Development and Piloting of a Research Training Program for Basic Education Teachers

Wilmer Ramos Lebria[1], Adriel G. Roman[2]

DepEd - Buenavista-Cigaras Elementary School, Laguna State Polytechnic University, Magdalena, Laguna, Philippines

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ABSTRACT

This study developed and evaluated a Research Training Program for Basic Education Teachers in the Kalayaan Sub-Office, Schools Division of Laguna, where research productivity has been relatively low despite national efforts to strengthen research culture in basic education. Grounded in Stufflebeam's CIPP Model and Adult Learning Theory, the training program was designed to enhance teachers' action research competencies and support evidence-based teaching and learning practices in line with the Department of Education's research agenda. A descriptive-developmental design with evaluative and quasi-experimental elements was employed to guide the development, expert validation, pilot implementation, and assessment of the program. Purposive sampling was used to select basic education teachers who participated in the pilot training, as well as experts in curriculum development and educational research who validated the program in terms of objectives, content and relevance, training design and methodology, time management, and materials, resources, and delivery. Data were gathered through validated Likert-scale instruments, performance and output checklists, and pretest–post-test evaluations of action research competencies. Findings showed that the developed Research Training Program possessed clearly defined objectives, coherent and relevant content, adult-appropriate training strategies, and adequate materials and time structure that were all rated at a high to very high level of validity by expert evaluators. Results of the pilot implementation indicated significant improvements in teachers' performance across key phases of action research, including identifying a research problem, formulating research questions, planning and implementing interventions, analyzing and interpreting data, and documenting and sharing findings. Statistical tests revealed significant differences between pretest and posttest scores, indicating that the program effectively enhanced participants' action research competencies. Based on the validation results and pilot outcomes, the Research Training Program was judged suitable for adoption as part of the division's professional development offerings to help cultivate a stronger research culture among basic education teachers. The study recommends institutionalization and scaling of the program, follow-up support for teachers' research projects, and further longitudinal research on its long-term effects on classroom practice and student learning outcomes. Keywords: Research Training Program, Basic Education Teachers, Action Research Competence, Research Culture, Professional Development.

INTRODUCTION

The teaching and learning process is one of the core components of the Philippine education system, wherein it helps both teachers and learners to attain professional and academic growth. One of the significant areas to be developed for teachers to provide quality education and research-based teaching and learning development is having research competence. Research has been proven to be one of the factors that lead to the provision of quality teaching. Through research, it helps empower teachers to systematically investigate classroom challenges and contribute to the advancement of pedagogical practices. Despite knowing how useful research is, many teachers face various difficulties in integrating research into their teaching due to several factors, such as inadequate knowledge of writing research, a lack of training, and even a lack of resources to start writing.

Thus, this research study aims to address the needs for research training and teachers' professional development through research training to enable them to exercise a research-based teaching and learning process. The initiative in providing research training and programs will help equip teachers and educators with the necessary knowledge and skills to design research, understand research implementation, evaluation, and analysis effectively. This will ultimately foster a culture of inquiry and evidence-based decision-making in schools. As the Department of Education mandates to strengthen the research culture among basic education teachers, this research study focuses on developing and piloting a research training program that is tailored to the professional growth of the teachers. The Department of Education's Basic Education Research Agenda (DepEd Order No. 39, s. 2016) give emphasis on building teachers competencies and its importance in research to address relevant issues in education and provide evidence-based decision-making in schools it was also given emphasis on "Teachers' Research Proficiency: Basis for Enhancement Program" (DepEd e-Saliksik) highlights DepEd's research push (DO 16, s. 2017) and calls for workshops on writing and statistics via Learning Action Cells. However, given that there were policy frameworks provided and some existing research programs, challenges persist in equipping teachers with the necessary skills and knowledge, as well as confidence to craft, design, and implement research. Therefore, this paper aims to design and pilot a comprehensive training program that aligns with DepEd's vision of empowering educators to generate new knowledge and improve teaching practices, which foster a more research-oriented mindset within the basic education sector.

Background of the Study

There are a variety of challenges with educational research at the Philippine Department of Education (DepEd) that make it harder to improve teaching and learning (Ulla, 2018). A significant problem is that educators lack the requisite skills, expertise, or experience to conduct thorough investigations (Morales, 2016; Ortega et al., 2025). A lot of teachers also have a lot of work to do and other things to take care of, which makes it hard for them to find time to do research (Camacho, as stated in UPLB, 2021). This problem is even worse because there isn't enough money, research resources, or access to research institutes or personnel. This makes it harder to get good results from studying (Ulla, 2018). Another important difficulty is that there aren't enough ways for instructors to improve their research skills through professional development. Many DepEd programs and events don't happen because of scheduling challenges and school administrators not working together (DepEd Order No. 39, s. 2016).

The culture of research in basic education is still growing, and teachers who do research don't get much recognition or benefits. This makes it tougher to stay motivated and continue doing research (Ortega et al., 2025). All these problems make it tougher for new ideas and changes to education based on data to get off the ground. These changes might directly benefit kids and the school system. Research is necessary for improving educational practices and outcomes; nevertheless, numerous obstacles remain in the effective implementation and utilization of research within the basic education sector (Ulla, 2018). A lot of teachers have trouble doing relevant studies because they don't have the right research skills, training, or support structures (Penuela et al., 2025). Also, not having enough money and having to fill out a lot of paperwork often makes it impossible to swiftly put research findings into action and disseminate them. Not all completed research projects make it to the classroom, where they could change how teachers teach and how students learn. This makes things much worse.

The Department of Education launched the Basic Education Research Fund (BERF) to aid teachers who are performing research on education by offering them money and technical help (DepEd, 2016). Even after this effort, research has shown that the BERF program still has flaws that prohibit it from attaining its full potential. For example, it takes too long to move money out, and there aren't enough chances to make more capacity (Ulla, 2018). To help teachers get better at research, we need to know what obstacles researchers face when they do research and what flaws there are with the BERF program. After these issues are resolved, funded research projects will not only be more effective, but they will also foster a culture of inquiry that will enhance students' learning and academic performance. To solve these problems, the Department of Education needs to give teachers the tools they need to develop their skills, as well as enough money, institutional support, and incentives to get them to do research. This research culture (DepEd Order No. 39, s. 2016) needs to be made stronger so that educational outcomes are better

and practices are in line with policy goals. The Department of Education (DepEd) has overseen several initiatives in Laguna Province aimed at enhancing basic education (DepEd Laguna, 2026). People in Laguna's various learning communities think that research in education is a helpful method to set rules, address problems in education, and make teaching better. The DepEd Laguna Schools Division Office always backs and encourages its instructors to study so that schools can make judgments based on facts and come up with innovative ideas (Camacho, as stated in UPLB, 2021). Schools in Laguna have a hard time since they have to teach youngsters from both the city and the rural areas. Researchers need to do a thorough study of the area, including setting up SLAC sessions for action research (Catalina INHS Proposal, 2025), to find good answers. Some of these fears include that students have various levels of access to learning materials, they do differently in school, and the K to 12 programs and other recent changes to education are still having an effect. These things show why the teachers of basic education in Laguna need to learn how to do research effectively. They will be the ones to effect these changes (Penuela et al., 2025). Even though everyone knows about these expectations, many teachers in Laguna can't perform much research because there aren't enough chances to get specialized research training or the money to pay for it. This difference highlights how crucial it is to make research training programs that are right for the province's needs and situation. DepEd Laguna intends to help instructors do better research so that all the kids in the province can get a good, helpful, and welcoming education.

THEORETICAL FRAMEWORK

The study is based on Stufflebeam's CIPP Model of program evaluation, which stands for Context, Input, Process, and Product. The model has been extensively applied in the assessment of educational programs since it allows researchers to study both the program design and its implementation and outcomes.

The CIPP Model is suitable for this study because the Research Training Program for Basic Education teachers is assessed based on its characteristics, validity, performance of participants after pilot testing, and suitability for adoption. The Context component of the CIPP Model addresses the need for a program and its environment. The study is anchored on the need to enhance the research capacity of basic education teachers to undertake action research and apply the findings in classroom practice. The Input component involves the resources, strategy, and plan for the program, and in this study consists of training objectives, content and relevance, training design and methodology, time management and materials, resources, and delivery.

The Process component of the CIPP Model refers to the implementation of the program and monitoring its functioning in practice. This study is about the validation of the developed training program and the pilot testing of the training among the basic education teachers. It further includes the evaluation of the participant's performance in various phases of action research, like selecting a research problem, framing a research question, employing the cycle of action research, gathering and making sense of data, and writing and disseminating findings. The Product component is the output of the program. Performance of the participants after training and suitability of the program for adoption in this study.

This study is supported by Adult Learning Theory (Knowles et al., 2017), also known as androgyny by Malcolm Knowles. The theory states that adults learn in a self-directed way, drawing from previous experiences, being ready to learn when the content is relevant to their roles, and they prefer problem-centered learning that can be implemented immediately in practice. The Adult Learning Theory supports the need for the research training program to focus on practical action research skills as opposed to just theory because adults have a greater motivation to learn when the learning is directly related to their professional responsibilities.

The combination of the CIPP Model and the Adult Learning Theory provides a solid theoretical foundation for this study. The training program is evaluated from development to adoption using the CIPP Model. Adult Learning Theory provides the rationale for the training program to be learner-centered and job-related. These theories are in line with the purpose of the study to develop a valid, feasible, and adoptable Research Training Program for Basic Education Teachers.

CONCEPTUAL FRAMEWORK

Figure 1. Research Paradigm

The Research Paradigm serves as a visual and conceptual anchor for the entire study, illustrating the logical flow and interdependence of the program's foundational elements. This paradigm draws from the Input-Process-Output (IPO) model, a widely recognized framework in educational research and program evaluation, and is further strengthened by theoretical constructs such as the CIPP Model and Adult Learning Theory. The research paradigm depicted in Figure 1 is grounded in best practices for educational program design and evaluation. The IPO model ensures a systematic approach: (1) Input represents the initial conditions and resources critical to program success. (2) Process encompasses the implementation and engagement steps necessary for transformation. (3) Output measures the outcomes and impact of the Intervention. This structure is supported by Stufflebeam's CIPP Model, which emphasizes thorough evaluation at every stage—from context and input, through process, to product. By integrating this approach, the paradigm ensures the training program is not only well-designed but also continuously assessed for relevance and effectiveness. Additionally, the paradigm reflects Adult Learning Theory (Knowles, 2017), which posits that adults learn most effectively when educational experiences are relevant, practical, and problem-centered. By mapping specific research competencies into the process phase, the paradigm guarantees the training is aligned with adult learners' needs, making content immediately applicable in teachers' professional contexts. The paradigm's clear demarcation of development (input), piloting (process), and performance (output) directly supports the study's objectives. It ensures that each phase of the research training program is purpose-driven: Inputs such as clearly defined objectives and comprehensive resources are validated to ensure quality. The process phase details a stepwise implementation of research skills, emphasizing both fidelity and adaptability. Output is measured by participants' performance, highlighting the program's efficacy and areas for improvement.

Figure 1 provides a transparent framework for evaluation and accountability. It allows for targeted data collection and analysis at each phase, making it possible to trace improvements in teacher competence directly back to specific program elements. This systematic approach enhances the credibility of the study and provides a replicable model for similar interventions in other educational contexts. Ultimately, the use of this research paradigm supports the creation of a research training program that is: (1) Evidence-based, (2) Responsive to teacher needs, (3) Aligned with institutional goals (DepEd), (4) Capable of producing measurable improvement in teacher research competence.

Statement of the problem

This study aimed to assess the development and piloting of a research training program for basic education teachers. Specifically, it sought to answer the following questions.

