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TEACHER CANDIDATES' LEARNING IN A RESEARCH COURSE: IMPLICATIONS FOR FUTURE TEACHING PRACTICES AND PROFESSIONAL IDENTITY FORMATION

(Research article)

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Abstract

This qualitative study investigated the learning outcomes of teacher candidates (TCs) enrolled in a required research course in a teacher preparation program in Ontario, Canada. Over a 15-week semester, 32 TCs completed the course and their teaching practicum concurrently. The course introduced foundational research concepts, principles, and practical skills, culminating in designing and implementing an action research project. Data collected from TCs' course reflections revealed an increased understanding of research, particularly action research, and a broadened perspective on inquiry- and evidence-based teaching. The findings also supported the development of their teacher identities, fostering greater agency, empowerment, and self-advocacy for personal and professional growth. This study supports existing evidence of the benefits of integrating research education into teacher preparation programs, advocating for its inclusion as a standard practice in teacher education globally.

Keywords: Teacher candidates, research principles, inquiry/evidence-based teaching, agency

1. Introduction

Globally, it is widely accepted that the quality of any education system is closely linked to the development and presence of exceptional teachers in classrooms, suggesting that education cannot exceed the quality of its teachers (Barber & Mourshed, 2007). In today's increasingly complex and demanding teaching environments, Hine (2013) argued that preparing teachers to be *exceptional* in responding to increasingly high educational standards necessitates empowering them to be independent problem solvers and critical thinkers. Several scholars (Barber & Mourshed, 2007; Carver & Klahr, 2001; Hine, 2013; OCT, 2013) argued that there is a need to prepare teacher candidates (TCs) to be exceptional and scholarly teachers for future educational demands. Therefore, it is assumed that if TCs acquire research principles and are provided with opportunities to apply these skills, they are more likely to transform their teaching practices and professional identities. However, this transformation is difficult to achieve and even more challenging to measure. Consequently, there is a growing demand for rethinking teacher preparation programs, emphasizing that future teachers should be more scholarly, inquiry-based, self-directed,

independent, and lifelong learners. One response to these demands has been to increase teachers' research competencies and capacity.

Carver and Klahr (2001) described the development of teachers' scholarly capacity as a shift toward equipping educators with foundational research principles and skills to support high-quality instruction, the use of inquiry- and evidence-based teaching (IEBT) strategies, and engagement with research-informed practices. In Ontario, Canada, the Ontario College of Teachers (OCT) has promoted a similar vision, advocating for the preparation of teacher candidates (TCs) who are "academic, not employment-based" (OCT, 2013, p. 2). In response, the Ontario Ministry of Education restructured teacher education programs to include research-based objectives and mandatory coursework aimed at developing teachers' research competencies (OCT, 2013).

This emphasis on developing research-minded educators, often referred to as teacher-researchers or scholar-practitioners, has gained global traction in teacher education programs (Borko, 2004; Dana & Yendol-Hoppey, 2019; Frances et al., 2018; Holter & Frabutt, 2012; James & Augustin, 2018; Mertler, 2016; Timperley et al., 2007). While prior research highlights the benefits of embedding research knowledge and skills within teacher education, Betts et al. (2017) identified there are limited studies involving TCs that bridge research learning with practical classroom application. Burgin and Daniel (2021) suggested that this gap is not unexpected, as many TCs receive limited exposure to implementing research processes during their teacher preparation programs, particularly in areas such as refining pedagogical approaches, selecting assessments, and adjusting instruction to meet student needs and improve academic outcomes. As a result, even when TCs acquire research skills, they often feel unprepared to apply this knowledge in practice. Consequently, it remains challenging to determine whether their acquisition of research knowledge translates into improved teaching or supports the development of exceptional educators. This disconnect highlights a significant limitation in the literature, specifically the lack of opportunities for TCS to apply research meaningfully during their teacher preparation programs. One of the objectives of the course and study was to address this gap by integrating research application into coursework and exploring the learning outcomes.

Therefore, the concept supported in this research was that TCs who acquired appropriate research principles and foundations, given the opportunity to implement these skills with an intentional approach, would modify their teaching practices and professional identities to become the exceptional teachers needed in classrooms to meet the increasing demands. The significance of this study lies in its course design, which not only develops research competencies but also facilitates the practical application of these skills during the teaching practicum. This dual emphasis on shifting TCs's perspectives on their roles as educators and reshaping their professional identities was the objective of the research course and the purpose of this research study, to determine whether these objectives were met. The study explored the following research questions:

1. Did TCs improve their knowledge and understanding of research fundamentals and principles?
2. What did TCs learn by applying their research knowledge in practice, particularly through organizing, implementing, and analyzing an action research (AR) project during their practicum?
3. How did their learning from the research course impact their professional teacher identity?

In this paper, I presented the course structure and the findings that emerged from the study.

2. Background Information and Literature Review

2.1 Terms

Several terms are used throughout this paper that require clarification for readers.

a) *Teacher Candidates (TCs)* are individuals enrolled in a teacher preparation program (and often referred to as pre-service program) who are training to become future teachers.
b) *Research principles* refer to the fundamental principles of research, including an understanding of methodology, data collection, participant selection, and data analysis, as well as the ability to locate, critically evaluate and analyze academic research.
c) *Action Research (AR)* is a qualitative research method frequently used in educational settings, wherein the researcher actively participates in the context being studied.
d) *Inquiry- and evidence-based teaching (IEBT)* refers to teaching practices informed by and grounded in research-based evidence. In this context, "inquiry" is used interchangeably with research.
e) *Agency* refers to the capacity of individuals to feel empowered and recognize their own resources to fulfill their potential.

2.2 New Directions for Teacher Education Programs

Pursuing continuous improvement in schooling and education has consistently driven the reshaping, restructuring, and reconceptualizing of teaching and education (Fullan et al.,1990). Over the past decade, a significant shift has emerged in teacher preparation programs, moving from a traditional focus on curriculum content (what teachers need to know) toward an emphasis on core teaching practices. This approach integrates content knowledge, pedagogical skills, and the development of professional identity through the act of learning to teach (Grossman et al., 2009). As a result, teacher preparation programs in Ontario (and beyond) have re-conceptualized

their program praxis, encouraging TCs to adopt different teaching practices and reframe professional identities.

2.2.1 Research content within teacher education programs

Many scholars (i.e., Borko, 2004; Dana & Yendol-Hoppey, 2019; Frances et al., 2018; Holter & Frabutt, 2012; James & Augustin, 2018; Mertler, 2016; Perrett, 2003) have documented a shift in teacher preparation programs, showing the inclusion of research content, particularly action research methods. Several (Mertler, 2016; Timperley et al., 2007) argued that embedding research principles within teacher education fosters greater professional agency, supports teacher inquiry, and promotes knowledge-building. In Ontario, this shift also aligns with the Ontario College of Teachers (OCT, 2013) directive for developing more scholarly and academically minded educators. Consequently, an increasing number of teacher education programs in Canada and beyond have responded by integrating dedicated research courses or expanding research-related content within their curricula (Cabaroglu, 2014; Costello, 2011; Goodnough et al., 2015; Hine, 2013; James & Augustin, 2018; Saribas & Ozar, 2022). These efforts aim to prepare *exceptional* teachers capable of improving student learning through inquiry-based and evidence-informed practices.

