of knowledge in this area.
        - We intend for this piece to show evidence that the candidate is able to think deeply about and respond to a significant problem/issue in the field related to the candidate's research interests.
    - The candidate should come to the <u>oral examination</u> prepared to answer questions that are specific to the content areas addressed in the included papers as well as questions that are specific to the content areas that were not targeted in the included papers. Questions will focus on the ideas covered in the starred readings on seminar reading lists.
6. **[MA] Preparation in inquiry (*max. 20 double-spaced pages - 5000 words – excluding tables and references)*.** This document should demonstrate the candidate's knowledge of the inquiry process and research methodology in a particular area of mathematics

education. This manuscript should include a well-articulated methods section showing the candidate's understanding of the methodology used, as well as the philosophical underpinnings of the methodology. Examples include but are not limited to:

- Early research experience (e.g. J605)
- Documented work in research from a project. *If the candidate is not the first author, the candidate should explain her/his contribution*
- Independent pilot study

7. **[MA] Preparation in teacher education (*max. 15 double-spaced pages - 3600 words – excluding tables and references)*.** This document should include evidence that the candidate has done significant work in preparing to become a teacher educator. Examples include:
    - Documents showing the design of a course or professional development workshop. These documents should be accompanied by a description of the conceptual foundations for the course, sources upon which the course is designed, possibly plans for future development, etc.
    - Teaching journal article
    - Self-study project
8. **[SA] Dissertation Overview *(max. 10 double-spaced pages – 2500 words).*** This document should provide evidence that the candidate has given significant thought to the dissertation. It should provide a brief overview of the dissertation by clearly articulating:
    - A description of the educational problem being addressed
    - A rationale for the study
    - A brief description of the literature that supports the research to be undertaken
    - A statement of the purpose/goal of the research or a list of research questions

PORTFOLIO PREPARATION

Because the portfolio is intended in part as evidence that the student is prepared to undertake independent inquiry, the faculty of the Mathematics Education Program and minor area representatives on the student's committee should not assist the student in any way in preparing any materials that will be included in the portfolio[2]. No faculty member, including the student's advisor, will read or react to drafts of papers or other materials being considered for the portfolio. The only exception to this policy is that the student's advisor may help the student conceptualize the portfolio. Students may consult with other students or non-mathematics education faculty as they prepare materials for their portfolios.

SAMPLE TABLE OF CONTENTS

A sample Table of Contents is shown below as an aid in preparing the portfolio. This sample also illustrates the importance of organizing the contents of the portfolio in a way that will make it easy for the reader to determine the competencies a particular entry is evidence of.

[2] Of course, some materials will have been produced previously under the direction of or with assistance from faculty members.