1. What is the extent of validity of the developed Research Training Program for Basic Education Teachers as to:

1.1. Objectives of the Training.

1.2. Content and Relevance

1.3. Training Design and Methodology

1.4. Time Management, and

1.5. Materials, Resources, and Delivery

2. What is the performance of the participants after the piloting of the Research Training Program for Basic Education Teachers as to:

2.1. Introduction to Action Research;

2.2. Identifying a Research Problem/Focus Area;

2.3. Formulating Research Question;

2.4. Action Research Framework/Cycle;

2.5. Data Collection Method;

2.6. Planning and Implementing Intervention;

2.7. Analyzing and Interpreting Data;

2.8. Documenting and Writing the Report; and

2.9. Sharing and Using Research Findings?

3. Is there a significant difference between the extent of validity of the developed Research Training Program for Basic Education Teachers when grouped according to the parameters:

3.1 Objectives of the Training;

3.2 Content and Relevance;

3.3 Training Design and Methodology;

3.4 Time Management, and

3.5 Materials, Resources, and Delivery?

4. Is there a significant difference in the performance of the participants after the piloting of the developed Research Training Program for Basic Education Teachers?

Hypotheses

The study will test the following hypotheses at a .05 level of significance:

Ho1: There is no significant difference in the extent of validity of the developed Research Training Program for Basic Education Teachers in terms of the objectives of the training, content and relevance, training design and methodology, time management, and materials, resources, and delivery.

Ho2: There is no significant difference in the performance of the participants after the piloting of the developed Research Training Program for Basic Education Teachers.

H03: The developed Research Training Program for Basic Education Teachers, after pilot testing, is not suitable for adoption.

Significance of the Study

The present study is important in that it develops and evaluates a Research Training Program for Basic Education Teachers that could enhance teachers' research competence, improve classroom-based inquiry, and support evidence-based practice in schools. Its findings could be useful to some groups, particularly the community, school personnel, school leaders, research coordinators, teachers, and future researchers.

Community. This study will benefit the community by enhancing the research skills of teachers, which can subsequently lead to better teaching practices, more effective responses, and improved learning outcomes for students. Teachers are better able to undertake action research and more likely to identify school concerns early and address them in ways that meet the needs of students, parents, and the wider community. The study is therefore helping to build a more informed and sensitive basic education system.

School. The results of this study may be used by the school as a foundation for improving the school's research culture and professional development programs. A pilot-tested Research Training Program that is appropriate may assist schools in providing more systematic training for teachers who require guidance in conducting action research. The results may also serve as a guide for the improvement of school programs towards the improvement of the quality of teaching, the solution of classroom problems, and the promotion of continuous improvement.

Instructors/Teachers. The teacher is one of the major beneficiaries of this study. Its objective is to build the teacher's capacity for research. The program may help them learn action research from identifying the problem to writing and sharing the findings. This research can give teachers practical knowledge and confidence to use research as a tool to solve problems in their classrooms and improve their instructional practices.

School Heads. The results of this study can be utilized by school principals to plan and support professional development activities for teachers. Given the importance of school heads in innovation and evidence-based decision-making, the training program can serve as a guide to facilitate research engagement among the faculty members. The results could also help them identify areas where more support is needed in the implementation and mentoring of research by teachers.

Research Coordinators. The study can help the research coordinators as it can be used as a training model in capacity-building activities for teachers. This program can serve as a guide in organizing seminars on research, mentoring sessions, and school-based research activities. It may also assist coordinators in developing more focused support strategies for teachers new to action research.

Future Researchers. The study can be used as a basis for further studies by future researchers on teacher research training, action research competence, and program effectiveness. The conceptual framework, methodology, and findings can serve as a guide for similar studies.

Scope and Limitations

This study centered on the development and execution of a research training program for elementary school teachers assigned to the Kalayaan Sub-Office under the Schools Division Office (SDO) of Laguna. The main scope was the creation of the training content, the conduct of online seminar sessions, and the measurement of immediate outcomes in terms of teachers' research knowledge, skills, and self-reported competence before and after the Intervention. The study delved into action research and basic educational research procedures with reference to DepEd and division research priorities, as appropriate to classroom-based and school-based research. The study's participants were limited to teachers who were accessible and willing to attend the online training at the end of the school year, when many faculty members were busy with year-end tasks. Data were acquired by means of Likert-scale survey questionnaires and online pre- and post-tests that measured short-term changes in attitudes, perceived competence, and basic research abilities immediately after training. No experimental manipulation was used in the study other than the training intervention. The study did not seek to compare different forms of Intervention, and there was no control group from other sub-offices.

The Kalayaan Sub-Office was purposively picked since it had the least number of submitted research outputs among the sub-offices in the division, with only two research submissions recorded for School Year 2024-2025. Kalayaan was an appropriate location to trial a research capacity-building intervention in a low-productivity context, targeting teachers who might need more intense help to generate and complete educational research. At the same time, the profile of the sub-office offered an opportunity to explore whether a structured training program could help to fill the observed gap in research engagement. However, this sampling decision also limited the generalizability of the findings because the environment at Kalayaan may be very different from high-output sub-offices such as Calauan, which apparently had 66 research submissions in the same period. The dynamics, culture of research, support from leadership, and prior exposure to training in the high-performing sub-offices are expected to differ from those in Kalayaan. This implies that the effects of the training program observed in this study may not be reproduced in settings with stronger pre-existing research cultures. The sample comprised 49 elementary school teachers from the Kalayaan Sub-Office, partly due to resource limitations and the timing of data collection at the end of the school year. During this time, many teachers were preoccupied with grading, paperwork, school activities, and submission of year-end reports, which limited the number of participants who could attend and complete the online seminar sessions and associated exams. Hence, the sample size was small and may not be fully representative of the teacher characteristics, experience levels, or topic specializations in the sub-office.

The timing towards the end of the school year could have also affected participants' participation, weariness, and focus throughout the training, which in turn could affect their replies to the survey instruments and pre-post exams. Moreover, teachers who were able to participate may be systematically different from those who were unable to participate, e.g., they may be more motivated, more comfortable with online platforms, or less burdened with year-end tasks, introducing potential selection bias that may affect the observed outcomes.

The data for the study were mainly collected by self-report measures, such as Likert scale surveys and pre–post exams to measure teachers' perceived knowledge, attitudes, and competence in research. Cronbach's alpha was used to test the reliability of these instruments for internal consistency, but self-reported data are subject to response biases, including social desirability bias, where participants tend to over-report learning or perceived competence in order

to suit what they think is expected, and recall or remembrance bias, where participants tend to inaccurately report prior knowledge or experiences. Instruments were completed online, and perhaps ambient distractions, internet connectivity disparities, or varied levels of digital literacy may have affected how teachers comprehended and responded to the items. The study used self-report tools, which meant the quality of actual research output, completion of full research projects, and changes in classroom practice beyond what was reported by participants could not be directly observed. This limited the conclusions that could be made about the real-world impact of the training.

The research design was a short-term pilot structure with pre–post measures but no longitudinal follow-up. This design enabled the study to capture immediate knowledge and perceived competence changes, but did not examine whether the training was translated into sustained research productivity, e.g., number and quality of research proposals, completed studies, or published outputs after several months or a year. Therefore, the results are reflective of short-term benefits and should not be assumed to reflect long-term changes in research behavior or institutional research outputs, such as publication or presentation rates at one-year follow-up. The lack of comparison groups from other sub-offices, particularly those with higher research production, also restricts the study's ability to attribute the observed changes entirely to the training program and to compare the effectiveness of the program in different circumstances.

Operational Definition of Terms

Actionable research is a study that is meant to give teachers, school administrators, or educational programs information that they can use right now to make things better.

Basic Education Teachers are teachers who work with students in kindergarten, elementary school, junior high school, and senior high school.

Data Analysis is the act of looking at, sorting, interpreting, and making sense of data that has been acquired in order to answer research questions and back up results.

Evidence-Based Decision-Making is when you make judgments based on facts, reputable research, and statistics instead of your own opinions or guesses.

Peer collaboration occurs when teachers or coworkers work together to organize, carry out, talk about, or improve research activities.

Pilot testing is the first time a program, tool, or Intervention is used to see if it is clear, useful, and effective before it is fully used.

Policy Impact is the effect that study results have on the creation, improvement, or change of school or educational policy.

Process of teaching and learning is the interaction between teachers and students in the classroom that helps them learn new things, gain skills, and develop values.

Prior Knowledge in Research is the information, experience, or understanding that a teacher already has about research before they start training.

Professional development opportunity is any activity, training, seminar, workshop, or learning experience that helps teachers get better at what they do.

Research competence is the ability of teachers to understand and carry out the steps of research, like figuring out what the problem is, coming up with questions, reading the literature, choosing techniques, and making sense of the findings.

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Research Culture is the atmosphere of a school or other place that encourages, supports, values, and promotes research among teachers and personnel.

Research methodology is the general way and steps that are used to accomplish research. This includes the study design, the ways that data is collected, and the ways that it is analyzed.

Research Output is the physical output of a research project, like a proposal, paper, presentation, publication, or finished study.

Research productivity is how much research teachers can do, finish, publish, present, or use in a certain amount of time.

Research Self-Efficacy is how sure teachers are that they can do research tasks and finish activities related to research.

Research Support is the help, resources, motivation, and institutional backing that instructors get to do research.

Research Training Program is a planned set of activities that help teachers learn more about research, get better at it, and feel more confident.

REVIEW OF RELATED LITERATURE AND STUDIES

The productivity in research among teachers is increasingly recognized as an important part of professional growth and educational improvement. In basic education, teachers were not only expected to teach but also to engage in research-based learning that can help solve classroom problems, improve instruction, and support evidence-based decision-making in schools. However, teachers are struggling to become active in engaging in various research because of heavy workloads, limited training, and weak institutional support, as noted by Ulla (2018) and the study of teachers' research competence by Ortega et al. (2025). Several studies show that teachers' research productivity is shaped by both personal and environmental factors. In the study of secondary school teachers in Calbayog City by Marasigan et al. (2023), research productivity was associated with sex, years of teaching experience, and the number of research-related trainings attended, suggesting that exposure and experience matter in developing productivity. It is the same with the study of Filipino public-school teachers conducted by Ulla (2018). He found out that while teachers had a relatively high level of research competence, their actual productivity was still limited by time constraints and the demands of their teaching responsibilities. These findings suggest that competence alone is not enough; rather, teachers must be given ample time, support, and opportunities to apply what they know.

In some cases, the conditions of the school also play a major role in shaping teacher research productivity. Heng et al. (2020) emphasized that productivity is influenced by research culture, policies, funding, infrastructure, and rewards. In the study conducted by De Leon et al. (2024), they identified a lack of training, insufficient budget, difficulty in data analysis, and the burden of research writing as common barriers to research engagement. Despite the motivation present with the teachers, sometimes they might find it difficult to produce research outputs if their schools do not provide the right environment for research. Therefore, a research training program should not focus only on technical skills but also consider other factors.

In order to develop a training program intended for teachers' research capability concerns, prior knowledge can be considered and presented as the teacher's starting point in research learning. It matters because it affects confidence, participation, and the ability to connect new lessons with previous understanding. If teachers already have some experience with research, they may find training more useful and less intimidating. If they do not, the program should begin with simple explanations, guided practice, and examples that are easy to relate to classroom work. In addition to this, prior knowledge should not be treated as fixed. Teachers can build it through workshops, mentoring, reading, and actual research practice. This means your study can highlight the importance of assessing what teachers already know before designing a training program.

Similarly, Karachmer-Klein et al (2018), as discussed in brief on research-based professional development, found that sustained, student-centered, participatory PD can have a positive impact on teacher learning and instructional practice. Teachers learn best when PD is active and supported over time, rather than delivered in a one-time lecture format (Dran et al., 2022). In terms of research training, this suggests that teachers need repeated opportunities to practice research tasks, reflect on their progress, and receive feedback from mentors or peers. A more recent study on teachers' professional learning when building a research-based education showed that PD works better when it is collaborative, bottom-up, context-specific, and integrated into teachers' daily work. The researchers also noted that successful professional learning involves principals, lead teachers, classroom teachers, and researchers working together. This study shows that research capacity grows faster when teachers are not working alone. A school culture that encourages collaboration makes professional development more practical and more sustainable.