2.2.1.1 Action research (AR).

AR is defined as a deliberate, intentional, and systematic inquiry aimed at addressing social issues or challenges (Bogdan & Biklen, 2006; Meyer, 2000; Stringer, 2014). This orientation makes AR relevant to education contexts, especially for teachers seeking to improve their teaching practices. Serving both as a research methodology and a professional development tool, AR has a longstanding place in educational research. The term AR was first associated with Kurt Lewin, who conceptualized AR as a cyclical, dynamic, and collaborative process. One of the most widely referenced definitions of AR, offered by Kemmis and McTaggart (1988), remains pertinent today:

> A form of collective reflective inquiry undertaken by participants in social situations to improve the rationality and justice of their social or educational practices and their understanding of these practices and the situations in which they are carried out. (p. 6)

Unlike casual classroom observations, AR involves an intentional, systematic and conscientious process for a specific purpose (Parsons et al., 2013). This distinction positions AR as an effective tool for self-directed professional learning and development, enabling educators to investigate and resolve classroom challenges. AR empowers teacher-researchers "to find effective solutions to problems that they confront in their everyday lives" (Stringer, 2014, p.1) with the primary purpose of effecting positive change in their practice (Frabutt et al., 2008; Holter & Frabutt, 2011), and, in some cases, contributing to the broader community (Mills, 2011).

AR's methodologies and methods align well with reconceptualizing the objectives of teacher preparation programs to develop teachers who identify as scholarly-practitioners (Dana & Yendol-

Hoppey, 2019; Mills, 2011). Miles et al. (2020) emphasized AR's accessibility, adaptability, and relevance to educators' roles, while Pedersen and Pedersen (2008) highlighted its capacity to integrate teaching, observation, mentorship, and pedagogical change to support student learning. Consistently over the years and across the literature, many scholars have argued for the inclusion of AR in educational contexts, citing its capacity to foster teachers' self-directed professional growth (Bann et al., 2020; Mertler, 2016; Osterman & Kottkamp, 1993; Tomlinson, 1995; Vaughan & Burnaford, 2016). More specifically, AR supports the development of agency and lifelong learners who can independently solve classroom challenges through evidence-based practices (Hine, 2013; Parsons et al., 2013).

AR is also widely regarded as a transformative practice. For example, Ward and Millar (2019) stated that "AR can transform teachers, the classroom, and the school community" (p.42), while Kemmis (2009) suggested that AR is a "critical and self-critical process aimed at animating these transformations through individual and collective self-transformation: transformation of our practices, transformation of the way we understand our practices, and transformation of the conditions that enable and constrain our practice" (p.463). Meyer (2000, 2006) further explained that AR's strength lies in its dual focus on generating practical solutions and empowering educators. Towers (2013) added that TCs who learn and implement AR develop the capacity to work within collaborative and action-based teacher education environments.

Despite the advantages of AR, it is not without limitations and criticisms. A primary concern is its vulnerability as a research method to subjectivity and biases, as the researcher is often an insider in the context being studied. This dual concern can raise questions about objectivity and analytical rigour (De Oliveira, 2023; Kock, 2004, 2005; Ward, 2021). (De Oliveira, 2023; Kock, 2004; 2005; Ward, 2021). However, such concerns are not unique to AR and apply broadly to many forms of qualitative research involving insider perspectives. Despite acknowledged weaknesses, AR remains a viable approach for educators to problem-solve within their educational settings. To mitigate its limitations, Kock (2004, 2005) suggested two key strategies: engaging in collaborative AR with other educators and strengthening educators' research skills and identities.

Given AR's potential benefits and the strategies available to address its limitations, embedding AR into teacher education program and research courses adds value. It supports the broader goal of fostering TCs' professional learning outcomes by positioning AR as a "modus operandi of effective teachers to foster collaborative, reflective and in-situation experiences, which appear to be necessary conditions for exploring the complexities of teaching" (Levin & Rock, 2003, p. x).

2.3 Changes to the Teacher Education Program in Ontario, Canada

In response to evolving educational demands, in 2015, the Ontario Ministry of Education implemented significant reforms to teacher preparation. These changes extended the program's duration from one year to two years and increased the required practicum to a minimum of 80 days. The revised curriculum also introduced mandatory core content emphasizing equity and diversity, supporting students with special needs, addressing mental health concerns related to children, youth, and families, and integrating technology as an instructional tool (Dolink, 2013).

The Ontario College of Teachers (OCT) mandated that teacher education programs be "academic, not employment-based" (2013, p. 2). To meet accreditation standards, programs were required to include the following components:

- At least 40 percent of one year, the focus is on teaching methods, such as how to teach students in specific grades or subjects.
- 20 percent of one year focused on education foundations—history, philosophy, and
- psychology of education.
- 20 percent in any other area of education.
- a minimum of 80 days of practicum supervised by the program provider. (OCT, 2013, p. 2).

More specifically, the OCT Regulation 347/02, Schedule 1, Pedagogical and Instructional Strategies Knowledge of the Accreditation of Teacher Education Programs included, among other regulations, that "a program of professional education prepares the teacher candidate to use inquiry-based research, data and assessment, and the selection and use of current instructional strategies to support student learning" (OCT, 2023, p. 18). These requirements were designed to ensure that future teachers have the skills and knowledge to meet diverse student needs and engage in evidence-informed teaching practices. This regulation's intent is to achieve the following:

1. The inclusion of content regarding inquiry-based research (IBR), data collection, and assessment is intended to highlight for teacher candidates that they learn from, with, and about their students and how to facilitate learning most effectively. This inclusion underscores the critical nature of maintaining an inquiry stance, individually and collaboratively, with colleagues.
2. The intent is for teacher candidates to see themselves as active, inquiring professionals who continually refine data-based planning, instruction, and assessment in pursuit of greater learner precision and personalization. The reflective inquiry cycle includes questioning, observing, consulting other data sources, collecting data, reflecting, interpreting, and intervening in instructional or assessment. (OCT, 2023, p. 18)

Furthermore, the recently updated *OCT Accreditation Resource Guide* (OCT, 2023) outlined the objectives of teacher education programs to prepare TCs with the knowledge, skills, perspectives, and practices necessary for effective, equitable teaching. These objectives included:

- their role as teacher inquirers is to seek further understanding of their students and their own implicit and explicit biases and inform equitable practice to enhance teacher and student learning.
- the importance of teachers taking "an assessment for learning and as learning approach" to their professional learning as model practitioners of professional reflection and growth.
- understanding the wide range of data sources (e.g., trackers/checklists, written work, and other products, conversations, oral communication, and presentations) and how to collect

and analyze these data, including opportunities to disaggregate data to recognize potential disparities in student learning outcomes.

- understanding the relationships between contextual data and equity and inclusive practices, including anti-racist and anti-oppressive practices (e.g., student identities and intersectional identities, barriers faced by students with disabilities, and community socioeconomic factors) considered when planning inclusive learning opportunities for improved student achievement.
- enrolment, attendance, course type (e.g., streaming), and their impact on student success, graduation rates, and initial post-secondary destinations.
- understanding the use of student data to inform planning, instruction, and assessment (OCT, 2023, p.19).

Kitchen and Petrarca (2015) reviewed the revisions to Ontario's teacher preparation program changes, highlighting the OCT's explicit commitment to "scholarly activities, scholarly growth of teachers, and excellence in research" (p. 69) within the framework of teaching and learning. A key objective emerging from the revised accreditation criteria was the expectation that teachers engage in inquiry- and evidence-based research (IEBR) to inform their practice, thereby fostering inquiry- and evidence-based teaching (IEBT). In response to these updates, the Ontario Faculties of Education revised the Bachelor of Professional Studies in Education (BPS) programs, designed to prepare TCs for OCT certification and accredited by the Consent of the Ontario Ministry of Colleges and Universities, to include a mandatory course focused wholly or partially on research content. This change resulted in the author's university creating and including an *Introduction to Research* course (EDU 495), developed as part of the two-year BPS program to meet OCT requirements and accreditation standards.

