

# An Integrated Approach to Facilitate the Training of Methodological Competencies in a Teacher Education Program

## Un approccio integrato per facilitare la formazione di competenze metodologiche in un programma di formazione degli insegnanti

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Lan Li

Bowling Green State University  
lli@bgsu.edu

Xiongyi Liu

Cleveland State University  
X.LIU6@csuohio.edu

Savilla Banister

Bowling Green State University  
sbanist@bgsu.edu

### ABSTRACT

Despite the increasingly recognized importance of research skills of teachers, teacher trainees are often dread of discrete research curricula and deem them as uninteresting and disengaging. This paper presents a model that enables teacher trainees in the Master's program of Education in Classroom Technology at a Mid-western university in the United States to acquire methodological skills in task-based real learning environments. This model employs an escalating process of four phases: Generating Initial Project Ideas, Proposing Research Plans, Collecting and Analyzing Data, and Completing Master's Project and Reporting Findings. Through these four phases, the model aims to streamline core courses and strengthen faculty mentorship to support students' scholarship and creative endeavors. The program evaluation suggests that the model was well received by teacher trainees. Teacher trainees reported positive program experience and highly regarded the academic challenges encountered and the support received in the program. Limitations of the study were discussed and future studies were suggested.

Nonostante l'importanza sempre più riconosciuta delle competenze di ricerca degli insegnanti, gli insegnanti tirocinanti hanno spesso paura dei curricula di ricerca discreta e li considerano come disinteressanti e disinteressati. Questo documento presenta un modello che consente agli insegnanti che insegnano nel programma di Master in Educazione in Tecnologie in aula in una università del Midwest, negli Stati Uniti, di acquisire abilità metodologiche negli ambienti di apprendimento reali basati su compiti. Questo modello impiega un processo in quattro fasi: generazione di idee di progetto iniziali, proposizione di piani di ricerca, raccolta e analisi dei dati e completamento del progetto del master e risultati dei rapporti. Attraverso queste quattro fasi, il modello mira a semplificare i corsi di base e rafforzare la tutorato delle facoltà per sostenere la borsa di studio degli studenti e gli sforzi creativi. La valutazione del programma suggerisce che il modello è stato ben accolto dai tirocinanti degli insegnanti. I tirocinanti degli insegnanti hanno riportato un'esperienza positiva sul programma e hanno considerato molto le sfide accademiche incontrate e il supporto ricevuto nel programma. Sono state discusse le limitazioni dello studio e sono stati suggeriti studi futuri.

### KEYWORDS

Teacher Preparation, Methodological Skills, Research Skills, Classroom Research, Formazione degli insegnanti, abilità metodologiche, competenze di ricerca, ricerca in aula.

## Introduction

In recent years, the training in research skills has been strongly advocated for higher education. There is ample evidence that undergraduate involvement in research activities is associated with improved logical thinking and problem-solving abilities, critical understanding of domain-specific literature, and increased personal initiative and communication skills (Bauer & Bennett, 2003). More and more degree programs nowadays require students to complete a certain number of courses in research methodology prior to graduation.

Teacher education programs are no exception to this trend. It is believed that research methodological skills as design and evaluation of educational interventions and communication of findings are crucial, and highly demanded professional competency of teachers. In the Republic of Kazakhstan, methodology is included in the State Compulsive Standards for Professional Training of Bachelor's degree candidates in elementary education. Researchers believe that future school teachers should not only acquire domain-specific knowledge and pedagogy, but also develop research competencies to quickly identify professional problems, find creative and practical solutions, organize professional activities to implement and evaluate selected solutions, take responsibility for their actions, and engage in critical decision making (Syzdykbayeva, Bainazarova, & Aitzhanova, 2015). To follow the guidelines developed by the United Nations Decade of Education for Sustainable Development for reorienting teacher education to address sustainability (UNESCO, 2005), Pipere and Salite (2006) suggest that teachers should integrate more research-oriented practices to analyze problems encountered in education and propose solutions. Further, the current ISTE (International Society for Technology in Education) Standards for Teachers require educators to not only provide authentic learning experiences for students, but also design and conduct classroom assessments to inform learning and teaching ("ISTE Standards for Teachers," n.d.).