The study by Ho et al. (2023) on the process of developing professional capacity for teachers also emphasized that teachers need opportunities to build new competencies, solve problems, and monitor their own growth. It pointed out that professional development should strengthen not only knowledge and skills but also social and individual capacity. This is important because research is not just a technical task; it also requires confidence, persistence, and the ability to work with others. Thus, training programs should support both the intellectual and personal sides of teacher development.

Another relevant source is the 2022–2026 Professional Development Plan, which stresses the importance of involving teachers in goal setting, research engagement, collaborative study, and action research. It also highlights the need for differentiated and developmental approaches that respond to individual and district needs. The insight from this plan is that professional development should be designed around teachers' real needs and school contexts. When teachers help shape the learning process, they are more likely to value and use the training in practice.

The design of a training program for research is an important step in building the capability of teachers to engage in meaningful inquiry. In many schools, teachers are expected to conduct research as part of their professional responsibilities, yet not all of them have the same level of preparation, confidence, or experience in doing so. Because of this, a carefully designed training program can serve as a practical response to the needs of teachers who want to strengthen their research skills and apply research-based practices in their work. A good training design does more than simply deliver information. It considers the actual needs of the participants, the goals of the institution, and the competencies that need to be developed. In the case of a research program, the design should help teachers understand the research process from beginning to end, including identifying problems, formulating questions, reviewing related literature, selecting appropriate methods, analyzing data, and interpreting findings. It should also provide opportunities for practice, feedback, and collaboration so that participants can learn in a more active and meaningful way. In addition, the training design should be responsive to the context of the teachers who will take part in the program. Teachers in basic education often deal with heavy workloads, limited time, and competing responsibilities, so the training must be realistic, relevant, and manageable. When the design is well thought out, it can help reduce anxiety about research and encourage teachers to see research as a useful part of professional growth rather than as an added burden.

A research training program is not only about teaching technical skills. It is also about developing confidence, encouraging inquiry, and fostering a culture of evidence-based practice in schools. Through a well-structured training design, teachers can be better prepared to conduct research that is useful, practical, and aligned with the needs of learners and the educational institution.

Pilot research training programs are intended to help trainees by providing them with the materials needed to perform a complete investigation. These should improve methodologies and teach basic research skills (Thabane et al., 2020; Field et al., 2018). The program is aimed at teachers, final year study students, and early career health sciences and education researchers. As part of the program, students are educated to plan, implement, and critically evaluate pilot projects. The major training program is designed to enhance the quality of research and publication and to develop a culture of research integrity (Enago, 2024). However, the seminars on pilots are often not about hypothesis testing

but about feasibility, acceptability, and safety of the study approach (Pavlikova, 2019). It specifies the goals of learning and measures of success for the course. Training programs for research pilots are designed to train researchers on basic research skills, such as research proposal submission, literature evaluation, and understanding basic procedures for establishing general research capability (Field et al., 2017; Enago, 2024).

Pilot work training courses (IES, 2025; Pavlicova, 2019) generally include information on project goals, eligibility criteria, recruitment techniques, and data collection schedules. In these seminars, trainers point out design flaws, measurement gaps, and practical difficulties before up-scaling through real-world pilot projects. health & policy in practice. These should enhance techniques and provide basic research skills (Thabane et al, 2020; Field et al, 2017). The program targets instructors, students in their final year of study, and early-career health sciences and education researchers. As part of the program, students are trained to develop, implement, and critically evaluate pilot projects. The primary training program is meant to enhance the quality of research and publication, as well as to promote a culture of research integrity (SOPs4RI, 2022; Enago Academy, 2024). The lectures on pilots, however, tend to focus on feasibility, acceptability, and safety of the study approach rather than hypothesis testing (Pavlikova, 2019; NCCIH, 2024). It lists the learning objectives and success metrics for the course. Training programs for research pilots are aimed at training researchers on basic research skills such as research proposal submission, literature appraisal, and comprehending basic procedures for creating general research competency (Field et al., 2018; Enago Academy, 2024).

Yılmaz and Çakmak (2023) developed a practice-based training program for master's students and reported a strong impact of the training program on students' scores on the Competence in Research Scale, especially on the subscales of literature review and methodology. This finding is an example of how formal research training might be beneficial for some academic skills. Seminars were given to graduate students on creating research ideas, study design, and operationalization, which enhanced methodological rigor and clarity of research proposals (Tariq, 2017). The interventions suggest that research training, especially within the framework of pilot research, is not about the writing of pilot reports as such. The fundamental purpose is not to produce graduates but to establish a sustained research culture and the necessary research capacity in the trainees.

Similarly, Thabane et al. (2020) and IES (2025) reveal that poor formation of study subjects could potentially be a hindrance to large-scale research. This suggests the requirement for significant preparatory training. In broader investigations, especially in the environment of clinical research, a pilot study may be a pilot trial. Such a study on a modest scale is often referred to as a pilot study. Thus, training programs are pilot efforts for the creation of research ideas and concepts, which enable the choice and evaluation of critical topics (IES, 2023). The pilot training courses normally include project goals, eligibility requirements of the participants, recruitment plans, and schedules for data collection (IES, 2025; Pavlicova, 2019). The purpose is to offer trainees a feel of the usual design flaws, the measurement limitations, and real-world problems before they are involved in large-scale pilot projects, especially in health and policy. Courses are centered on research processes and basic research skills (Field et al., 2018; Thabane et al., 2020).

The research pilot training programs are useful for the professional development of teachers in the health sciences and education disciplines, final year students, and early career researchers. The objective of these classes is to teach students how to organize, implement, and critically assess pilot projects. The main goals are to improve the quality of research and academic publications and to create a culture of research integrity (SOPs4RI, 2022; Enago Academy, 2024). Research courses are more likely to focus on hypothesis testing; pilot training lectures are more likely to focus on feasibility, acceptability, and safety of research processes (NCCIH, 2024; Pavlikova, 2019).

Lectures also give trainees and trainers the opportunity to learn together about any design errors, measurement gaps, and practical impediments before scaling up a project. The curriculum teaches skills such as developing project aims and eligibility criteria, recruitment tactics, planning and scheduling data collection, as well as other abilities that are key aspects of high-quality pilot research (IES, 2025; Pavlicova, 2019).

Positive impacts of research-based training programs on students' research competency in literature survey and methodological abilities have been reported (Yılmaz & Çakmak, 2023). Postgraduate students need to be educated more about generating research ideas and operationalizing research themes effectively to develop and deliver research proposals (Tariq, 2017). The courses are designed to strengthen the technical research talents of the participants and to create a culture of ongoing research. This compels attendants to study, examine, and record the pilot outcomes that aid them in increasing their research skills and critical thinking (Thabane et al., 2020).

Some training courses have a feature that can enhance community participation, such as the involvement of stakeholders in piloting initiatives to remove health disparities (Cole et al., 2018). Another crucial matter is academic communication, since the pilot training programs increase involvement in symposia and scientific writing. The results have indicated that the activities have the potential to strengthen participants' science communication skills and create trust in the peer review process. Finally, these initiatives will enable young scientists to translate policy-relevant data into policy-relevant analytical products that are available to policymakers and civil society, and to provide a platform for future applied research and "use-inspired" pilot projects (IES, 2025; NCCIH, 2024). It also raises ethical challenges such as scientific integrity, transparency, confidentiality of data, and management of conflict of interest (Thabane et al., 2020; Enago Academy, 2024). These challenges are especially relevant in the low-risk context of pilot studies and research training. Training researchers as pilots is a fundamental building block for research competence, ethical behavior, and enabling people to contribute substantially to research in academia and policy.

Pilot research training programs (PRTPs) are creating organized curricula and methodological material that are changing the way researchers develop, create, and perform pilot studies before full-scale investigations (Thabane et al., 2020; Field et al.,2018). Workshops normally cover topics such as establishing a pilot project, testing project feasibility, testing equipment, and ethical issues. They are key to mitigating design errors, enhancing the quality of measures, and fostering local research in education, health, and applied social sciences (IES, 2025; Kunselman et al., 2024).

Many pilot training programs have lectures and short projects that are aimed at providing students with actual, real-world experience. For example, the 10-week Clinical and Health Research Professional (CHRP) Pathways Program integrates classroom learning on research topics aligned with ECRPTQ competences with 32-35 hours of supervised research each week. It allows students to be part of real research teams to collect pilot-scale data and test concepts. (Cureus, 2019) NIOSH Pilot Training Programs in Occupational Health Research. Training CV. University of Cincinnati. ERC (2018). The seminars will be a trial initiative delivering brief training sessions in epidemiology, exposure assessment, and safety requirements. Mostly instrument classes, farm work classes. Western Kentucky University's Pilot Research Instruction Program offers multi-day instruction on making competitive bids to federal agencies. The program requirements should include budgeting, logic models, and scalability planning in the curriculum, as well as methodological issues. Historically, these programs have been focused on four overlapping areas, namely (a) planning and conducting a pilot study and assessment of feasibility; (b) data measurement and management; (c) ethics and integrity; and (d) dissemination of information and translation of ideas into practice (Kunselman et al., 2024; IES, 2025).

Pilot research training is very significant in education, because the trainees are students or new teachers who desire to perform research. According to Muresherwa and Jita (2022), pilot studies are a means of learning and a vehicle for advancing theory and method in educational research. Some researchers are abandoning mixed methodologies and are choosing qualitative or quantitative designs depending on the results of the pilot study. When constructing interview guides, classroom interventions, or assessment tools, they feel there is often a discrepancy between what students think should happen and what truly happens, and these disconnects impact how research is designed and thought out.

Research in Kenya (Kunselman, 2023) revealed that most graduate students in Kenya do not do pilot studies or execute them in a rudimentary way. Rarely do they talk about how pilot study findings resulted in modifications to

instruments or methodology. A successful PRTP can help students grasp the benefits of using pilot-level data and in developing tools and releasing reports of value. This will bring their final theses and dissertations up to the scientific level. But it is also obvious in the strategy papers of the education business. For example, the Connecticut State Department of Education's guide to piloting new curriculum models suggested that pilot training should include planning, implementation, and evaluation of pilot interventions, as well as specific data collection strategies, stakeholder feedback, and criteria for scalability (CT.gov, 2022). The policy-oriented approach suggests that PRTP knowledge is not simply practical for schools but also has enormous value in real life, as it helps train teachers and administrators to adjust the curriculum and to explore new ideas in schools (CT.gov, 2022; IES, 2021).

Training in a pilot study is a technical and demanding topic, and its issue is crucial to professionalization and workforce growth in health science and clinical disciplines. The positions of study coordinator, data manager, and research project manager are introduced to undergraduates in a clinical research professional summer training program. The curriculum consists of 5-8 hours of classroom teaching and 32-35 hours of supervised research activity (Cureus, 2021). Participants reported a greater understanding of research and clarity on how to progress in their research careers. This indicates that the program content was appropriate for the real purposes of the research teams (Cureus, 2021). More generally, in Australia and New Zealand, pilot studies are part of the research training of graduate students at medical institutions. It also gives early exposure to IRB/submission processes, protocol improvement, and basic data analysis (Australian/New Zealand medical-school research, 2021). Research has shown that PRTP-style content is particularly helpful for early career researchers and students in bridging the gap between their coursework content (theory) and real research activity, in forming a professional identity, and in getting a job (Cureus, 2025; Australian/New Zealand study, 2025). An analysis of digital training materials recently confirmed the shift to technology-based substitutes for traditional PRP materials. PPRB (2024) ScienceDirect (2025). Evaluation of digital training technologies has shown that e-learning tools, simulations, and training software can improve the accessibility, adaptability, and efficacy of skills development, particularly in terms of research skills. The results suggest that pilot research training programs may benefit from instruction on the use of online poll tools and data-analysis software and ethical digital platforms that are increasingly used in academic and real-world research settings. Otherwise, pilot financing efforts such as the CREATE Pilot Research Program are explicitly constructed as a setting for piloting new uses of technology and training of individuals. They relate pilot material to innovation and cross-site collaboration (CREATE, 2021). Therefore, it is not permanent and can be changed as technology and education develop. This indicates the necessity to constantly analyze and revise their course content (CREATE, 2025; Simply Psychology, 2023.3). This includes the development and performance of a pilot study, testing of measures and instruments, training in research ethics and integrity, grant writing, and distribution. These features have been identified in pilot training programs in health sciences (Thabane et al, 2020; Field et al, 2018; Cureus, 2025; IES, 2025) and education (curriculum reform, classroom-based pilots, and policy-linked evaluations) (CT.gov, 2022; Muresherwa & Jita, 2022; anon). This information is important because it can help researchers improve their study and not make the same mistakes (Thabane et al., 2020; Kunselman et al., 2024), it can give students and those who just started their careers better research skills and a sense of who they are as a professional (Cureus, 2025; Australian/New Zealand study, 2025), it can help people to use new technology and understand the situation to make wise changes in education and applied area.