2.4. EDU 495: The Introduction to Research Course

2.4.1 Course Overview

The objective of the EDU 495: *Introduction to Research* course was to support TCs in developing knowledge and proficiency in educational research and data analysis, aligning with OCT Regulation 347/02, Accreditation of Teacher Education Programs. This regulation mandated that professional education programs prepare TCs to engage with inquiry-based research, data, and assessment and select and implement current instructional strategies to support student learning (Regulation 347/02, Schedule 1, Pedagogical and Instructional Strategies Knowledge).

The official course description for *EDU 495* states,

> This course is designed to introduce teacher candidates to the principles of research in education. Students will become effective consumers of educational research by analyzing the literature in a particular area of study and synthesizing the results into material that can be applied to diverse educational settings. Students will also develop practical research skills that

they will use to assist them in their professional development. Teacher candidates enrolled in this course will complete a field-based research project on their study area.

The course was intentionally structured to teach TCs how to understand, interpret, and apply formal and informal data sources—such as provincial standardized test results, diagnostic tools, and classroom-based observations—to inform and improve teaching practices. Emphasizing a sustained inquiry-oriented mindset, the course encouraged teacher candidates to collaborate with colleagues and engage in reflective professional learning. TCs were guided to see themselves as proactive, inquiring professionals, continuously refining their instructional planning, assessment practices, and pedagogical decisions through a self-directed inquiry cycle. This cycle included key components of action research, such as questioning, observing, consulting various data sources, reflecting, interpreting evidence, and implementing responsive instructional interventions.

2.4.1.1 The course student learning objectives

The following outlines the course's student learning objectives (SLOs), developed collaboratively by faculty and designed to support the achievement of the broader course goals.

By the end of this course, TCs should demonstrate the following SLOs:

1. How to access, interpret, evaluate, and use educational research literature and large- and small-scale assessment data to make informed decisions about its usefulness in a particular context.
2. Collecting and using data with other information and knowledge to make instructional decisions to facilitate learning.
3. Knowledge of and capacities to engage in the inquiry process to facilitate student learning.
4. Collaborate with colleagues around shared questions and areas of interest, looking at evidence, research, theory, or other bodies of knowledge to make precise, personalized pedagogical decisions and determine the next steps.
5. Role as teacher inquirers seeking further understanding of their students and their practices to enhance student learning.
6. The importance of teachers taking "an assessment for learning and as a learning approach" to their professional learning as models and capacities to undertake reflection.
7. Understanding the wide range of data sources (behaviors, written work, and other products, conversations, oral communication, and presentations) and how to collect and analyze these data.
8. Understanding the student as the focus and source of information to inform planning and assessment.

2.4.2 Course Content

As the course instructor, my approach to designing *EDU 495: Introduction to Research* was guided by two core objectives aligned with the course's student learning outcomes (SLOs):

1. To build teacher candidates' (TCs') foundational knowledge of educational research through targeted lectures and interactive activities.
2. To develop their practical research skills by implementing a mini-action research (AR) project during their teaching practicum.

To support these goals, I adopted a scaffolding approach to instruction—gradually building complexity and depth of understanding while providing structured support. This strategy allowed TCs to progress from foundational concepts to the practical application of research in classroom settings. The course content is outlined below for those interested in replicating a similar structure when designing research-based courses for preservice teachers.

2.4.2.1 Course timeline

The course was delivered over a 15-week semester and strategically organized to align with the TCs' practicum schedule. The semester began with four bi-weekly, in-person 3 hour classes (for nine sessions), where core research concepts were introduced and explored. This was followed by a two-month teaching practicum (October–November), during which TCs conducted their mini-action research projects. Midway through the practicum, we held an additional class session to review their progress, address challenges, and provide ongoing support for the AR process. The course concluded in December with a final in-person class, where TCs presented their AR findings and engaged in reflective discussions about their learning journey. Figure 1 provides a visual outline of the course structure and timeline.

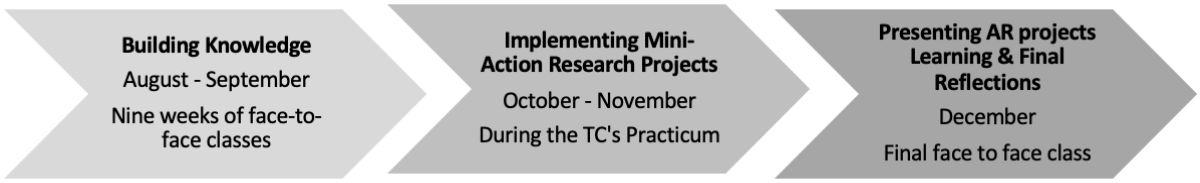

Figure 1. *Course Timeline*

2.4.2.2. Building knowledge - Course content

I designed the course content using a scaffolding approach to ensure teacher candidates (TCs) acquired essential research knowledge. This approach allowed TCs to build their understanding of key research concepts progressively. A detailed outline of the major topics covered in each class during the first four weeks is provided in Appendix A. I used *Engaging in Action Research: A Practical Guide to Teacher-Conducted Research for Educators and School Leaders* by Parsons, Hewson, Adrian, and Day (2013) as the required course textbook and supplemented with readings and other resources aligned with the scaffolding pedagogy to support TCs in gradually acquiring the necessary knowledge and skills for their research projects.

2.4.2.3 Implementing Skills - Course Assignments

In addition to developing skills for the AR project, the course enhanced knowledge application. To facilitate the development of practical research skills, I incorporated various assignments that encouraged TCs to engage in hands-on learning. These assignments included i) self-reflections, ii) journal evaluations, iii) a literature review project, and iv) a mini-AR project, including a final report. The specific details, skills, and purpose of each assignment are outlined in Appendix B.

3. Methods

This qualitative research study was conducted over a 15-week semester in a required research course with TCs enrolled in a teacher preparation program in Ontario, Canada. The study's objective was to evaluate the students' learning outcomes of the *Introduction to Research* course against the OCT's objective to prepare TCS "to use inquiry-based research, data and assessment, and the selection and use of current instructional strategies to support student learning" (OCT, 2023, p. 18). The study explored the following research questions:

1. Did TCs improve their knowledge of the fundamentals and principles of research?
2. What did they learned from putting their research knowledge into practice (i.e. organizing, implementing and analyzing an AR project in their teaching practicum)?
3. How did their learning from the research course impact their professional teacher identity?

Throughout the course, TCS learned about foundational research methodologies, principles, and methods, laying the basis for conducting research-informed teaching. Guided by the Ontario Ministry of Education's emphasis on nurturing reflective, inquiry-driven educators, the theoretical framework for this study centred on the belief that teacher education programs should foster scholarly, inquiry-focused teachers. The study's theory of action proposed that if TCS learned fundamental research principles in a structured course and applied them through an AR project during their practicum, this experience would enhance their research competencies and identity as scholarly practitioners, leading to exceptional teachers. Drawing on the work of Kitchen and Petrarca (2015), the theory further posited that these research experiences would contribute to the scholarly development of TCS, enabling them to implement evidence-based and inquiry-oriented approaches in their teaching. This theory of action focused on two main objectives: first, to determine the extent to which TCS developed a foundational understanding of educational research principles and methodologies, and second, to assess whether TCS demonstrated a shift toward a more scholarly teaching identity, particularly through the implementation of inquiry- and evidence-based teaching practices.