This teacher-as-research movement has also supported the rise of action research, where teachers are seen as lifelong learners and reflective practitioners (Odhiambo, 2010). It has long been urged that teachers should conduct research in their own classrooms as one way to improve teaching effectiveness and quality of student learning (Levin & Rock, 2003). When conducting classroom research based on their own curiosity, teachers become more knowledgeable about their fields, reflect deeper on their teaching practice, and show improved problem-solving, decision making, and critical thinking abilities. Pre-service and in-service teachers who conduct collaborative action research projects benefit even more from such experiences, as they engage in shared dialogue and inquiry about teaching and learning, and develop effective pedagogical partnership. Rock and Levin (2002, p. 12) claims that teacher can gain "awareness and appreciation for the processes of inquiry, reflection, action, and change as important roles of a professional teacher".

At Bowling Green State University in the United States, the Master of Education in Classroom Technology program (MCT) has created a series of courses to introduce educational research and statistics as effective tools to inform classroom practice. Most students in the MCT programs hold full-time teaching jobs and complete the Master's program exclusively online. These students in the program go by many different names—Master's students, in-service teachers, full-time teachers, non-traditional students, online students, etc. For clarity, we refer students in the MCT program as teacher trainees in this paper.

These teacher trainees have quickly embraced the idea of conducting classroom research and have perceived this method as critical and transformative in the 21<sup>st</sup> century teaching. However, being enthusiastic about classroom research

is one thing; intellectually and methodically designing and conducting research is another. Teacher trainees often report that they have difficulty connecting what they study in courses with learning environments in the real world. They may understand theories and concepts, but are in need of structured guidance to applying these to real cases. The dilemma faced by teacher trainees in the MCT program echoes those reported in the literature. Sela and Harel (2012) state that many teachers perceive teaching and research as two distinctly separated fields and need a mentoring system to support and guide them when making the connection. In order for teachers in graduate programs to grow and succeed as classroom researchers, Kaplan and colleagues (2003) argue teachers should take manageable and progressive steps to help them through the “research-building” process.

To systematically enhance teacher trainees’ competencies in asking relevant questions and make data-driven decisions in classroom, the MCT program at Bowling Green State University decided to create a Master’s Project Journey (MPJ) to streamline core courses and strengthen faculty mentorship to better support students’ scholarship and creative endeavors. From its conception, the MPJ process is characterized by an emphasis on the development of various research competencies among teacher trainees. Throughout this intensive two-year journey, the training of specific methodological skills is integrated in all core courses as well as activities related to teacher trainees’ thesis project and directly leads to the production of an empirical research paper, which is based on collection and analysis of data from an identified K-12 student population that the teacher trainees will work with upon graduation. All program faculty are highly involved in such efforts and the teacher trainees receive consistent mentoring through the journey. The purpose of the present study is to present the transformation and to report findings from the first round of program evaluation.

### **1. Master’s Project Journey**

MPJ is a key component of the Classroom Technology Master’s Degree. Teacher trainees are expected to demonstrate their accomplishments as classroom teachers and/or technology facilitator and leader through the project. The focus of their projects should reflect their own professional goals, be supported through relevant research, and demonstrate impact on student learning. There are two major components in the journey: Project Files Creation and Research Investigation. Usually, teacher trainees first develop technology-mediated instructional materials and then investigate the impact of their technology creations on student learning. For example, as Figure 1 shows, one teacher developed a series of podcasts for his 8<sup>th</sup> Social Studies class as his project files. Each podcast was designed to aid students in learning and help them better understand class materials. The podcasts covered topics for an entire year, ranging from “first migration to America” to “Reconstruction after the Civil War”. Afterwards, the teacher designed and implemented a study to examine the impact of his podcasts on student learning in his class.