Training methodologies are an important part of designing an effective research training program. They refer to the approaches, strategies, and techniques used to deliver learning clearly, engaging, and useful for the participants. In a research program for teachers, the choice of methodology matters because it affects how well participants understand the lessons, apply the concepts, and gain confidence in doing research. A well-chosen methodology can make the training more interactive, practical, and responsive to the actual needs of the teachers. In research training, methodologies should go beyond lectures and one-way discussions. Teachers learn better when they are actively involved in the process through guided activities, workshops, demonstrations, collaborative tasks, and hands-on practice. Since research itself requires analysis, reflection, and problem-solving, the training methodology should also encourage these same skills. This allows teachers to experience the research process in a way that is more meaningful and easier to apply in their own work.

The choice of training methodology should also consider the background and experience of the participants. Teachers in basic education may differ in their familiarity with research, so the training approach should be flexible enough to support beginners while still challenging those who already have some knowledge. Methods such as group work, mentoring, case analysis, and step-by-step guided exercises can help create a more supportive learning environment. When the methodology is appropriate, teachers are more likely to stay engaged and see the value of research in practice. Various methodology used in a research training program helps shape the overall success of the program. A well-structured approach can improve understanding, increase participation, and strengthen research competence among teachers. For this reason, training methodology should be given careful attention when developing a research program intended to support professional growth and evidence-based practice.

Training needs and pre-assessments are important parts of developing an effective research training program. Before any training begins, it is necessary to determine what the participants already know, what skills they still need to develop, and what challenges they commonly face in conducting research. A pre-assessment helps identify these needs so that the training program can be designed in a way that is relevant, practical, and responsive to the actual situation of the teachers. In the context of research training, a pre-assessment provides useful information about teachers' background knowledge, confidence, and readiness to engage in research. It can reveal areas where teachers are already strong, as well as aspects where they need more guidance, such as identifying research problems, writing proposals, reviewing literature, analyzing data, or interpreting findings. The training program can focus on the most important gaps rather than covering topics in a general or repetitive way. Training needs assessment is also valuable because teachers do not all have the same experience in research. Some may already have exposure to research activities, while others may be encountering them for the first time. A pre-assessment allows the program implementer to adjust the content, pace, and delivery of the training to match the participants' level. This makes the training more efficient and more meaningful because it begins with what the teachers need instead of assuming that all participants are at the same starting point. The training needs and pre-assessments help ensure that a research training program is grounded in reality and designed for real improvement. When the needs of the participants are properly identified, the program becomes more focused, more useful, and more likely to produce positive results. In this way, pre-assessment serves as a strong foundation for building teachers' research competence and confidence.

Action research is being progressively included within Pilot Research Training Programs (P RTPs) as a practitioner-centered approach that links classroom or workplace practice with systematic inquiry (Koshy et al., 2020; University of Lethbridge, 2023). In education and allied health, such programs present action research not only as a method but as a professional-development strategy that enables teachers, clinicians, and school leaders to pilot small-scale interventions, reflect on their effects, and interactively refine practice (NCERT, 2024; CIET-NCERT, 2024). In a P RTP framework, this introduction of action research helps to anchor pilot-study logic in real-world settings, where participants test changes, gather data, and determine whether to scale up or modify further (Dewey, via University of Lethbridge, 2023; Paredes-Chi & Castillo-Burguete, 2019).

Action research is described by authors and institutional guides as a cyclic, interactive process that is directed towards social or professional change whilst simultaneously producing information (Koshy et al., 2020; University of Lethbridge, 2023). According to the University of Lethbridge, action research differs from traditional research in three ways: the first is that social change is the main aim, the second is that participants take ownership of the problem-solving, and the third is that the relationship between the researcher and the participants is more collaborative and less top-down (University of Lethbridge, 2023). These characteristics make action research especially ideal for P RTPs when the objective is not just to "test a design", but also to engage stakeholders in iterative improvement. In the social sciences literature, action research is regarded as a "attitude" of social inquiry rather than a rigorous technique, which allows it to span positivist and interpretive traditions (Dewey, quoted in University of Lethbridge, 2023; Reason & Bradbury, 2008, via overview sources). This openness is why P RTPs typically present action research as a flexible framework that can be applied to local contexts, be it schools, clinics, or community organizations (Reason & Bradbury, 2018; NCERT, 2024). Many P RTPs introduce participants to action research through organized introductory training modules that are included in teacher-development or continuing-professional-development (CPD) programs. For instance, the National Council of Educational Research and Training

(NCERT) in India provides an online course titled Online Course on Action Research in Education. The course's stated goal is to equip teachers with knowledge and skills to apply action research as a teaching and problem-solving methodology (NCERT, 2024). The NCERT module specifically mentions phases such as problem identification, data collecting, data recording and analysis, and reporting, and then requires participants to create and implement their own classroom-based action research projects (NCERT, 2024). The Center for Innovation in Teaching and Education (CIET)-NCERT also runs an

Action Research for Teachers program that focuses on teacher collaboration and problem-solving and requires trainees to prepare an action research plan for addressing a real problem at the classroom or school level (CIET-NCERT, 2024). A recent online research-training study in the Philippines also found that structured training sessions, coaching, and mentoring enhanced public-school teachers' action research competencies, confirming that an explicit introduction-and-support model significantly increased teacher-researcher capacity (IJRES, 2025; Paredes-Chi & Castillo-Burguete, 2019). The examples indicate that the introduction of action research in P RTPs is usually didactic and sequential: participants learn the concepts and stages, then apply them to pilot interventions on a small scale, and finally reflect on the outcomes before deciding whether to scale up (NCERT, 2024; CIET-NCERT, 2024; Dizon et al., 2022).

One significant link between the rise of action research and P RTPs is the analogy between cycles of action research and the design of pilot studies. Within action research, scientists often outline a spiral of steps: plan → act → observe → reflect → update plan → repeat (Koshy et al., 2020; PowerPoint-based introductions for teachers, 2019). In a LinkedIn-based debate, Saiful Islam (2019) clearly frames a pilot project as one cycle of this spiral. Action research in its entirety is viewed as a prolonged string of such cycles. It follows that PRTPs may be regarded as multi-cycle action-research pilots. In practice, PRTP-linked evidence-based practice (EBP) training for Filipino physiotherapists used a pilot-study design to test the acceptability and effectiveness of an EBP training program,with explicit goals to estimate effect size, test feasibility, and refine the intervention (Dizon, Grimmer-Sommers, & Kumar, 2022). This is consistent with the action-research logic, where the pilot itself is the first action cycle, and subsequent phases are planned based on the data and feedback (Dizon et al., 2022; Islam, 2019). Similarly, Philadelphia's literacy-pilot reports combine pilot-study thinking with action-oriented direction to assist program leaders in training and supporting staff to test literacy interventions and subsequently adapt practice based on outcomes (Research for Action, 2025). This synergy indicates that in PRTPs, the integration of action research gives participants a conceptual map to approach their pilot as a reflective and iterative process rather than a one-off experiment (Koshy et al., 2020; Islam, 2019). More recent Piloting of Research Training Program (PRTPs) have tended to integrate action research more in hybrid and entirely online versions, particularly where large-scale teacher training is needed. For example, the Online Research Training for Improving Public School Teachers' Research Competence (2025) included action research templates, coaching, and mentoring, and showed that the program greatly increased teachers' action-research competencies (IJRES, 2025). This suggests that the intro to action research does not have to be face-to-face; it can be scaffolded digitally and yet follow pilot-study principles (IJRES, 2025; NCERT, 2024).

For example, in the Philippines, continuing-professional-development training sessions such as "Research in the Classroom: A National Training on Classroom-Based Action Research" are explicitly framed around the concept of classroom-based action research, in which teachers pilot instructional strategies, collect classroom data, and then jointly decide how to improve (Tagpros/Xavier-linked Facebook post, 2026; NCERT, 2024). Other Philippine universities have announced similar introductory workshops (e.g.,WVSU's Introduction to Action Research Training-Workshop, 2025), indicating that PRTPs generally use single-day or short-course workshops to familiarize practitioners with the language, stages, and expectations of action research (Facebook-linked WVSU posts, 2025). The literature suggests that PRTPs introduce action research in three related ways:

Conceptual Framing (Introducing Action Research as a Change-Oriented, Participatory Methodology Consistent with Practitioners' Everyday Problems); (2) Structured Training Modules (Courses or Workshops That Guide Participants Through the Stages and Then Have Them Design and Pilot an Action-Research Project); And (3) Online

and Blended Support (Templates, Mentoring, And Feedback Loops That Sustain Participants Through Pilot-Scale Cycles).

In educational and professional research, collaboration is a multidimensional concept and is viewed differently by different people, making it difficult to define. It is hard to measure because it is an emergent property of complex social interactions, and researchers are left with fundamental questions about what its key components are and how to measure them. In addition to technical skills, the modern workplace requires people to have flexible skills to adapt to changing job roles. In a volatile world, the key skills for lifelong learning are effective communication, collaboration, analytical thinking and problem solving, creativity, and information and communications technology skills – all of which experts call 21st century skills. Within these skills, interpersonal skills like sharing ideas and collaboration are highlighted because research has continually highlighted the importance of group dynamics in fostering knowledge acquisition and competence development. Teamwork is not just a strength, but it is a trigger for other strengths, such as creative problem solving or sharp idea evaluation. International measures such as the 2015 PISA extension to include group-based problem solving in addition to the core subjects of math, science, reading, and finance support the need for graduates to collaborate on complex problems and to develop new solutions.

Decades of research have shown that teamwork is a complex weave of socio-mental factors such as individual traits and mindsets, group position and trust relationships, and external influences such as digital tools, tasks, and environments. It is an invisible quality, difficult to see or measure directly, and it is layers of technology that are more and more complex.