3.1 Participants

The participants in this study were a purposeful sample of teacher candidates (TCS) enrolled in the required research course I taught during the semester of their teacher preparation program at a private university in Ontario, Canada. All TCs enrolled in the course were invited to participate in

the study. Participation was voluntary, and informed consent was obtained from those who agreed, allowing their course assignments to be included in this research. The study involved 32 TCs in their third semester of a four-semester program. No additional grades or incentives were provided for participating. Ethical approval for the study was obtained from the author's academic institution. To ensure confidentiality, each participant was assigned a unique identifier (e.g., TC#1, TC#2) in the data and reporting.

3.2 Data Collection

Data for this study were collected over the 15-week semester during the required *EDU 495: Introduction to Research* course. While TCs completed four-course assignments, only their self-reflections were used as the data source for this research. Each teacher candidate completed four self-reflections at various points throughout the course. The reflections were scheduled at strategic intervals to capture the learning about the course content topics. The following table outlines the topics addressed within each of the four reflections. A list of the detailed reflection prompts is provided in Appendix C.

Reflection	Topics
1st	Principles of Researcher, Inquiry and Research-Based Evidence, Positionality and Potential Biases.
2nd	Evaluating Research and Evidence.
3rd	AR, Planning for the Research, Data methods, Creating a problem of practice.
4th	The research process, challenges, and the biggest learning and takeaways.

Table 1: Overview of Topics for Self-Reflections.

The first reflection was completed after the second class, the second after four additional classes, the third after another three sessions, and the final reflection was submitted at the end of the course, following the completion of the mini-AR project. The questions were intentionally crafted to connect to the course content, prompt critical thinking, and demonstrate their learning.

3.3 Data Analysis

"All analysis is an act of interpretation, but the major aim in any analysis is to identify information that represents the perspective and experience of the participants" (Stringer, 2014, p. 139). Guided by this principle, I used conventional and interpretative qualitative content analysis. The rationale for this dual approach allowed the development of coding categories directly from the data, facilitating a deeper understanding of the study's research questions, specifically, the TCS' learning about and using educational research and how it influenced their emerging professional identities (Downe-Wamboldt, 1992). Interpretive analysis was used to summarize

participants' perceptions and experiences, while content relational analysis identified the frequency of recurring ideas, themes and patterns that aligned with the research questions. Each of the four self-reflections underwent multiple readings and was summarized into a structured data display to provide a data visualization (Glesne, 2016; Miles et al., 2020).

Kumar's (2014) four-step data analysis process was followed:

1. Initial Reading - Preliminary readings of the self-reflections were conducted during the course to identify early themes and were organized into an initial data display.
2. Focused Coding - Following the course's conclusion, additional readings enabled more detailed coding of recurring ideas and their frequency across the four reflections.
3. Theme Development - Sub-themes and response categories were developed in alignment with the study's three core research questions: to assess TCS' learning about research, the implementation of AR in practice, and its influence on their teaching identity. The data displays for each reflection were then consolidated to identify commonalities and the frequency of key themes.
4. Synthesis – The themes emerging from all reflections were synthesized to construct the study's findings, offering a comprehensive overview of the participants' learning throughout the course.

This combined analytic approach proved both relevant and effective, enabling a nuanced interpretation of participants' learning while systematically identifying themes aligned with the research questions. By integrating conventional and interpretive content analysis, the process ensured a robust, data-informed understanding of how TCs engaged with educational research and how this engagement contributed to the development of their professional identities. The findings are presented following the course structure and the study's questions, highlighting the evolution of research knowledge and its impact on professional identity.

4. Findings and Interpretation

As previously stated, the research course was intentionally designed using a scaffolded approach to develop TC knowledge, skills, and practical experience in alignment with OCT's regulations for teacher preparation. This regulation emphasized equipping TCs to engage in inquiry-based research, utilize data and assessment, and apply current instructional strategies to enhance student learning (OCT, 2023). Therefore, the course began with foundational topics, including the principles of educational research, followed by an exploration of AR methods and methodologies, culminating in the planning and implementation of an AR project during the TCS teaching practicum.

The analysis of the collected data provided strong evidence that by the end of the course, TCs had successfully met the course learning objectives and developed a clear understanding of the value

of adopting a research-oriented mindset as part of their emerging teacher identities. The findings are presented in three sections, corresponding to the research questions. The first section described the TCS' learning about research. The second section is what the TCs learned from applying their research knowledge in practice (i.e., organizing, implementing, and analyzing an AR project in their teaching practicum). The third section described how the research course and their learning impacted their professional teacher identity.

4.1 The TCs Learning about Research

4..1.1 The fundamentals and principles of research

The course began by introducing TCs to the fundamentals of educational research in the context of their future teaching roles. Many entered with preconceived notions—viewing research as scientific, complex, or unrelated to teaching—but early course content shifted these perspectives. TCs came to see research as both accessible and relevant to classroom practice.

For example, TC#13 explained,

> Research is an intimidating word, but as a future teacher, the research process has been demystified. I learned that as teacher-researchers, we constantly collaborate with peers, students, and parents; as researchers, we grow as teachers and professionals, ultimately improving student learning. By constantly researching, I would study my teaching practices, my students, and myself as a professional educator.

Similarly, TC#22 added she could see the benefit of using research in her teaching by stating,

> The most surprising thing I have learned about research is that you don't have to be a scientist in a lab coat to conduct research. Research and research-based evidence happen on an everyday basis, but it is not noticed that it is happening. Research-based evidence helps create a sense of validity, credibility, and reliability. Through observation and actions, we can see which methods work and which need adjustment. This can help teachers differentiate their teaching methods and help students succeed by differentiating their learning.

From the first reflection, TCs remarked they had never associated teaching with research. TC#2 stated, "I was surprised that research can be a manageable process and help reveal answers to problems." TC#4 added, "I never considered research and teaching together. It's inspiring to know that educators are always researching—by asking questions and seeking solutions."

Many TCs' (<65%) comments suggested a perspective change, and TC #15 echoed this perspective by stating,

> I had never considered conducting research as a teacher before the beginning of this course. Previously, when I heard the word research, the first things that came to mind were professional journals and science. However, the first two days of the course made me recognize that research always happens, especially for teachers searching for answers to broad and generalized questions. I now see myself as an educator, trying to learn new things and discovering information to better my teaching methods and create a productive learning environment for my future students.

Likewise, TC#26 admitted, "I assumed research was solely for scientific or higher-level purposes, but I am now aware of how effective it could be for teachers in their classrooms. I will be using action research in the future."

Overall, the TCs expressed newfound motivation to engage with research, not only to inform their practice but also to become more critical consumers of educational evidence. These early reflections signalled a meaningful alignment with the Ontario Ministry of Education's goal of fostering inquiry-driven, research-informed teacher identities through this course.

4.1.2 Accessing, planning, and evaluating research.

The next phase of the course focused on two key learning outcomes: (i) accessing, interpreting, evaluating, and using educational research literature and large and small-scale assessment data to inform practice and (ii) collecting and integrating data with other knowledge to guide instructional decisions to facilitate learning. The TCs confirmed that learning to locate and analyze research was impactful, with many highlighting activities, such as evaluating journal articles and the Bottom-Line Actionable Message (BLAM) assignment as especially effective. One TC noted, "The course activities helped me feel more confident in finding, evaluating, and using research for my teaching practices to support student learning."