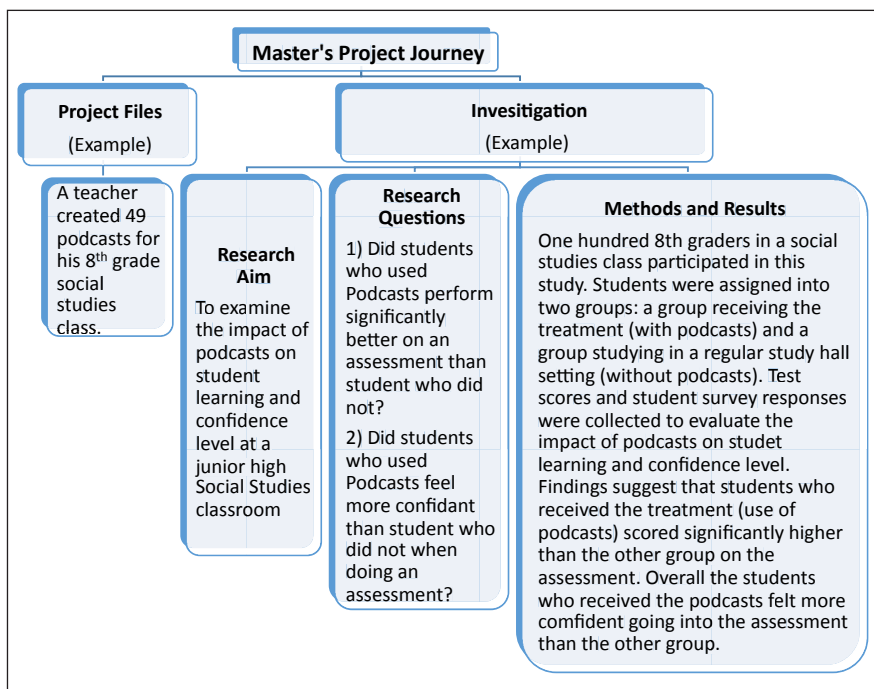


Fig. 1. Master's Project Journey Components & Example

Through the journey, teacher trainees design and fine-tune their research projects. Below (Figure 2) is an explanation of how teacher trainees might negotiate their project development, as they progress through the journey.

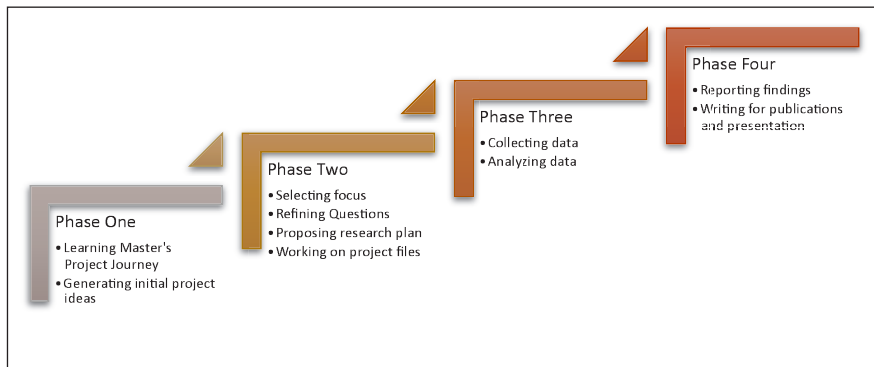


Fig. 2. MCT Masters Research Project Journey

**Phase One: Generating Initial Project Ideas**

During their first classes, teacher trainees are introduced to the Master's Project Journey and begin making a list of possible ideas for their Master's Projects. They are encouraged to add one or two pages to their blogs or wikis that include these ideas, along with resources and literature reviews that connect with these ideas. They are expected to talk to course instructors, faculty advisers, and classmates about the preliminary possibilities and refine their directions.

### **Phase Two: Proposing Research Plans**

Teacher trainees solidify their directions and write project proposals. At this stage, teacher trainees would submit their prospecti to the program coordinator and their own faculty advisers for approval. Once they determine their projects' directions and have approved prospecti, they start to complete the substance of their project files. The foci of teacher trainees' project files vary depending upon their interests and subject areas. Their project files might be a set of differentiated instruction materials and assessments to be used in particular curricular area utilizing digital technologies, a series of professional development technology workshops developed for a local school district, or a sequence of podcasts to aid students in learning course materials, as Figure 1 shows.

### **Phase Three: Collecting and Analyzing Data**

With the guidance of faculty who teach in educational research and statistics classes and their faculty advisers, teacher trainees refine their ideas, plan strategies of data collection and analysis, examine results and write manuscripts for submission to practitioner and research journals. Informed by data, preferably linked to student learning outcomes, they continue to tweak their projects' roll-out. Teacher trainees are encouraged to present and publish their work at this stage.

### **Phase Four: Completing Masters Project and Reporting Findings**

For the final seminar class, teacher trainees bring together evidence of project development in their professional portfolios, including their initial project proposals, actual project files, presentation and publication submissions, data collection, data analysis and findings. The ultimate goal is that they demonstrate how they have become experts in their areas of focus, that they have impacted student learning, and that they have shared their work with the broader educational community, in their efforts. They will be rewriting and resubmitting any articles not yet published during the final seminar course, and possibly proposing additional presentation and publications.