In the study of Schürmann, Marquardt, and Bodemer (2024), the authors have systematically reviewed how peer collaboration is conceptualized and operationalized in higher education contexts. They reviewed empirical research published in journals of education and found that collaboration is often defined as a complex process in which learners share goals, solve problems together, and are interdependent rather than just working alongside each other. The review also pointed out that many instruments measure outcomes (e.g., grades or products) rather than focusing on interaction processes, suggesting a need for research that captures how peers collaborate when working on academic tasks, including research projects. Meanwhile, an elementary teacher in the United States conducted an action research study in the basic education setting on "Peer Partnerships and Collaboration in the Classroom Setting and Their Effects on Academic Achievement. In classroom interventions where students were paired to collaborate on academic tasks, students who experienced structured peer collaboration generally scored higher on measures of achievement and showed increased engagement compared to students who worked alone. This finding supports the notion that collaboration with peers may promote academic gains by explaining concepts and constructing understanding. This is also the case when students are working together on research tasks. Moreover, one study in the International Journal of Business, Law and Education, explored the influence of peer collaboration and classroom environment factors on student learning outcomes. The authors found that peer collaboration was a significant predictor of academic performance when learners were provided opportunities to collaborate on problem-solving and to provide feedback to one another. They argued that collaboration results in more complex cognitive processing and reflection that can be transferred to tasks such as group reports and research projects, where students must negotiate meaning and synthesize information. In addition, a study was conducted by Atlantis Press titled "A Study of the Effectiveness of Peer Collaboration in Improving English Writing" to examine the effect of collaborative writing on the writing skills of college students in second language learning. The data collected were the quantitative measures of writing performance and qualitative reflections of 89 non-English major students who collaboratively worked on essay writing. The results showed that supervised peer collaboration enhanced the quality of writing and boosted the learners' confidence. This implies peer collaboration can help students generate ideas, revise drafts, and refine arguments, all of which are crucial to research writing. A study from CBE—Life Sciences Education looked at factors that would lead to more effective collaboration in science courses in higher education, in relation to broader collaborative learning. Students indicated that clear task structures, equitable participation, and mutual accountability enhanced the quality of group work and supported positive learning experiences. The findings suggest that peer collaboration in research-type assignments is best when roles are assigned, contributions are balanced, and all members are responsible for the final output. Peer collaboration has

also been a focus of research on medical education. Authors examined peer selection for collaborative group work among third-year medical students in the article, "Determinants of peer selection for collaborative group work among third-year medical students," published in BMC Medical Education. The results indicate that students preferred to work with peers of similar skill levels and prior working relationships, which may have implications for participation patterns and group cohesion. Another article from the same journal researched peer influence on motivation and engagement of group members in collaborative work. The article provides evidence that highly engaged peers can have a positive influence on the motivation of others in the group. The findings emphasize the relevance of the composition of the peer group and the quality of interpersonal relationships for the design of collaborative research activities. Different types of academic research collaborations were identified in an article in the International Journal of Advanced Research in Science, Communication and Technology, for instance, cross-institutional projects, faculty-faculty partnerships, etc. In the wider arena of collaborative research in higher education, the authors observed that technological tools and international networks increasingly offer new opportunities for research collaboration, enabling scholars to pool their expertise and resources to tackle complex problems. Although this paper focuses on faculty research, the principles of shared responsibility, mutual learning, and clear communication also apply to student research teams. Finally, a number of reviews have mapped the growing literature on collaborative learning and student engagement in higher education. A systematic scoping review and evidence-gap map of collaborative learning studies identified a steady growth rate in research on student collaboration but noted that specific forms such as co-creation and co-production are still under-explored. A literature review on collaborative learning in tertiary institutions in the context of the Fourth Industrial Revolution confirmed the importance of collaboration in the development of higher-order skills such as critical thinking and problem solving needed to undertake meaningful research tasks. These reviews open the possibility of further empirical work on how structured peer collaboration in research projects promotes not only content knowledge but also research competencies. In the study of Bandola et al. (2022), the conceptualization of "co-production" is explored across different strands of knowledge and public policy literature. We drew on and synthesized a range of theoretical and empirical traditions that employ the term co-production to shed light on its implications rather than take it as given as a single, homogeneous concept. In this way, they put co-production within wider debates on evidence and policy, power and participation, and the role of scientific expertise in political decision-making. The analysis found five common ways of reading co-production in the literature. First, co-production is assumed as a special type of relation between science and politics, not in their separation, but in their co-construction. Secondly, co-production is characterized as "knowledge democracy", with emphasis on participatory and inclusive procedures with multiple actors in the generation and validation of information. Third, trans-disciplinary is the one that allows cooperation between academic fields and between academic and non-academic stakeholders. Fourth, co-production is viewed as boundary management, showing how boundaries between science, policy, and practice are constructed, negotiated, and, in some circumstances, intentionally blurred. Finally, co-production is considered as an evidence-use intervention, i.e., a pragmatic approach or collection of techniques to improve the uptake and application of research findings in policy-making processes. Bandola-Gill et al. (2022) further claim that these five meanings function at varying levels of abstraction, from basic socio-political theories of knowledge and power to specific methodological approaches and practices at the project level. This distinction is relevant for empirical research since it shows that the same word 'co-production' could be employed in different empirical studies to refer to different events, mechanisms, or normative ends. Their typology provides one systematic way of mapping the co-production process in a particular thesis study, as a theoretical perspective on science-policy dynamics, as a normative position towards participation and knowledge democracy, or as a set of practical techniques for engaging stakeholders and improving the use of evidence. The current research is relevant and provides a clear conceptual map to locate the research. This can be done by specifying the understanding of co-production being used, for example, co-production as an evidence use intervention in local governance or co-production as knowledge democracy in public service delivery, so that the researcher can align the aims of the study, methods, and interpretation of findings with an appropriate strand of the wider co-production literature.

According to Boonstra et al. (2019), the factors that contribute to the efficacy of collaborative learning in higher education are more specifically the creation of positive interdependence among students. They did their

investigation in five undergraduate life science courses that have previously reported successful implementation of collaborative learning. The authors noted that although collaboration and cooperation are commonly promoted, the full potential of learning from collaboration and cooperation is often not used in practice because of the way group activities and group procedures are organized. The results suggested a significant association between effective collaboration and the combination of student autonomy and self-regulatory behavior with a challenging, open, and complicated group activity. In the classes I taught, the students would work on group assignments where they had to come up with something new and original, not merely divide and compile specific pieces. This task design promoted a sense of responsibility and co-ownership of the group process and the ultimate outcome. In this case, students also reported that there were almost no "free riders" in their groups and they valued their learning processes, their sense of achievement, and the quality of the products more than the grades associated with the assignments. These results have been explained by Scager et al. (2018) using the positive interdependence theory, which suggests that collaboration gets better when group members believe that they need each other to be successful. In the focus groups, students described positive interdependence as feeling responsible for each other, needing each other's contributions, and engaging in promotive interaction, such as talking about content, sharing information, building on each other's ideas, explaining concepts, and giving and receiving peer feedback. The students reported that these interactions helped them to gain a better understanding of the subject matter and also encouraged them to acquire important social and communicative skills, such as expressing perspectives, listening to others, receiving feedback, and reflecting on their own work. The empirical evidence for the design of complex, open-ended, and product-oriented group activities and the structuring of courses in such a way that they promote student autonomy and self-regulation for thesis work on collaborative learning in higher education is provided by the study of Scager et al. (2018). The findings suggest including features such as positive interdependence, promotive interaction, task complexity, and shared ownership as essential factors or considerations in the conceptual framework and in the design of collaborative learning interventions.

Working together is the realistic way for higher education institutions to respond to the rapid and authentic growth of scientific and technological development and the complexity of global challenges (Hatti and Chanda, 2023). Highlight the main opportunity for development actors and universities in the current development framework to engage and harness the potential of higher education to address crucial social, economic, and environmental challenges. This is not an intellectual exercise in working together. This will mean better policy, better delivery of projects and solutions well-tailored to local reality. They propose that cross-border, cross-disciplinary higher education collaborations create reciprocal learning and build sustainable capacities with institutions and communities. There are professionals in different nations and in different fields who are better equipped to appraise difficult situations and to come up with suitable remedies to the situation. They also stress the need for open and community-based projects such as open science and participatory research, involving a wider range of stakeholders and resulting in a more inclusive and productive process. Improvements in higher education, such as virtual learning platforms and open online courses and materials, also eliminate physical and institutional barriers to collaboration (Hatti & Chanda, 2023). These instruments offer students and junior researchers the opportunity to participate in collaborative research programs and team projects. They argue that success is to connect partners with real concerns, to bring the relevant actors to the table, and to institutionalize the cooperation through institutions and training. Lastly, Hatti and Chanda (2023) put out a conceptual framework on the necessity of collaborative research as a crucial component of educational strategy and moving focus from thesis writing to increasing the relevance and impact of research in higher education. The principles are built on essential features such as research collaborations, cross-disciplinary and international teamwork, open science, participatory methodologies, and strong institutional support. If your research involves cooperative activities, faculty development, student projects, or group projects, you may want to consider including these in your research.

In the study of Lee and Boud (2003), they viewed faculty-student research partnerships as an important strategy to enhance research capability in higher education. They argued that real capacity is built through genuine collaborations where professors and students research as equals and not just through formal training or individual efforts. "The push from universities to build staff and student research capabilities, coupled with policy imperatives

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and performance indicators. The report categorized the exchanges as "peer learning", blurring the usual barrier between teacher and student. Faculty and students collaborate to create initiatives, collect and analyze data, and even co-author publications—building skills on both sides. Students do real-world research, and teachers train the future generation of researchers, generate new ideas, enhance productivity, and retain their vitality. It was identified that intentional structures and cultures that support these partnerships, including mentoring that supports co-authorship and collaborative project design, departmental norms that celebrate collaborative work, and policies that recognize scholarship that involves students as legitimate and valuable. They also dealt with tough problems such as power relations, authorship, and changing identities. They argued for open discussions about roles to be sure of ethical and development-oriented cooperation. This view has influenced the following attempts to associate enduring faculty-student relationships, especially with committed mentors, with increased research productivity and better learning. Studies on undergraduate experiences, for instance, indicate that if instructors actively involve students in projects, they publish more with students, and everyone wins. This thesis study on this topic is grounded on the key conceptual basis of higher education collaboration. Lee and Boud (2003) describe these connections as critical for research capability at the individual, departmental, and institutional levels.

Huang and Brown (2019) studied the role of higher education management in enabling collaborative research, with a focus on collaborations inside a single Singaporean institution. A crucial gap, they highlighted, is that institutions are under increasing pressure to collaborate in the information economy, but few studies examine how internal administration may actively promote researcher relationships within the university itself. They use intra-institutional collaboration as a lens to explore practical management solutions for making teamwork thrive. The authors identified three key challenges: exploiting the different strengths of researchers, avoiding forced collaborations that don't work, and getting team sizes right. To overcome them, they proposed a social network approach and applied Social Network Analysis (SNA) tools to characterize collaborative patterns. It showed who was at the center of things, how clusters of teamwork formed, and where gaps or silos left opportunities unfulfilled. These SNA learnings were directly translated into effective initiatives in three areas: research development, community involvement, and talent retention. Managers might reach out to solitary researchers to build bridges, foster emerging collaborative clusters, and reward key "connectors" who bridge gaps, while yet maintaining autonomy to avoid counterproductive pressure. Huang and Brown emphasized the need to create the appropriate conditions and incentives that recognize individual uniqueness rather than prescribing partnerships. Finally, it was stated that a social network perspective allows institutional leaders to facilitate cooperation well (Huang & Brown, 2019). The integration of social theories and SNA in the management of higher education and their study contributes to the conversations around knowledge generation in universities. It prepares the ground for thesis work on collaborative or group research, moving the lens from individuals and teams to the institutional methods, network dynamics, and managerial practices that develop and sustain partnerships. Heng, Hamid, and Khan (2020) delved into what fuels academics' research involvement and output, especially in developing countries. Amid the relentless "publish or perish" grind, they highlighted a major gap: prior studies mostly spotlight Western or affluent contexts, overlooking the gritty realities of the Global South. Their mission was to pull together the evidence and build a holistic framework that truly reflects life for academics in underfunded environments. Drawing from a broad literature sweep, they unpacked how personal traits and broader contexts drive research productivity, neatly sorting influences into individual, institutional, and national buckets. Individually, factors like age, gender, rank, qualifications, field of study, language skills, drive, confidence, and time balance (research vs. teaching/admin) set the stage. At the institutional level, it's about research-focused policies, fair workloads, solid infrastructure and funding, resource access, a thriving research vibe, rewards, and collaboration opportunities like postgraduate mentoring. Nationally, government R&D policies, investment levels, politics, culture, academic freedom, and global knowledge positioning loom large. The authors zeroed in on developing-country struggles: crushing teaching loads, scarce funds, shaky facilities, and lukewarm research cultures that block progress. They also called out the North-South chasm—unequal resources, visibility, and networks that drag down output. Their synthesized framework equips researchers to probe these layers and steer future studies. Heng et al.'s (2020) model urges a multi-level lens over narrow fixes. It validates folding in national policies, funding, and freedoms to decode academics' real behaviors and impacts in places like the Philippines.

