

Action Research in an Educational Research Methods Course to Implement Alternative Teaching Approaches

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Abstract

Teacher education programs put emphasis on the inclusion of educational research methods courses in the curriculum for the successful completion of teacher training. There are problems in engaging pre-service teachers in the research process to explore educational issues. To overcome these challenges, the author aimed to conduct an action research study to integrate inquiry-based teaching and learning experiences into an educational research course to assist students in designing applicable research proposals. The instructor prepared different instructional materials for each week to guide students understand the theoretical perspectives in an active process. The design of the course materials followed the backwards design to emphasize the learning outcomes of each week and supported students to prepare a research proposal. Through the qualitative design of the study, instructor journals, student reflections, and samples of students' written work or assessment artifacts were collected as the data sources and analyzed through inductive analysis to understand the challenges and successes of the instructor and students' attitudes and experiences: The instructor focused on the preparation of formative and summative assessments in an iterative process by listening to the learners' perspectives. Evaluation of student achievement was based on completion of weekly materials and final proposal; students' active involvement in weekly activities contributed to their final grades to develop satisfactory research proposals. Integrating alternative approaches to teacher training is necessary to guide pre-service teachers' learning in an active process with diverse formative assessment materials. Inquiry-oriented instruction can help pre-service teachers gain competency to deal with problems in practice.

Keywords: Action Research, Educational Research, Alternative Teaching Methods

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Introduction

Teacher education aims to focus on pedagogical knowledge as well as basic subject knowledge training (Berry et al., 2015). Pedagogical knowledge is not just about transferring the knowledge; it aims to enhance teachers' inquiry-oriented practices and raise the teacher as a good researcher. Therefore, it is of great importance to include educational research methods courses in the curriculum of teacher education programs for the successful completion of training. Teachers need to understand scientific research methods and apply them in practice to investigate problems in the teaching and learning process. It is necessary to involve teachers in solving the problems to make them aware of and investigate problems in teaching and learning. For this reason, it is important to take educational research courses and pass them successfully for teachers. This study aimed to improve the teaching of educational research methods to enable teacher candidates to design applicable research proposals. The instructor acted as a researcher and aimed to conduct an action research study to integrate inquiry-based teaching methods into the educational research course. During the action research process, the instructor designed the teaching materials in accordance with the backward design to emphasize the learning outcomes to ensure active participation of the students. The purpose of this study was to investigate and understand an instructor's teaching of an educational research methods course as an action researcher through inquiry strategies. The research questions guiding this study are: 1. How does the design of the course change across different cycles? 2. What experience does the instructor have when integrating the questioning method?

Methods

Action research can be defined as a practitioner-oriented inquiry to actively think, practice specific situations while doing research (Putman & Rock, 2016). Action research focuses on implementation to understand the problems and take actions for change and improvement and treatment of problematic situations. This process requires practitioners to diagnose the problems, make evaluations and monitor the process of change as an action for future development.

Action research aims to link theoretical perspectives into research and practice. It is a process of linking action, theory, and research to improve teaching and learning practices as well as knowledge about a problem or specific situation. According to Altrichter et al. (2013), action research continues in different cycles to modify the instructional practices through planning the lesson, acting on or teaching the lesson plan, observing the implementation, and reflecting to make changes for future practices. In this process, teachers as researchers plan, teach, observe and reflect in different cycles to better understand how they teach and how effectively their teaching methods help their students learn. They ask questions, collect data, reflect on it, and evaluate it in ongoing cycles. The data and assessments collected provide an understanding of how the instructor teaches and how effectively his teaching methods help his students learn.

The action research study was conducted in an "Educational Research Methods in Mathematics and Science Education" course. The course aimed to teach the basics of educational research, understand how to conduct your own research and how to evaluate and use the findings of research conducted by others. Students in the course were guided to develop basic knowledge about research methods utilized in education. The course also

aimed to help learners engage in discussions on processes involved in research to understand how to use specific methods and findings or previous research to address the problems.

The research was conducted across three semesters with different pre-service mathematics and science teachers. Each semester, the course included 20-30 pre-service mathematics and science teachers. The education language of the course was in English. Instructor as action researcher and the main participant of the study was a science educator in a research university in Turkey, who had qualifications in qualitative and quantitative research methods.

The study aimed to understand the challenges and successes of the instructor and students' attitudes and experiences. The study included a qualitative design with variety of data sources: instructor pre- and post- lesson journals, student reflections, and samples of students' written work or assessment artifacts. The data were analyzed through inductive analysis to construct themes of the instructor's experiences.

Results

The instructor-as-researcher collected data in three semesters as cycles of the study. In the first cycle, the instructor planned the lesson, taught the lesson, observed what happened, and reflected on what to do for next cycle. In the second cycle, the instructor's lesson planning changed based on reflections in the first cycle, taught the new planning, observed what happened and reflected on what to do for the third cycle. During the third cycle, the instructor combined the reflections and prepared a new teaching plan for the following semesters.