Let's retrace the journey of the teacher who created 49 podcasts (Figure 1) as an example. In the first a few classes he took (Phase One), the teacher explored concepts of digital age teaching and learning, and studied various dynamic tools that can be used in the 21<sup>st</sup> century classroom. He then expressed his interest in examining Web 2.0 tools and their impact on student learning and discussed this direction with classmates, course instructors, and his faculty adviser. In Phase Two, the teacher narrowed the scope of his project down to the impact of podcasts on student learning. He worked on his proposal and got it proposal approved. Afterwards, he started to design and create his podcast episodes. During Phase Three, the faculty who taught educational research and classroom assessment classes helped the teacher refine his research questions and guided him through the data collection, analysis and reporting process. Also at this stage, he started to work on conference proposals and write journal manuscripts. In the last phase (Phase Four), the teacher created a professional portfolio archiving all components of his MPJ, including all his podcast series and his research elements such as project approval, documentation of data collect and analysis, evidence of conference presentations and journal submissions. With the guidance of the faculty teaching the seminar class, he was encouraged to revise and resubmit not-yet-published work or propose new projects.

## 2. Program Evaluation

To evaluate the effectiveness of the program, particularly the effectiveness of the MPJ process, all teacher trainees graduating from MCT program from Fall 2012 to Summer 2013 were invited to complete a program exit survey. The survey was administered online via Qualtrics and a link to the survey was provided to the trainees during Phase Four of the program while they were taking a seminar. While the survey contained questions that prompt teacher trainees' all-aspect program evaluation, this paper only reports those parts that are relevant to its focus.

Among 29 valid responses received (with a 55% response rate), 13 came from Fall 2012, 2 from Summer 2012, 4 from Spring 2013, and 10 from Fall and Summer 2013. The respondents consist of 10 males and 19 females, all U.S. citizens, almost all Caucasian (27 Caucasian, 1 Caucasian and Asian, and 1 Native American/Alaskan), mostly younger adults (16 between 24 and 29, 5 between 30 and 39, 5 between 40 and 49, and 3 of the age 50 or above), and mostly with a higher GPA (Grade Point Average): 23 with GPA of 3.6 or above, 4 with GPA of 3.4-3.59, 2 with GPA of 3.2-3.39, and 1 with GPA of 3.0-3.19. The majority of the respondents were part-time students (27 out of 29). All indicated that they were taking most of their graduate course work online, except for one that indicated working in an off-campus cohort. Seventeen of the 29 already have a full time K-12 teaching job, 8 with a part-time K-12 teaching job.

**Program Quality:** Among the 29 valid respondents, 5 thought the program was excellent, 16 very good, and 8 good. When asked whether they would select BG-SU to do their graduate studies if they had to do it again, 1 said probably not, 2 maybe, 5 yes with reservations, and 21 chose yes without reservations. All but 1 indicated that they would recommend this university to a friend or relative considering this program. Regarding how often they have been challenged to do their best, most indicated always (9) or mostly (17), while a few indicated sometimes (3).

**Research Quality:** When asked to rate the quality of research being done in the program, 8 respondents selected Excellent, 7 Very Good, 12 Good and 2 Fair. When rating the availability of faculty to work with them on their research, 6 respondents chose Excellent, 9 Very Good, 11 Good, and 3 Fair. When asked the extent to which they agree or disagree with the statement, "My professors are good researchers", 8 students strongly agreed, 12 agreed, 1 somewhat agreed, 3 neither agreed nor disagreed and 5 no response. For the statement that "There is opportunity for research experience in my classes", 10 strongly agreed, 11 agreed, 3 somewhat agreed, 1 neither agreed nor disagreed, and 4 no response.

**Personal Growth:** On a 4-point Likert Scale, the respondents ranked the program highly for its contribution to their personal growth in such areas as *independent working/learning* (3.72), *preparing for work as a teacher-leader in the field of classroom technology* (3.66), *effective time management* (3.59), *thinking logically/resolving analytical problems* (3.38), *preparing to pursue lifelong learning* (3.24), *ability to carry out systematic research* (3.21), *followed by ethical practices* (2.93), *understanding written information* (2.93), *writing effectively* (2.83), and *speaking effectively* (2.31).

**Helpfulness of Advice:** Additionally, the respondents gave high ratings to the helpfulness of advice they had received on their Master's projects. Table 1 shows the mean ratings of 17 candidates that answered all six questions. The rating



scale is from 1 (strongly disagree) to 7 (strongly agree). Respondents rated their overall experience with advising 6.06 out of 7. Ratings on different aspects of advising range from 5.88 to 6.25 (Table 1).