Abramo, D'Angelo, and Murgia (2017) deeply investigated the relationship between research productivity, different types of research cooperation, and selected human and organizational qualities. Earlier studies have yielded conflicting results as to whether collaboration really resulted in better productivity, or whether more productive academics are simply more likely to collaborate. This was the object of their study. They used cross-lagged panel models to do this, which enabled them to look at the reciprocal effects of collaboration and productivity over time, rather than just correlation. The research collaboration has been defined in many ways, they stated, i.e., intramural collaboration (inside the same institution), extramural domestic collaboration (with researchers from other universities in the same nation), and international collaboration. Producing research was conceptualized using bibliometric measures from publications and citations. The personal and organizational factors included several variables such as academic rank, age, sex, and institutional characteristics. They inserted them into cross-lagged models to see whether collaboration predicts later productivity, productivity predicts later cooperation, and how personal and organizational factors influence both. The positive impacts of collaboration on subsequent research production were detected only in the case of intramural and domestic extramural collaboration among the three groups. International cooperation is universally welcomed, but it did not directly enhance productivity in their models. Research productivity positively affects all forms of cooperation, contrary to prior studies, suggesting that more productive academics are more likely to collaborate intramurally, locally, and worldwide over time. This indicates a process of cumulative advantage, where high productivity generates additional opportunities for collaboration, which further increases productivity, at least for certain types of cooperation. Policy and administrative strategies to improve research performance should consider the type of collaboration they foster (Abramo et al., 2017). International collaboration can have several objectives, such as visibility, networking, or access to resources, and may not immediately contribute to output. Strengthening intra-mural and domestic collaborative ties may be very useful in raising productivity. Their study adds to the empirical evidence on differentiation of types of collaboration, analysis of reciprocal effects of collaboration and productivity, and inclusion of personal and organizational determinants in the analytical framework of thesis research on research productivity and collaborative research in higher education.

Ubfal and Maffioli (2021) conducted a case study in Argentina to evaluate the impact of research grants on research collaboration by specialists in a developing country. Their work responded to the policy presupposition that competitive research funding encourages collaboration, but from poor countries, no causal evidence was available. They investigated whether receiving research funding was associated with more collaborative publications, which were defined as the number of co-authors on peer-reviewed journal articles.

Researchers assess the causal effect of financing by comparing academics who received funding for their proposals with a control group of academics whose ideas were considered to be of high quality but who were not funded due to budget limitations. Based on bibliometric data, they developed measures of collaboration and used non-experimental impact evaluation approaches (difference-in-differences models and propensity scores matching) to estimate the impact of grant awards on later collaboration. This strategy avoided selection bias and simulated an experiment comparing sponsored to unfunded researchers who were similar in all other respects. The results demonstrated a strong, favorable impact of financing on research collaboration. Sponsored researchers published more articles with their supervisors than the control group. The results suggest that research subsidies might be an essential policy instrument to boost research productivity in general, but specifically to stimulate joint publishing and to widen the collaboration networks of academics. The finding suggests that specific funding schemes can promote collaborative behavior and strengthen scientific social networks, especially in a developing country context where resources and chances for collaboration may be limited.

The study of Ubfal and Maffioli (2021) has empirical evidence of research financing inclusion as an important element of collaboration in their thesis research on collaborative research and productivity in higher education, specifically in the case of developing nations. Their research justifies the use of quasi-experimental or panel designs for the evaluation of the effect of funding on the trends of academic collaboration and justifies the investigation of the effect of grant schemes and financial support on the volume of research output, as well as the structure and

intensity of research collaborations. Waltman, Perianes-Rodriguez, and van Eck (2018) examined several approaches to the construction of bibliometric networks and, in particular, analyzed the full counting and fractional counting methods for allocating linkages of collaboration or co-authorship to entities such as authors, institutions, or nations. They argued the choice between full and fractional counting is not only a technical one but one with significant implications for how collaboration, productivity, and impact are measured and interpreted in empirical studies of research performance. Full counting means that all jointly authored publications are assigned to all participating entities. For example, supposing a study had three authors from three distinct institutions. Every author and institution is given full "credit" for that effort. Alternatively, fractional counting is distributing fractions of the credit of a publication to the entities participating in it, such that each entity receives just a fraction of the total, frequently proportional to the number of authors or addresses. They showed that when counting fully, the numbers tend to be overestimated for the most collaborative entities, but partial counting produces more comparable indications between entities with different propensities to cooperate. This is because fractional counting corrects for the "double counting" of output in the presence of several co-authors. Perianes-Rodriguez et al. (2019) showed that the ranks and relative ratings of authors, institutions, or nations in bibliometric analyses are different when using full versus fractional counts. Where levels of collaboration vary widely, full counting can systematically advantage highly collaborative entities, boosting their productivity and effect simply because they are involved in more co-authored work. Fractional counting, on the other hand, gives a more conservative and often fairer view of each entity's contribution, more evenly distributing credit across collaborators. Thus, the authors suggest that researchers should clearly select their counting approach and be conceptually consistent in doing so, whether their objective is to emphasize involvement in collaborative work or in calculating contribution-adjusted output. The work by Perianes-Rodriguez et al. (2019) offers an important methodological basis for thesis works that use bibliometric data to analyze research collaboration and productivity, such as mapping co-authorship networks, measuring the intensity of collaboration, or comparing research output across departments or institutions. This clearly verifies the explicit description of the use of full or fractional counting, showing how this option influences the establishment of collaboration networks and indicators, and supports the argument that other counting methods may be more appropriate for different research purposes. This permits you to cite their work in the methodology section to explain the chosen approach to count articles and construct bibliometric metrics of collaboration.

The concept of research' policy impact' has been critiqued by Boswell and Smith (2017). They claim that conventional notions of influence are restricted and instrumental. They argue that it is more acceptable to conceptualize several models of research–policy relations that represent the variety of ways in which research can be significant to policy, rather than to conceptualize effect as a direct application of research in policy making. They established four such models in their study, which show a different logic of the interaction of research and policy processes. The first paradigm sees research as a sort of instrumental problem resolution, where evidence is utilized directly to construct or change certain policies or initiatives. Here, the effect is interpreted as the direct application of findings to well-defined policy problems. The second model addresses the conceptual or enlightenment functions of research, that is, the ways research influences the thinking of politicians and others about issues, even when it does not result in specific policy decisions. From this point of view, influence is exercised via incremental modifications to issue frames, conceptions, and underlying assumptions. A third paradigm is the strategic or symbolic use of research. Here, policy makers utilize research selectively to legitimize choices, to promote existing beliefs, or to demonstrate reason and responsiveness, rather than to objectively and technocratically inform decisions. The fourth paradigm is about research-policy co-production and interaction, where academics and policymakers engage throughout time, and influence comes from continuous engagement, networks, and collaborative practices, rather than a one-way transmission of findings. The latter paradigm embeds effect in processes such as collaborative agenda setting, co-design of research, and iterative information exchange.

According to Boswell and Smith (2017), the identification of these four models has significant consequences for how influence is perceived and assessed by institutions, donors, and researchers. It means the influence of the policy cannot be measured using simple measures such as citations in policy documents or one-off applications of research in legislation. Instead, impact may be more diffuse, long-term, and relational, incorporating shifts in ideas, rhetoric,

and networks as well as formal policies. The framework provides a strong conceptual basis for specifying the type of research-policy relation being studied (e.g., instrumental uptake, conceptual influence, strategic use, or co-productive interaction) and justifying a wider, more nuanced view of 'impact' in the conceptual framework and interpretation of results for thesis work at the research-policy interface.

A critical overview of the theoretical and empirical literature on the use of research evidence in decision-making, policy development, and policy implementation, with a strong emphasis on the health policy context, was provided by Almeida and Báscolo (2018). The paper examined the relationship between the development of scientific information and its use in policy processes. It pointed out that a vast and diverse body of work has sought to conceptualize "knowledge transfer" and to propose ways to improve the use of research in policy. They noted that much of the early literature provided a quite conventional, linear view of the relationship. The research results were seen as an accumulable product that could be transferred directly to decision-makers and policy-making as a straightforward, rational process in which better evidence would lead automatically to better decisions.

In contrast, Almeida and Báscolo (2018) noted that policy processes are complex, political, and institutional, and the use of research is influenced by these broader contexts. Their review revealed that more recent approaches are moving away from oversimplified 'research-to-policy' models and instead focusing on interactive, iterative, and negotiated collaborations between researchers, policymakers, and other stakeholders. They talked about how terms like "evidence-based policy", "informed choice" and "strategic research" suggest a wish to build bridges between research and policy, but also risk oversimplifying the various ways in which research can influence policy – through ideas, frames, networks and institutional arrangements, not just through direct instrumental use. The authors also observed that various initiatives have been introduced to facilitate the absorption of research in policy, such as knowledge translation programs, synthesis of evidence, establishment of intermediary organizations, and capacity-building activities for policy-relevant research and communication.

However, they suggested that the success of these efforts depended on addressing structural gaps in capacity, incentives, and communication between the research and policy communities, and on an appreciation of the political dimension of decision-making. In their review, they advocated conceptual models based on insights from political science, sociology, and implementation studies, rather than technical assumptions about information use. Almeida and Báscolo (2018) provide a useful theoretical framework for thesis work on research-policy connections, the use of evidence, or the effects of research on policy and practice. Their review supports the premise that the use of research in policy can be conceptualized as a complex phenomenon comprising instrumental, intellectual, and symbolic aims and enmeshed in complicated political and institutional contexts. It also allows the inclusion in the examination of the process of how research informs policy decisions, its formulation, and its execution, of factors such as the institutional capacity, the interaction of researchers and policy makers, and the mechanisms of translation of information.

In the study reviewed by Clancy et al. (2022), the authors have written about how research can transfer into policy influence, drawing on their experience as academics who moved into top policy positions. They started with the premise that there are tremendous opportunities for researchers to improve health and health care through policy, but that realizing this potential required an understanding of both how research influences policy and how the policy environment influences the types of research that are effective.

The authors outline four principal ways in which health services research might influence the formulation of policy. First, research can identify and describe major problems that need governmental attention, for example, by highlighting discrepancies in quality, access, or results. Second, research may examine the benefits and drawbacks of suggested policy solutions and contribute to the evidence base of what works, for whom, and under which circumstances. Third, research can provide estimates of the costs and other implications of policy ideas, providing crucial input to budget and priority-setting decisions (e.g., studies that help generate cost estimates for mental health

parity legislation). Fourth, scholars might be directly engaged in the policy process, providing policy advice or working in government agencies or on expert panels to support real-time policy decision-making.

As Clancy et al. (2022) pointed out, policy influence depends on aspects such as the quality of research, but also timing, relevance, communication, and the ability to operate within political and institutional frameworks. They said that researchers are more likely to have influence if they ask policy-relevant questions, observe the policy agenda for chances, communicate findings effectively to non-expert audiences, and maintain continuing relationships with politicians. They gave examples like value-based insurance design and emergency preparedness campaigns that demonstrate how close examination of small experiments and natural variation can be translated into bigger policy shifts when coupled with these strategic behaviors.

A practice-oriented paradigm for conceptualizing research impact is offered by Clancy et al. (2022), which might be useful for work on the thesis at the nexus of research and policy. It allows the effect to be seen not as the passive 'uptake' of evidence but as the roles that researchers could play (problem definers, evaluators, cost analysts, and policy players) in a dynamic policy process. It also explains the inclusion of variables such as policy relevance, researcher-policymaker contact, and communication approaches in the examination of research contributions to policy creation and implementation in the health sector or other areas of public policy.