In the first semester, the instructor started asking questions about how to teach the course. The course content was prepared to focus on what research is, what research is not, research problem, question, and purpose, review of literature, validity and reliability in research, and qualitative and quantitative data collection and analysis. The instructor gave homework on exploring a research topic, conducting review of literature, writing research proposal, determining data collection and analysis methods, and writing the results and discussion sections. At the end of the semester, the instructor's reflections showed that the instructor had difficulties in explaining sampling and instrumentation, in focusing on quantitative methods, and managing the time and grading across the given assignments.

The instructor's experiences in the first semester led her to prepare more organized lesson plans. Students were given five assignments at the beginning of the semester with appropriate timing and grading. The assignments focused on identification of research problem, methodology, data collection and analysis, review of literature, and results and discussion sections. Then, the instructor prepared the learning objectives and essential questions for each week. For example, the first week's content addressed the following essential questions: What is the nature of research in academic settings? What research paradigms can guide research process? What kind of research tools can we utilize during the research process? As to learning objectives, the following one was prepared to plan the instruction: students will be able to explain the nature of research in academic settings, compare the research paradigms, and identify research tools. Additionally, the course emphasized the ethical standards in research through addressing confidentiality and informed consent. Then, the instructor explained the types of sampling and instrumentation strategies. To emphasize statistics, the instructor integrated a discussion on variables under investigation including dependent, independent, mediating, moderating, and confounding variables along with descriptive and inferential statistics. With this plan and organization, the instructor's

reflections showed that she was satisfied with more organized teaching and learning process, students' use of quantitative data collection and analysis methods and diversity in students' research topics.

The third semester was used to reorganize the instructor's planning, assessment, and reflections. The instructor redesigned the learning objectives in a comprehensive way as follows:

By the end of the semester, students will be able to:

- design, conduct, and interpret educational research to
 - understand research terminology, concepts, and practices
 - generate research questions in the selected educational issue of interest
 - review the related literature
 - develop basic skills for statistical and qualitative analysis
 - design an appropriate research study to collect and analyze data
 - understand how educational research can inform teaching
- express findings clearly in oral and written form based on disciplinary standards
- apply ethical standards when evaluating and conducting educational research
- enhance collaborative work to design and conduct educational research

The instructor also rearranged the class topics and activities for 12-week course period as follows:

Week-1: Introduction to Educational Research

Week-2: Research Paradigms in Education

Week-3: Research Problem, Hypothesis, and Assumptions

Week-4: Review of Literature

Week-5: Quantitative Research Design

Week-6: Qualitative Research Design

Week-7: Sampling Strategies

Week-8: Variables and Instrumentation

Week-9: Data Collection

Week-10: Data Analysis

Week-11: Ethical Standards and Outline of Research Proposal

Week-12: Conclusions

Moreover, the instructor prepared the lesson activities and learning tasks based on a three-level teaching cycle. The cycle included engagement phase to read the content of the lesson, exploration phase to work on the activities and formative assessment to provide feedback on students' learning, and evaluation phase to work on multiple-choice questions as summative assessment. Figure-1 presents the teaching cycle.

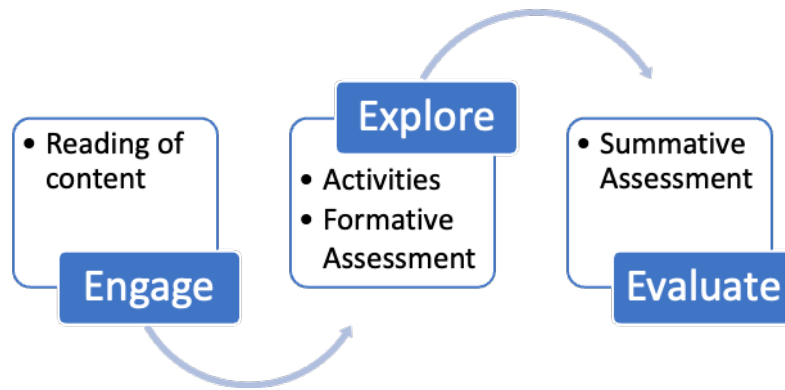


Figure 1. Teaching cycle

Conclusion

This study showed that students' active involvement in weekly activities contributed to develop satisfactory research proposals. Integrating alternative approaches to teacher training is necessary to guide pre-service teachers' learning in an active process with diverse assessment materials. Inquiry-oriented instruction can help teacher candidates gain competency to deal with problems in practice (Sengul & Schwartz, 2020). The instructor could experience consistent rehearsal across semester, refine delivery style and prepare useful resources. In this process, it was easy to arrange timing and transitions across the assessments. Action research is useful methodology to seek feedback, reflect on performance, explore new techniques through setting goals in an iterative process.

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