Questions	Mean
My project mentor/chair was available when needed.	6.25
The project advice I received was useful for my educational goals.	6.18
The project advice I received was helpful.	6.12
The project advice I received was useful for my research goals.	6.00
The project advice I received was useful for my career goals.	5.88
My <u>overall</u> experience with advising for my Master's project at BGSU is good.	6.06

**Table 1. Mean Scores on Different Aspects of MCT Program Advising**

**Research Publications and Presentations:** Out of the 29 respondents, 20 have given presentations as part of course requirements, including 14 that did 1-2 presentations, 4 that did 3-4 presentations, and 2 that did 5-6 presentations. Again, out of the 29, 27 have participated in team projects as part of their coursework, including 15 that did 1-2 team projects, 10 that did 3-4 team projects, and 2 that did 5-6 projects. From of the 29, 7 reported that they submitted for conference presentations while acquiring their Master's degree and among those, three submitted more than 6 papers, one 5-6 papers, one 3-4 papers, and two 1-2 papers. The four respondents that submitted five or more papers were also the ones that presented formal conference papers, including one that presented more than 6 conference papers, two that presented 3-4 conference papers, and one that presented 1-2 conference papers. The same 4 respondents also reported having submitted papers for journal publications, with the addition of one more respondent. Of these 5 respondents, 3 had their submissions accepted for publication in a journal. The most prolific of them published more than six journal papers, which is quite productive for a student in a Master's program. It is also encouraging to report that seven of the respondents indicated that they expected to earn a doctoral degree in the near future.

## Conclusion

Many teacher education programs have attempted to equip student teachers and teacher trainees with research skills through various educational research and statistics courses. While these classes may be effective at improving teachers' methodological skills, nevertheless, the teacher-as-researcher paradigm may not ensue as expected. Teachers may deem discrete research curricula as uninteresting and disengaging (O'Hanlon, 1988). Researchers (Lovat, Davies & Plotnikoff, 1995) argue that teachers would be more enthusiastic if methodological skills are integrated into coursework, and thus are acquired through task-based methods.

This paper presents a model that enables teacher trainees to acquire methodological skills in real learning environments. The MPJ model is embedded in the Master of Education in Classroom Technology program at Bowling Green State University through four distinct phases that guide students through the research journey from the beginning to the completion of the program. Overall, the program evaluation indicates that the MPJ model has been well-received by teacher trainees. A few highlights from the evaluation findings include: first, the program trainees reported mostly positive program experiences, particularly about their research journey. They indicated that they were always or mostly challenged to do their best in the program, and rated the quality of research being done in the program as good, very good, or excellent. In addition, the trainees gave very high ratings (over 6.0 on a 7-point scale) regarding the helpfulness of advice that they received from program faculty. Second, the trainees ranked the program highly for its contribution to their personal growth. While the areas of personal growth that received the highest ratings were related to independence, leadership, and time management, the trainees also gave high ratings (over 3.2 on a 4-point scale) to the program in terms of helping them think logically, resolve analytical problems, carry out systematic research, etc. It implies that the full integration of research training in the program has not only directly contributed to the mastery of methodological skills among the trainees, but also indirectly helped in the development of other crucial skills that empower trainees to become reflective practitioners and life-long learners. Third, and the most importantly, there is strong evidence that the trainees have achieved sufficient methodological skills that allowed them to subject their research papers to the scrutiny of peer reviews and, in many cases, pass such scrutiny to present in professional conferences and publish in academic journals.

Since the implementation of the MJP process, the program has attracted quality candidates, and those who have completed the program reported mostly positive experiences. Formal program evaluation provides much evidence that the MJP model is considerably effective in preparing the trainees for their research journey by helping them master crucial research concepts and develop fundamental methodological skills. It also implies that faculty involvement is key to the success of such an innovative program. In spite of a slight increase in their workload, most program faculty consistently provided useful, timely advice to the trainees. Since many trainees were new to scientific research when they entered the program, support from faculty played an extremely important role in maintaining teacher trainees' motivation and helping them to overcome various hurdles in this challenging journey.

While we are delighted to see the results presented in this paper are encouraging and promising, we recognize that they only represent perspectives of teacher trainees in this particular program. Future studies are warranted to explore thoughts and insights from university faculty and local schools where teacher trainees conduct their research. Studying how faculty and school administrators view the MJP process and its impact on teachers' classroom practice would provide valuable data to triangulate the findings of this study. By sharing our experience in conceptualizing and implementing the MPJ model, we hope to encourage more experimentation of similar programs and further discussion about strategies to ensure both short-term and long-term impact of such programs on their participants, teacher education and the education system.



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