TCs also demonstrated growth in identifying the validity and credibility of research. TC#8 shared, "I need to be a critical thinker and learn to identify and reject any opinion-based knowledge that might guide my teaching agendas." Similarly, TC#7 emphasized, "We must use critical thinking to look beyond the article—to assess whether the conclusions align with our research question and practice." TC#25 described this shift toward evidence-based practice: "The best way to be an evidence-based teacher is to get comfortable curating and reviewing research articles regularly. I could see setting aside weekly time to review relevant research for my students' needs."

These reflections revealed that TCs were embracing their role as critical evaluators of knowledge and developing a teacher-researcher identity. Many emphasized the importance of understanding data and using research-based evidence in their practice. For example, TC#13

explained, "We had to unlearn what we thought were credible, peer-reviewed journals—this course taught us how to find and unpack reliable sources." TC#17 added,

> Deciding whether research is useful for teaching and classroom practices is difficult. Educators can become better judges and consumers of evidence by developing skills to identify high-quality research. Sometimes, it can be challenging to tell the difference between activities strongly supported by research and those based on more constrained findings.

TC#5 concluded,

> This week, I learned that educational resources on the Internet are helpful but not as thorough or credible as formal research articles. I think it is important for an educator to be skeptical and discerning of the information acquired and subsequently implemented in the classroom. Great teachers are individuals who have a large "toolbox" of classroom strategies from a variety of sources.

4.1.3 Research and researcher biases.

As TCs learned to assess and evaluate research, they were introduced to the concept of bias in research and researcher biases. Their reflections revealed awareness of the limitations and subjectivity within research and a recognition of how personal perspectives can shape interpretation. For example, TC #11 commented,

> Our perceptions and previous life experiences cannot sway our interpretations of research, and we cannot show bias. We should be open-minded and try to understand the big picture regarding the research question and method used. We do not want to misinterpret any information that was researched.

Similarly, TC #28 emphasized the risks of misinformation and the influence of the researcher's worldview.

> It is important to be aware of the many issues that teacher-researchers may encounter. For example, something as simple as false information may lead your research astray and cause your findings to be incorrect. According to Parsons et al. (2013), all researchers have their own philosophy that guides their investigation and brings perspective to their work - this is known as their methodology. This may lead to what is known as "research bias. Articulating one's worldview in research methodology lends context and understanding to findings and interpretations" (p. 13). Therefore, as we carry out our research as educators, we must consider the concept of bias and false information and how it may impact our research.

Many TCs (<75%) acknowledged how bias could influence instructional decisions and the interpretation of evidence, potentially leading to ineffective practices. TC#1 noted a shift in mindset:

> To be better evidence-based teachers, we must turn away from the traditional textbook way of teaching and move towards a more evidence-based way. I read that evidence-based teaching involves more scientific teaching than traditional judgment. It stated that evidence-based teaching requires utilizing existing evidence and establishing new evidence (Wiltshier, 2007). By having this view on education, we are not only allowing for a smoother classroom environment but a classroom where students learn in ways that benefit their needs.

4.1.4 Methods and Methodology of AR

Based on the supportive literature on using AR in education, and more particularly its relevance for classroom-based inquiry (Betts et al., 2017; Hine, 2013; Meyer, 2000; 2006; Parsons et at., 2013), AR was selected as the method and methodology for achieving the course's learning outcomes. Central to these outcomes was the understanding that student learning should be both the focus and the source of information for planning and assessment. This aligned with the course objective of guiding teacher candidates (TCs) in completing a field-based research project within their study area.

While simultaneously enrolled in this course and completing their teaching practicum, TCs planned and implemented AR projects. Their reflections revealed that AR was viewed as an effective and practical approach for classroom use. Common descriptors included: "easy to do and use," "personalized," "natural," "self-directed professional learning," and "specific to my students."

Many TCs (70%) expressed that AR gave them a sense of agency and empowerment, enabling them to identify, address and solve classroom challenges. They frequently described AR as a process for helping them adjust and evaluate their teacher practice to increase student learning. Several noted (<40%) that their AR project helped them confront personal biases and assumptions, with data offering more objective insight into their teaching practices and its effects on student learning.

Other TCs (<45%) commented they felt a sense of confidence knowing that AR gave them the skills, knowledge, and ability to improve their teaching practices, resulting in increased student learning. One commonly echoed reflection captured this well:

> It [AR] involves using evidence to establish where students are in their learning and can also help educators decide on appropriate teaching strategies, monitor student progress, and evaluate

teaching effectiveness. Therefore, we believe we can become better evidence-based teachers by doing thorough independent research and finding what strategies work best in our teaching.

4.2. Implementing AR in Practice.

The TCs applied AR methods by planning, selecting data collection, and data analysis. Data triangulation was explained in the course and encouraged in their projects. After identifying a research question (or problem of practice), TCs selected or created data collection tools suited to answer their question—such as observations, interviews with students and educators, journaling, and anecdotal notes. Many of their reflections echoed the following sentiment:

> The triangulation of data collection throughout my AR project provided helpful insight into patterns and themes throughout my *place-value* math unit. I noticed that when students had access to tools, their confidence and participation during the math lessons increased. Students raised their hands more, shared their ideas, and justified their thinking using more appropriate math language. I also noticed that once students started using manipulatives, they requested them more frequently, whether they excelled or struggled with the content. At the beginning of my research, I had to remind my students to grab their math manipulative kits in their bins. Still, by the end of the unit, students no longer needed the reminders and would naturally and willingly grab them before math lessons.

Upon completing their AR projects, TCs completed their fourth and final self-reflection. Their responses reflected a sense of excitement and pride in their learning outcomes. Common descriptors of the AR experience included: "action," "hands-on," "evaluative," "easy," "independent," "capable," and "beneficial for improving both student learning and teaching practice." Many TCs (<65%) were surprised by some unexpected findings. For example, TC#4 observed, "Their [students'] motivation didn't increase from wellness breaks, but I learned the reasons why." Other TCs were gratified with their increased ability to complete and learn much about a specific area of teaching practice and the research process from implementing the project. TC#18 shared,

> This research and the data collected have helped me learn an immense amount of information regarding the research cycle and the math curriculum. Math is a sensitive subject; most students have negative associations and lack confidence in their knowledge and performance. It has been such a great experience creating an environment and watching students unfold into confident, happy, explorative, and eager-to-learn students.

TC #26 noted the following from the research process,

> I learned from my AR project how important it is for us as teachers to be constantly involved in research and always on our toes to provide the best learning environments for students. With

> the constant change of needs, challenges, and behaviours in the classroom, it is important to continuously find ways to support students and help them succeed. Researching as a teacher can help me find solutions to problems that arise in the classroom. For example, if classroom management becomes a challenge in the classroom, I can do further research on it to compile strategies that will support the students' needs in my classroom.

Another, TC#32, stated,

> My biggest takeaway was just how important it is for educators to conduct research in their classrooms in some capacity. Conducting AR with my class or maybe with just one student allowed me to better understand my students as learners and individuals. It also allowed me to continue learning about topics I may not have known.

Many TCs (<45%) noted that the AR project gave students a voice, allowing them to understand their learning needs better. For example, TC#11 explained,

> One of the best benefits of my research project was asking them [the students] their opinions. This will help me become a better teacher because I am aware of how important the students' voices are in classroom decisions.

Overall, the TCs described the AR process as empowering. They described it as a self-directed, independent, and reflective practice that enabled them to create solutions and resolve classroom challenges to increase student learning. Their reflections suggested a sense of control over their teaching and confidence in using inquiry- and evidence-based strategies. Many (<80%) recognized how the process not only improved their practice but also helped challenge assumptions and uncover student needs more objectively. Ultimately, AR strengthened their sense of agency and deepened their commitment to student-centred learning.