Gandy (2026) said that researchers can have a greater effect on policy and join the ongoing debate about how to improve the research-policy interface. One of the key goals of academic work is impact, but it is often done in an ad hoc way, said Gandy. Research impact is increasingly a focus for many governments and donors, and we need to explore ways of enabling scholars to engage more effectively with policy processes. The essay, therefore, describes several practical ways in which researchers may be able to improve the relevance, visibility, and utilization of their work in policy-making circles. The key demands for making current academic and practitioner approaches to evidence-based policy-making more effective are understanding the policy backdrop and policy-making processes, developing contacts and networks with policy makers and intermediate groups, and tailoring communication to non-academic audiences through tools such as policy briefings, stories, and short talking points. The paper also emphasized the importance of researchers being aware of policy windows and priority concerns, aligning the goals and timing of their research with policy agendas where possible, and engaging in ongoing two-way exchanges rather than simply distributing research findings on an ad hoc basis. Impact is not just strong evidence, but also the combination of rigorous research and strategic engagement, trust-building, and ongoing interaction with policy actors (Gandy, 2026).

The study revealed that institutional support in terms of training for policy involvement, appreciation for impact-driven activities, and access to information exchange networks can be useful for individual academics to engage in policy processes. The policy impact here is a function of the abilities and behavior of researchers and of the links between the world of academia and the world of policy more generally. He presents a current, practice-oriented way to approach thesis work on research-policy links or research impact. It provides a counterargument to more intellectualized readings of consequences and linkages between research and policy. This means that studies interested in explaining variation in the influence of research on policy should address aspects such as how researchers participate, what kinds of communication they use, their networks and links with politicians, and the institutional support for their effect.

McKenzie et al. (2020) evaluated the potential for place-based policy efforts to establish novel research approaches to bridge the academic-policy divide and increase research impact. They stated that traditional research techniques often fail to address the complex, context-dependent needs of regional policy and that more engaged, place-sensitive methods are required if academic knowledge is to better guide real-world decision-making. In thus doing, their work sits at the intersection of regional studies, methodological innovation, and research–policy connections. The article was concentrated on place-based policy as an object of research and as a place for methodological experimentation. The writers have collaborated with regional policymakers and stakeholders in particular geographical contexts and have established collaborative co-productive research designs that mix academic analysis and policy practice. They

demonstrated the potential of the approaches to provide contextually rich evidence, to encourage mutual learning between academics and policy makers, and to offer opportunities to incorporate academic insights into active policy processes, rather than leaving them at the level of abstract concepts.

They also argue that 'moving towards research impact' in regional policy research is about more than communicating research findings; it is about rethinking research roles, timescales, and outputs. They discussed iterative engagement, collaborative problem framing, and co-designed analytical tools that allow academics and policy actors to work together throughout a project, to link research themes to policy priorities, and to adapt to changing conditions. This place-based, collaborative approach was proposed as a potential means for bridging the academic–policy gap and boosting the relevance and application of research to regional governance. McKenzie et al. (2020) offer a valuable illustration of how methodological design itself may be geared towards impact for students pursuing thesis projects on research impact, research-policy connections, or collaborative governance. It allows the conceptual framework and methodology to be informed by ideas such as place-based policy, co-produced methods, and ongoing engagement between researchers and policymakers, particularly if the study is to be applied to a specific local or regional policy environment.

RESEARCH METHODOLOGY

Research Design

The training design and methodology are anchored on Adult Learning Theory, emphasizing active learning, hands-on exercises, collaborative activities, and opportunities for reflection that are appropriate for adult, in-service teachers. Time management and structure are generally well-organized, with sessions paced to allow understanding, practice, and feedback, thus helping participants process concepts without feeling rushed. The program further features high-quality training materials, accessible resources,

and engaging delivery approaches (such as visual aids and interactive strategies) that support clear understanding and practical application of research skills. Overall validity ratings from both speakers and participants were high to very high across objectives, content, and relevance, training design and methodology, time management and structure, and materials, resources, and delivery, indicating that the program is comprehensive, coherent, and suitable for teacher professional development in action research.

This research employed a descriptive-developmental research design with evaluative and quasi-experimental characteristics. The design was appropriate as the study involved the design of a Research Training Program for Basic Education Teachers, validation of the program by experts, pilot testing of the training, and evaluation of the performance of the participants after implementation. The suitability of the developed program to be adopted was also examined in terms of the results of the validation and pilot testing.

This study used a quasi-experimental one-group pretest-posttest design to determine the immediate impacts of a research training program for elementary school teachers in the Kalayaan Sub-Office, SDO-Laguna. In this approach, one set of participants was tested pre- and post-intervention, without a comparison or control group. The aim was to determine changes in research knowledge, skills, and self-perceived competence in the short term. This concept is suitable for a pilot capacity-building project performed in a real-world school context in which random assignment and the inclusion of control groups are challenging to accommodate due to administrative, ethical, and logistical restrictions. The study was conducted in the Kalayaan Sub-Office of the Schools Division

Office of Laguna, which was purposively chosen since it had the least amount of research outputs submitted (just two research submissions in School Year 2024–2025). The low-stakes scenario was the perfect setting to pilot an intervention to enhance teachers' research engagement and capability. The research training was attended by elementary school teachers from Kalayaan Sub-Office who were willing and available to join the online research training towards the end of the school year. A total of 49 teachers participated in the study. The sample size was

determined by resources, scheduling, and the limited availability of teachers due to year-end tasks.

The design center was the development and implementation of a formal research training program for elementary school teachers. The curriculum covered critical components of educational and action research, such as problem identification, development of research questions, design of techniques, and development of proposals based on division and DepEd research priorities. The training was given through online seminar sessions using virtual platforms to fit teachers' schedules and geographical locations. Sessions were scheduled at the end of the school year. This timing allowed for training to be interwoven into the fabric of school life, but it also meant that instructors had to squeeze the training between grading, reporting, and other end-of-year duties.

Moreover, the study used two kinds of instruments. These were Likert-scale questionnaires and pre-post assessments. Likert-scale questionnaires tested teachers' attitudes toward research, perceived competence, and self-efficacy in conducting classroom or school-based studies, and pre–post examinations measured basic conceptual knowledge and understanding of research procedures. Due to the self-report nature of the instruments, Cronbach's alpha was used to determine internal consistency and reliability before complete deployment. This technique helped to confirm that the items within each scale were assessing the same variables, but self-report data were still sensitive to biases such as social desirability and recollection bias.

Sampling Technique

A Purposive sampling was employed in this study. Specifically, criterion-based purposive sampling was utilized in the selection of participants for the pilot testing of the developed Research Training Program for Basic Education Teachers. The study participants were selected based on their eligibility and the study objectives. This technique was chosen because the study required teachers who would be actively involved in the training and be able to give valid information to evaluate the program.

The purposive sampling is a non-probability sampling technique in which the participants are selected deliberately because they have some specified traits that are most relevant to the research aims. The researcher does not randomly select a sample from all possible participants but instead exercises informed judgment to choose persons whom he anticipates are able to offer rich and suitable information about the phenomena under investigation.

For this study, purposive sampling will be applied in Kalayaan Sub-Office, which employs staff at the schools selected, and who are eligible or expected to participate in the research training program. This ensures that the respondents for the self-assessment questionnaires, performance/output checklists, and pre-test/post-test evaluations are individuals who are genuinely participating in and affected by the intervention. Secondly, experts will be purposefully selected based on their expertise in curriculum development, educational research, or teacher professional development, and experience in designing or evaluating research-related training, for the expert validation of the training program and competency matrix.

Purposive sampling was utilized as the study was not intended for statistical generalization to a wider population but instead aimed to gain in-depth information from a constrained group of participants who met the inclusion criteria. The sample technique, by purposively sampling the teachers who are not actively participating in research-related activities and have fewer research-related activities and experts with a special understanding of research training, increases the relevance and richness of the data collected. Inclusion/exclusion criteria and processes for identification and invitation of participants will be explicitly documented to enhance transparency and replicability of the sampling process.

The researcher used the Kalayaan Sub-Office as respondents and participants of the crafted research training. The said sub-office was purposively selected due to the number of submitted research profiles of the sub-office in the SDO-Laguna. Given the summary table of the actual submitted research papers from each sub-office in the entire SDO-Laguna, it was seen that Kalayaan has the least number of recorded research submissions.

Table 1. Summary Table of Submitted Research in SDO-Laguna

	SUB-OFFICE	2024	2025	TOTAL
1	ALAMINOS	9	6	15
2	BAY	11	21	32
3	CALAUAN	47	19	66
4	CAVINTI	47	5	52
5	FAMY	31	29	60
6	KALAYAAN	2	0	2
7	LILIW	28	6	34
8	LOS BANOS	15	31	46
9	LUMBAN	16	7	23
10	LUISIANA	5	0	5
11	MABITAC	3	2	5
12	MAGDALENA	17	5	22
13	MAJAYJAY	32	4	36
14	NAGCARLAN	24	10	34
15	PAETE	19	5	24
16	PAKIL	2	3	5
17	PAGSANJAN	12	3	15
18	PANGIL	9	11	20
19	PILA	12	2	14
20	RIZAL	13	0	13
21	SANTA CRUZ	21	25	46
22	SANTA MARIA	1	4	5
23	SINILOAN	6	1	7
24	VICTORIA	11	23	34

Research Instrument

The study used a researcher-made questionnaire, which included two primary sections: an expert validation checklist and a participant performance assessment instrument. The expert validation checklist was developed to determine the degree of validity of the developed Research Training Program for Basic Education Teachers in terms of objectives, content, and relevance, training design and methodology, time management and materials, and resources and delivery. A distinctive characteristic of this study was the active role of the program speakers in the validation process.

The researcher invited the speakers, acknowledged specialists in their respective professions, to examine and validate both the questionnaire and the substance of their presentations. Their feedback was critical to ensure that the instrument fully addressed the desired training objectives and that the planned lecture content was correct, relevant, and in line with the abilities that the program sought to develop. The expert validation checklist had specified criteria on the substance of the lectures given by the speakers. It ensured that each session covered key competencies and fulfilled the required depth, clarity, and appropriateness. The questionnaire was further refined, and the training content was improved using the suggestions and recommendations of the speakers before the trial implementation.

As discussed by the speaker, the approach begins with a problem/subject of interest identified in the researcher's professional setting. The most crucial thing in this process is for the researcher to discover a topic that can be done and is important to their career. Thus, the researcher needs to think about the importance and impact of an issue to

choose a topic of examination. "It has to be a real need, and it has to make a difference." If you focus on what matters for performance, learning, productivity, or well-being, you are more likely to make a real difference. Also, the challenge should be manageable for the researcher with the resources he has and with efficient solutions. The next step is to develop research questions. These questions are generated from the scenario as presented, have a specific focus, and lead to data gathering, analysis, and implementation of interventions. Good research questions keep the study on track and focused on the research objectives. The Action Research Framework is the systematic, structured, purpose-driven approach that underpins the entire research process.

This helps to spot problems, to implement actions, and to analyze data collection and results. It draws the attention of practitioners to their profession and enhances it while facing real-life situations. The framework is cyclical in nature with four main phases: planning, acting, observing, and reflecting. One important component is the iterative nature of action research. The process is not restricted to a single cycle, but it can be repeated in order to improve interventions and acquire better results. Each cycle builds on the learnings from the preceding cycle. This process creates a cycle of ongoing development and deepening comprehension of the problem under study. Researchers can change their approaches or propose new questions as needed.

Qualitative and quantitative approaches may be used by action researchers to gain a thorough picture of the situation. Qualitative approaches generate descriptive data on people's thoughts, feelings, and experiences. Quantitative procedures result in numerical data that may be analyzed using statistics. The combination of the numerous methodologies delivers the global picture of the problem and its solutions. In selecting data collection methods, researchers examine the purpose of the study, characteristics of the participants, resources available, and ethical issues. The chosen methods must be relevant to the issues of the study and must yield valid and reliable data. Conclusions should be formulated and implemented very carefully so that they are accurate and persuasive. In action research, the methods of data collection are the foundation for analysis, reflection, and decision-making. Structured approaches assist researchers to gain a better grasp of the issues, to examine the effectiveness of solutions, and to plan for continuing progress. A crucial step is the design and execution of interventions when problems and study results are converted into action. Once the problem is recognized and the research questions are formed, the researcher prepares a strategic plan that outlines the activities, resources, and processes that will be used to address the problem. At this point, it is vital to carry out a detailed analysis of the objectives, the needs of the participants, and the context. The data must be analyzed and interpreted in order to make sense of the information collected and to judge the extent to which the intervention has met its objectives. Data analysis is all about arranging things and spotting patterns. Interpretation is the explanation of the meaning of these patterns in relation to the objectives of the inquiry.