4.3 Impact on Teachers' Professional Identity

One of the key re-conceptualizations put forth in the teacher preparation program by the OCT, the regulatory teacher accreditation body in Ontario, Canada, for adding a research content-based course in a teacher preparation program was to broaden and develop the teachers' professional identity as "academic, not only employment-based" (2013, p. 2). Specifically, the OCT aimed to achieve this objective of a more academic orientation by embedding "inquiry-based research, data-informed assessment, and current instructional strategies into teacher preparation programs (OCT, 2023, p. 18). The data collected indicated that the required *Introduction to Research* course positively impacted and influenced the TCs' professional identity. While many TCs (<75%) commented about a shift in mindset, the most notable change was the TC's increased emphasis and understanding of being an inquiry-and-evidence-based teacher (IEBT) with a clear focus on student learning. This identity was desirable and necessary, one that could be pursued through

classroom-based research (i.e., AR) and formal scholarly inquiry (i.e. published research). As the course progressed, TCs demonstrated an evident transformation in conceptualizing their professional identity. Their final reflections showed deeper insights, more sophisticated articulations of their responsibilities, and increased alignment with the IEBT model. For example, TC #23's comment summarized the general reflections of many TCs.

> I believe that I can be a better evidence-based teacher by following the more cyclical process of researching, implementing, evaluating, and reflecting upon my teaching. This means I will always be learning new things, including data from peer-reviewed journals, and trying them with our students to improve their education and increase the chances of successful teaching (i.e., teaching that sticks). The goal of teaching is to get through to our students to help them learn. Evidence-based teaching can help make this possible because we will have proof of strategies that work and can make a difference in our student's personal and academic lives.

Similarly, TC #14 highlighted the importance of continuous professional growth:

> My unlearning was not to become comfortable in my teaching style but to always involve research to understand the student's learning needs better and implement classroom strategies. If those strategies don't work, I will introspect again and modify them for better results.

By the end of the course, many TCs (<50%) viewed IEB teaching as the foundation of their pedagogies and commented that, like research, it should be a continuous cycle and process. TC #3 referred to IEBT as "a reflective process in their practice for constantly seeking ways to improve lessons and create a positive learning environment," while TC #19 explained:

> It [IEBT] involves using evidence to establish where students are in their learning. Evidence can also help educators decide on appropriate teaching strategies, monitor student progress, and evaluate teaching effectiveness. Therefore, we can become better evidence-based teachers by conducting thorough independent research and finding best teaching strategies.

TC #1 echoed this perspective, stating, "This process [AR] includes establishing where students are learning, deciding on appropriate teaching strategies and interventions, monitoring student progress, and evaluating teaching effectiveness."

The TCs' comments indicated a transformed professional identity that emphasized accountability and responsibility for student learning. TC #7 summarized this transformation: "I see my role as ensuring that students are always learning, which is to be achieved by being a proactive IEBT." Many TCs (<50%) recognized that data must support assumptions about student engagement. For instance, TC #21 remarked, "It is not just students engaged because engagement does not necessarily mean the student is learning. We need to know this information: Are our students learning?"

TCs developed two central understandings of IEBT: how to utilize formal research and conduct informal classroom-based inquiry as part of ongoing professional development. TC #5 reflected a commonly held view by the TCs:

Becoming a better evidence-based teacher means seeking feedback and using different assessment strategies. For example, observation can help plan the next steps. Feedback should come from students; gaining student feedback will help to validate what they have learned. By collecting feedback from students, we will be able to determine their understanding before moving forward with the lesson; we can also gauge if we need to adjust our approach for future lessons. The educator can collect data through a survey, observation, and speaking with students individually or in a group setting. In addition to student feedback, the educator can also seek advice from co-workers. All these practices are necessary.

Notably, many TCs came to view IEB teaching not just as a set of practices but as a mindset. TC #16 emphasized:

> Mindset is vital for evidence-based teaching. Having the skills to implement evidence-based practices is not enough; you must believe and have the attitude that these practices will improve your teaching. Teachers need to be motivated to do professional development to help create new ideas and opportunities to reflect on their teaching.

Overall, the data demonstrated their teacher identity had been transformed. They emerged from the course with a more scholarly outlook, able to articulate the value of research in their practice, and confident in their roles as IEBTs committed to improving student learning.

5. Discussion and Conclusion

5.1 Discussion

The findings revealed a consistent pattern of personal and professional growth among TCs, highlighting that their engagement with research principles and implementing action research (AR) was an empowering, transformative, and enriching experience. The research course and the estudy supported existing evidence (see, for example, Borko, 2004; Dana & Yendol-Hoppey, 2019; Frances et al., 2018; Holter & Frabutt, 2012; James & Augustin, 2018; Mertler, 2016; Timperley et al., 2007) of the benefits of integrating research education into teacher preparation programs. The data confirmed that TCs expanded their competencies about research principles, application of a research method (AR), Moreover, there was a notable shift in their professional identities to encompass roles such as teacher-researcher, scholarly-practitioner, knowledge evaluator, and inquiry- and evidence-based educator.

5.1.1 Increasing TCs understanding of research principles

The data confirmed that the *Introduction to Research* course deepened the TCS' understanding of research principles and practices. Through course activities and assignments, TCs developed the ability to locate, critically evaluate, and meaningfully apply both formal sources (e.g., peer-reviewed academic literature) and informal data (e.g., classroom observations) to inform instructional decisions, broadening their capacity to engage with IEBT and providing a strong foundation for integrating research into their teaching practices.

5.1.2 Implementing AR in practice.

The study confirmed many of the positive outcomes associated with AR established as documented in previous literatrue (Borko, 2004; Dana & Yendol-Hoppey, 2019; Frances et al., 2018; Holter & Frabutt, 2012; James & Augustin, 2018; Mertler, 2016; Perrett, 2003). The structured, step-by-step approach of designing and implementing an AR project during the course and in their practicum offered TCs a practical, hands-on experience in a supportive and relatively low-risk environment. The data suggested this was a highly valuable experience for TCS as it deepened their understanding of the application of research and IEBT and enhanced their confidence in using research to address real-world classroom challenges. These findings were consistent with previous research, which has shown that engaging in research (and AR processes) during teacher preparation provides a systematic (Frabutt et al., 2008; Ryan, 2021), collaborative (Kemmis & McTaggart, 1988: Westheimer, 2008), and participatory (Holter & Frabutt, 2012; Mills, 2011) process of inquiry. Furthermore. The findings contributed to addressing a recognized gap in the literature (Betts et al., 2017; Burgin & Daniel, 2021) by providing evidence that TCS can effectively apply research knowledge in practice.

5.1.3 Impact on Teacher's Professional Identity

The data also revealed that as the TCs expanded their research knowledge and applied it to their classroom practices, it led to a shift in their professional identity. The course's content, objectives, reflective activities, and AR project prompted TCs to consider adopting more IEBT practices, often describing themselves as teacher-researchers or scholarly practitioners. This shift reflected an increased sense of agency and ownership over their professional growth, as they connected their ability to use IEBT practices with student achievements. For example, they saw themselves as being able to use their research knowledge and skills to solve their classroom problems. This data confirms that agency and empowerment became an integral part of their professional identity. These outcomes aligned with broader literature emphasizing the transformative role of research in teacher identity and agency (Johnson, 2012; Stringer, 2014), as well as with global expecations of promoting the development of exceptional, research-informed educators (Barber & Mourshed, 2007; Carver & Klahr, 2001; Hine, 2013; OCT, 2013).

Overall, the data affirmed a shift in the TCs professional identity, confirming the course learning objectives and the OCT requirements. This shift suggested increased agency, critical thinking, and a greater readiness to uphold high educational standards through IEBT.

5.2 Limitations

A notable limitation emerged regarding the lack of attention given to researcher positionality and biases. This aligns with the critiques of action research (AR), which highlighted its vulnerability to subjectivity due to the researcher's dual role as both practitioner and investigator (Kock, 2004, 2005). Although some teacher candidates (TCs) acknowledged the importance of reflecting on their positionality, this area warrants more deliberate integration in future iterations of the course.

As emphasized in critical educational research literature (Freire, 1998; Haberman, 2005; Kozol, 2005; Ladson-Billings, 1996; Moll & Gonzales, 2004; Nieto, 2000; Ogbu, 1999), researcher biases must not be overlooked. An educator’s values, beliefs and experiences act as lenses through which they organize and interpret knowledge, influencing their perceptions, judgments, and actions. Without this critical self-reflection, there is a risk of reinforcing unexamined assumptions in research and instructional practices. Without critical self-examination, there is a risk of perpetuating unexamined assumptions that may negatively impact both research outcomes and instructional effectiveness. To address this, future courses should include structured opportunities for TCs to critically reflect on their personal and professional values, identities, and biases in their research and teaching.

Another limitation pertains to the unknown long-term impact of the course on the TCs’ sustained development as teacher-researchers or scholarly practitioners. There is a noticeable gap in the literature regarding longitudinal studies that follow TCs beyond their teacher preparation programs to examine whether research coursework continues to influence their pedagogical practices. It remains unclear whether the research knowledge, IEBT approaches and so forth introduced during their teaching education program are sustained and whether they contribute to those exceptional teachers for improving student learning over time.

Tracking early-career teachers longitudinally could provide invaluable insights into the enduring effects of research knowledge on teachers. Such research could help determine whether the foundational knowledge and practices developed through research coursework and AR translate into long-term professional growth and educational impact, ultimately informing the design of more effective teacher preparation programs responsive to the demands of global education systems.

5.3 Conclusion

This qualitative study confirmed that the *EDU 495 Introduction to Research* course and this study achieved its intended learning outcomes and research objectives. The findings demonstrated that TCs were better prepared "to use inquiry-based research, data and assessment, and the selection and use of current instructional strategies to support student learning" (OCT, 2023, p. 18). Specifically, TCs demonstrated they (i) acquired and applied foundational knowledge in educational research and data analysis; (ii) learned to integrate both informal data (e.g., classroom-based observations and assessments) and formal data (e.g., peer-reviewed research) into their teaching practice; and (iii) recognized the importance of applying this knowledge and these skills to inform their instructional decisions (IEB teaching) and enhance student learning outcomes. Collectively, these learning outcomes signalled a clear shift in the TCs' professional identities toward a more scholarly and reflective teaching approach grounded in IEBT practices. TCs developed a greater sense of agency, empowerment, and self-advocacy, supporting their personal and professional growth as educators. Given the positive results of this study, there is a rationale for teacher preparation programs to continue—and where not already present, begin—integrating research education as a foundational component of teacher preparation. As the literature and policy alike emphasize, highly capable, research-informed teachers are critical to the overall quality of education systems. Preparing future educators with the skills to engage in independent inquiry, critical thinking, and IRBT, including evidence-based decision-making, is essential to fostering *exceptional* teachers and promoting meaningful student learning. Expanding future teachers' research capacity is a positive move in this direction.

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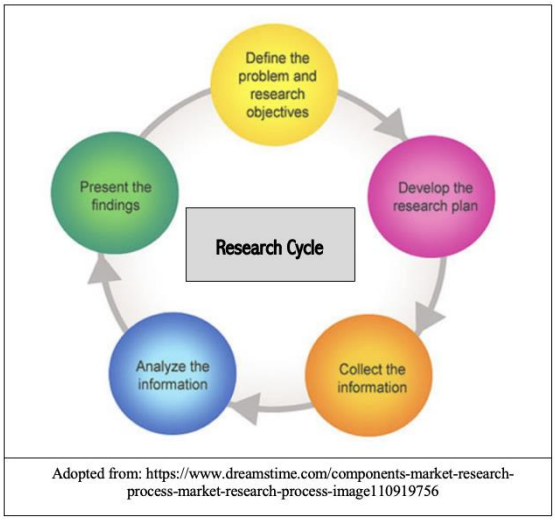
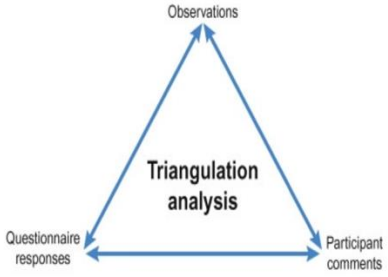
Appendix A: *Course Content Overview*

Class	Overview Class topics	Specific class Content Discussion
Class #1	Review Course syllabus Overview of Research in education	Why teachers should be conducting research. Teachers take on action research for the purpose of... - To improve your teaching and learning. - Promote independent or self-regulated professional learning - To test assumptions of educational theories, teaching and learning pedagogies, strategies, programs, etc. - A means of evaluating and implementing improved teaching practises to improve student learning. - It is a systematically evolving process of changing both the researcher and the situations in which he or she works. AR is not: - The usual things teachers do when they think about teaching. It is systematic and involves collecting evidence on which to base rigorous reflection. - Just problem solving – It is also problem posing. - Research by particular people on their own work to help them to improve what they do. It is a scientific method applied to teaching.
Class #2	Principles of Research in Education Develop Practical Research Skills **Researcher Positionality**	**Principal of Research.** • What does it mean to do research? • Basic, Applied and Action Research • Method vs Methodology • Qualitative versus Quantitative • Research Cycle  Adopted from: https://www.dreamstime.com/components-market-research-process-market-research-process-image110919756 • Basic concept of research: What it means to do research? • Research is to persuade or inform! **Researcher Positionality and potential Biases -** Perspective and the potential of research biases. Epistemological views. Theoretical stance in research. Positivist, interpretivist, and participatory worldviews

Class #3	Analyzing and Synthesizing Educational Research Critiquing Research	**Evaluating Research and Evidence.** - Evidenced Based Teaching involves the use of evidence to make decisions about teaching. - **Distinguish between** Peer-reviewed and non-peer-reviewed research information. • How to access, interpret, evaluate, and use educational research literature. • Large- and small- scale assessment data to make informed decisions about its usefulness in a particular context. • Using research – looked at data and made decisions. Created a Research in A Nutshell (RiaN)
Class #4	Connecting research to enhance practice.	Practice activity with retrieving and evaluating research. Analysis and Summary of findings. Created a BLAM. A research strategy to mobilize research-based evidence to practice & improve student learning
Class #5	The Research Process	**Planning for Research** AR Research Cycle  **Reference:** Identify the problem. Choose the question. Collect and analyze the data. Develop the action plan. The following steps were chosen. Step 1: The Question Step 2: Data Collection Step 3: Data Analysis Step 4: Findings Step 5: Action Plan Step 6: Repeat
Class #6	Identifying a problem of practice and reviewing the literature	**Planning for AR research project.** **Goals of the AR research** - Collection and use of data in conjunction with other information and knowledge to make instructional decisions to facilitate learning. - Knowledge of and capacities to engage in the process of inquiry to facilitate student learning. - Role as teacher inquirers seeking further understanding of their students and their own. - Practices to enhance student learning. - The importance of teachers taking "an assessment for learning and as learning approach" to their own professional learning as models and capacities to undertake reflection. - Understanding of the wide range of sources of data (behaviors, written work and other products, conversations, oral communication and presentations) and how to collect and analyze these data. - Understanding the student as the focus and source of information to inform planning and assessment.

Class #7	Starting your research plan	**The Research Process.**  (1) establish where students are in their learning; **Evidence to identify starting points for teaching and learning** (2) decide on appropriate teaching strategies and interventions - **Evidence to inform teaching strategies and interventions** (3) monitor student progress and evaluate teaching effectiveness. - **Evidence to evaluate student progress and teaching effectiveness** **A focus on Action, Implementation and Knowledge mobilization.** How can you implement strategies in your classroom? What are some barriers/challenges?
Class #8	Preparing for Field research	**Creating your problem of practice** Backward design approach: at the end of your research project, you should be able to: - Identify your research purpose and objectives. - Identify methods to obtain more information on your topic of interest. - Identify the main components of the final report. - Develop a strategy/plan to implement for changed practice.
Class #9	Design your Research Method and Collecting Data	Data Collection  Data analysis: three levels of analysis: descriptive, interpretive and critical.
Class #10	Check in on progress of Mini AR project	Review and discuss AR, progress, challenges and solution-oriented discussion toward solving challenges.
Class #11	Presentation and reflection of AR project	Presentations of AR projects.

Appendix B: *Course assignment, purpose and detailed description.*

Assignment Activities	**Purpose**	**Detail Description**
Assignment #1: Reflection Journals Four Reflections completed over the 13-weeks with targeted questions related to the content learned.	This assignment is to continually evaluate and reflect on the topics and questions presented throughout the course. The purpose of each reflection is to demonstrate what you have learned and unlearned about the principles of and use of research in education.	A template was provided over four dates with specific reflection questions based on the content taught during the timeframe. These reflections were useful for identify and confirming areas the TCS learned and areas needing further teaching. Feedback was given to the TCs on each of their reflection submissions that consisted of probing questions and further knowledge. The reflection questions are provided in appendix A.
Assignment #2: Evaluation of Journal Articles	The purpose of this assignment is for you to demonstrate how to access, interpret, and evaluate educational research. As well, to demonstrate that you can effectively use data to make informed decisions about its usefulness in a particular context to improve student learning.	The TCs were required to: - find four articles: 3 that represented each of the three methods (qualitative, quantitative and mixed methods) and one from a non-peer reviewed professional Journal. - Site each article using APA. - Provide a brief description of each article. - State the research question/topic that was explored in each article. - Explain the specific research methodology used and rationale? • Offer your opinion: Do you think this was a good choice of research method and methodology, and why or why not? • Could you make informed decisions about each article usefulness in a particular context in the classroom to increase student learning. • How is it specifically linked to the Ministry of Education renewed goals and how would you use the RBE in practice. An example of the articles are included in Appendix B.
Assignment #3: A BLAM- Bottom Line Actionable Message	The purpose of this assignment is to be able to take multiple research-based evidence (i.e., published research articles with evidence, data, and knowledge) and provide a summary of the findings and key points that could help improve teaching practices among the teaching profession and share your work online. Therefore, you are also contributing to *OCT Standard 4 Leadership in Learning Communities* because you are creating a professional learning resource that will be	**A BLAM**- Bottom Line Actionable Message is a synthesize) of a collection of research that identifies: • Background: identifies the key problems or points about why the topic is important • Key Findings: A synthesize (to combine several things into a coherent whole) of at least 4 articles) was included that addressed each of these points: ○ Summary of what works

	shared among your peers in the teaching profession. This standard emphasizes that OCT members promote and participate in the creation of collaborative, safe, and supportive learning communities and recognize there are shared responsibilities and leadership roles in facilitating student success, which means sharing professional resources.	○ Important points ○ Advice - Your point of view **Knowledge Mobilization:** How to Implement in Practice. Provide suggestions of how to mobilize the research/knowledge presented in the BLAM to practice (application) Include strengths and challenges of application of knowledge in practice. See appendix C for an example.
Assignment #4: Field-Based Research Project	The purpose of this project is based on the learning theory that doing (applying knowledge) increases learning and understanding. This project is intended for you to apply the practical research skills that you have learned about the principles of using research in education and connecting research-based evidence to inform your teaching practices throughout this course. You will complete your field-based research project during your teaching practicum in term 3. The purpose of this assignment is for you to conduct a research project in the field such that you:	Assignment details include: 1. Provide a background to the research study (i.e., literature review). 2. Identify a problem of practice. 3. Provide a description of the research context. 4. Identify a data collection method and describe how you collected the data. An example of your data collection tools should be provided in the appendix of the report. 5. Complete an analysis of the data (findings) that is concise and accurate. 6. Provide an accurate summary of your findings and identify what you learned or unlearned 7. Provide a reasonable plan (with teaching strategies) of how you could improve your teaching practice from what you learned to increase student learning. 8. Identify the next steps of the research cycle. 9. Provide a reasonable plan (with teaching strategies) of how you could improve your teaching practice from what you learned to increase student learning. 10. Identify the next steps of the research cycle. Students were provided a template that walked them through step by step towards their final research report. Step #1: identifying a problem of practice and reviewing the literature Step #2: creating your research outline - act

		step #3: data analysis step #4: research summary and action plan step #5: research report: headings for your research report. 1. Background to the research study (i.e. literature review that was collected in your BLAM). 2. Problem of practice. 3. The research context. 4. Data collection method. 5. Data Analysis. 6. Summary of Findings: - What I learned - What I unlearned - Overview based on the data. 7. Action Plan (how you could improve your teaching practice from what you learned to increase student learning). 8. Next steps for this research cycle.

Appendix C: *Self-Reflection Questions*

Reflection #1 Questions (Week 3)

1. Why is knowing the difference between research methods and methodology important for teachers when collecting evidence in their classes/schools?
2. How is research a way of thinking? And why is it important for teachers?
3. Why is it important to know how to access and analyze research?
4. How do you see yourself overcoming the challenges and barriers of putting evidence/research into practice?
5. What was the most surprising thing you learned in the last few days about research and research-based evidence?

Reflection #2 Questions (Week 6)

1. We discussed how to analyze research and peer-reviewed journals. Explain why this is important for a teacher to know.
2. How do you feel about some of the hidden agendas in research? What do you need to know and be aware of?
3. What strategies could you use to identify researcher biases in the research approach or the analysis?
4. How would you decide if the research or data is useful to use in your classroom practices to improve and enhance student learning?
5. What do you think is the biggest challenge when searching for quality research? What are good processes or steps to use?
6. What was your biggest learning AND unlearning during this past week of classes?

Reflection #3 (Week 9)

1. Reflect on what you have learned thus far about ACTION research. How do you think this aligns with the assessment *for, of and as* a learning approach for teachers?
2. Explain your understanding of connecting planning your research project to student learning.
3. How do you see using the various data collection methods to determine a student's needs in learning? Explain.
4. Thinking of being a change agent in your school, how would you encourage other teachers to do action research? What could you do?
5. What has been your biggest takeaway from the last two weeks of the course?

Reflection #4 (week 12)

1. What has been your biggest challenge when **collecting data** for your research project?
2. What has been your biggest challenge when **analyzing data** for your research project?
3. What have you learned about the process of finding and using research-based evidence and mobilizing it into practice? What are some necessary knowledge and skills needed? What would you do differently?
4. What is your biggest takeaway from this course about research and its processes? How do you think it will help you to be a better teacher for increasing student learning?
5. Any additional comments?