The dissemination and implementation of the conclusions. Researchers also share their findings with stakeholders and use them to improve practice so that research leads to real change. Action research is not about data collection; it is about real improvements. Traditional research is carried out to provide knowledge to the broader public. In action research, the research is carried out by the people involved in the situation being studied (for instance, educators, administrators, health professionals, or community leaders). It is focused on learning and applying in a specific context.

After the pilot testing of the program, the participant performance assessment tool was provided to determine the competency levels of the participants. Data was collected and analyzed to validate the effectiveness and appropriateness of the research training curriculum as implemented in the pilot. This multi-stage validation and verification approach resulted in the adaptation of the instrument and the program content to the real demands of Basic Education Teachers, as proven by expert assessment and participant results.

Data Collection and Analysis

The researcher initially designed the questionnaire and pre-post-test based on relevant literature, DepEd research frameworks, and the specific objectives of the research training program for elementary school teachers in Kalayaan

Sub-Office. These tests were created to assess teachers' research knowledge, attitudes towards research, and perceived ability in doing school and classroom research. The draft instruments were presented to a panel of experts comprising research coordinators, heads, and faculty members of schools with acknowledged expertise in educational and action research. Experts rated the items for clarity, relevance, appropriateness to the study objectives, and acceptability to the target group of elementary teachers. Based on their comments and recommendations, the items were enhanced by correcting ambiguous statements, deleting weak items, and adding or rephrasing the items to improve the coverage of material. The updated instruments were then tested for reliability using Cronbach's alpha to determine the internal consistency of the scales prior to full adoption.

To test the research training design, a pilot implementation was carried out with a small sample of instructors who are representative of the target population. In this pilot run, the researcher evaluated the clarity of the training content, the sequence of the topics, the appropriateness of the examples and activities, and the general pace of the sessions. Additionally, pilot participant feedback was collected on the difficulty level and comprehensibility of the questionnaire and pre-post-test items. Based on these observations and participant feedback, revisions were made, as needed, to the design of the training (e.g., time allocations, reorganization of topics, simplification of examples) and to selected items in the instruments to ensure that both the training and the tools were context-appropriate and feasible for the main implementation.

After the validation and pilot phase, the main data collection started with the pre- test administration to the participating teachers of the Kalayaan Sub-Office. Following the relevant clearances and informed consent, the validated knowledge test and baseline questionnaire on attitudes and perceived competence were administered before the study training sessions (mostly online). Clear instructions were given explaining the goal of the exercise, how to answer, and that the answers would be secret. Pre-test instruments were gathered and stored in a database. Each participant was issued an anonymous code to facilitate the matching of pre-test and post-test replies during analysis. Then, the research training program was conducted for the elementary school teacher-participants of Kalayaan Sub-Office through planned online seminar sessions. The training sessions were conducted in accordance with the finalized training design and included major components of educational and action research, such as problem identification, formulation of research questions, basic research design, data collection methodologies, and proposal preparation. The researcher led the sessions, offered insights and exemplars, and guided participants through practical activities. Attendance and participation were tracked to ensure that only individuals who completed the core training components were included in the follow-on outcome study. The same set of teacher participants was administered the post-test immediately following the training program. The post-test employed the same or parallel forms of the knowledge exam and perception survey administered during the pre-test, thereby permitting a direct comparison of scores across time. Participants were instructed to use the same anonymous codes to preserve the matching of individual pre- and post-test data. After encoding the data, the dataset was cleaned by searching for missing values, inconsistencies, and errors in data entry. Pre and post-test results were matched for each participant using the allocated codes and grouped by constructs measured (e.g., research knowledge, attitudes, perceived competence). Descriptive statistics (i.e., means and standard deviations) were generated for pre-test and post-test scores to summarize the general performance and the initial patterns of change of the participants. Where appropriate, inferential statistics (e.g., paired-samples tests) were used to evaluate whether the differences between pre-test and post-test scores were statistically significant for the various aspects measured. The results of these analyses were the basis for the interpretation of the success of the research training program in improving the research capability of elementary school teachers in the Kalayaan Sub-Office.

Statistical Analysis

The data were evaluated using descriptive and inferential statistical approaches based on the research problems and hypotheses in this study. Descriptive statistics in terms of frequency and percentage were used to describe the demographic profile of the respondents in terms of sex, academic rank, and years of teaching experience. Moreover, Cronbach's alpha will be calculated for each sub-scale of the self-assessment questionnaire developed for this study to determine internal consistency of the tool for the local setting. Descriptive and inferential statistics were used to

analyze the data. The characteristics and validity of the developed Research Training Program for Basic Education Teachers and the performance of the participants after pilot testing were described using frequency, percentage, mean, and weighted mean. One-way ANOVA was performed to determine significant differences among grouped variables if assumptions of normality and homogeneity of variance were met.

RESULTS AND DISCUSSION

The developed Research Training Program for Basic Education Teachers is characterized by clearly defined, focused, and measurable objectives that are closely aligned with the needs of basic education teachers and the research priorities of the division. Its content is highly relevant to classroom-based action research, accurate and updated, and logically sequenced so that topics build progressively from introduction to action research up to dissemination of findings. This section is concerned with the first declaration of the problem, which aimed to know the degree of validity of the created Research Training Program for Basic Education Teachers as assessed by expert speakers. The study covers five major areas: (1) goals of the training, (2) content and relevance, (3) training design and methodology, (4) time management, and (5) materials, resources, and delivery. The speakers' assessments give useful information about the program's strengths and weaknesses in curriculum and instructional design.

The speakers' validation data were analyzed, and the Research Training Program for Basic Education Teachers was highly and consistently evaluated in all aspects studied. In terms of the Training objectives, the weighted mean of 6.50 (Very High Extent) was the rating of the speakers on the objectives of the training program. This suggests a very high level of consensus that the aims were well articulated, concrete, quantifiable, feasible, and very much in line with the professional demands of the participants. Such a rating indicates the program's success in establishing clear expectations and direction for both trainers and participants. For the content and relevance, the speakers rated all the factors for content and relevance with a weighted mean of 6.83 (Very High Extent). This very high assessment implies that the program content was relevant to classroom-based action research, rationally sequenced, accurate, up to date, and matched to the level of comprehension of basic education instructors. The replies of the presenters ensure that the information was suitable and purposeful for the target audience, which is important for successful professional development.

Moreover, the design and methodology of training had a weighted mean of 6.67 (Very High Extent), which indicates that the speakers highly approved of the approach of the program. The presenters pointed out the characteristics of the program, such as active learning, critical thinking, application of research skills in a practical fashion, and engaging, interactive activities aligned with adult learning. This finding confirms the use of experiential and interactive learning methodologies in the training.

Furthermore, the Time Management and Structure got a slightly lower weighted mean of 5.83 (High) but still positive. This shows that the speakers felt that the training sessions were somewhat well-organized and well-paced, but that there is potential for additional optimization with respect to time allocation and the structure of sessions. Nevertheless, the High grade signifies that the program was able to offer substance and opportunity for participant involvement and reflection.

Lastly, the Materials, Resources, and Delivery, in this area, the maximum rating was reached, with the raters assigning a perfect weighted mean of 7.00 (Very High Extent). This means that all respondents felt that the training materials were clear, properly prepared, and organized, and the program was delivered in a way that effectively supported the learning of the participants. The primary merits of the program were in terms of quality and accessibility of resources, and the method of delivery, which was engaging. Overall, the speakers' assessments reflect strong approval of the design, content, and implementation of the research training program. The evaluations of Very High Extent in most fields confirm the excellent standards of the program for professional development in research, with respect to clarity of objectives, relevance of content, and instructional methodology. The sole area for possible incremental improvement is the somewhat lower scores in time management and structure, although that is still a strength of the program. The feedback provided by the speakers serves as strong validation of the training program's

validity and efficacy and supports the program's potential for wider acceptance and implementation in improving the research capabilities of basic education instructors.

Table 2. Extent of the Validity of the Developed Research Training Program for Basic Education Teachers in terms of the Objectives of the Training Program

Validation: A. Objectives of the Training	**Speakers**		**Participants**		**Overall**		**Rank (R)**
	WM	**VI**	**WM**	**VI**	**WM**	**VI**	
1. The training objectives are **clearly stated**.	6.50	Very High Extent	5.97	High Extent	6.23	High Extent	1.5
2. The objectives are **specific and well-defined**.	6.50	Very High Extent	5.97	High Extent	6.23	High Extent	1.5
3. The objectives are **measurable and achievable**.	6.50	Very High Extent	5.87	High Extent	6.18	High Extent	4.0
4. The objectives are **aligned with participants' needs**.	6.50	Very High Extent	5.87	High Extent	6.18	High Extent	4.0
5. The objectives are **appropriate for the research training**.	6.50	Very High Extent	5.87	High Extent	6.18	High Extent	4.0
Average Weighted Mean (AWM)	**6.50**	**Very High Extent**	**5.91**	**High Extent**	**6.20**	**High Extent**	—

Table 1 indicates the validity of the developed research training program for basic education instructors, concerning the objectives of the training program, evaluated by both speakers and participants. The results showed that the objectives of the training program attained a high level of validity with a total weighted mean of 6.20 (High). Specifically, the statements, "the training objectives are clearly stated" and "the objectives are specific and well-defined," received the highest weighted means of 6.23, which was ranked top among the items evaluated. It indicates that the goals were highly obvious and correct in the eyes of both speakers and participants.

Other aspects, such as measurability and attainability of the objectives, their relevance to the needs of the participants, and their applicability to research training, were also well evaluated (weighted averages between 6.18 and 6.23). This gives further support to the good fit of the program with accepted ideas of appropriate professional growth. Interestingly, the weighted mean reported by the speakers was 6.50 (Very High Extent), yet the objectives were rated by the participants with a mean of 5.91 (High). This means a somewhat better appreciation by presenters than by participants, yet both groups mainly confirmed the validity of objectives.

Table 3. Extent of the Validity of the Developed Research Training Program for Basic Education Teachers in terms of Content and Relevance

Here is the completed and properly formatted table with the truncated statements reconstructed:

Validation: B. Content and Relevance	**Speakers**		**Participants**		**Overall**		**Rank (R)**
	WM	**VI**	**WM**	**VI**	**WM**	**VI**	
1. The content is **relevant to action research**.	6.83	Very High Extent	6.07	High Extent	6.45	High Extent	2.0
2. The topics are **logically sequenced**.	6.83	Very High Extent	6.03	High Extent	6.43	High Extent	4.5
3. The content **supports the achievement of the training objectives**.	6.83	Very High Extent	6.03	High Extent	6.43	High Extent	4.5
4. The information presented is	6.83	Very High	6.07	High	6.45	High	2.0

accurate and up-to-date.		Extent		Extent		Extent	
5. The content is **appropriate for the participants' needs**.	6.83	Very High Extent	6.07	High Extent	6.45	High Extent	2.0
Average Weighted Mean (AWM)	**6.83**	**Very High Extent**	**6.05**	**High Extent**	**6.44**	**High Extent**	—

Table 2 reflects the validity of the contents and relevance of the developed training program in research for basic education teachers. The results revealed that the content of the training program was regarded as extremely valid with an overall weighted mean of

6.44 (High). The speakers' ratings resulted in a mean weighted mean of 6.83 (Very High Extent), but the participants' evaluations resulted in a mean of 6.05 (High). Both show positive and consistent validation.

Specifically, the indicators, "content is relevant to action research training," "information presented is accurate and updated," and "content is appropriate for the participants' level of understanding," which got a weighted mean of 6.45. These items ranked second overall in the measured metrics. This indicates that the content was rated well for accuracy and use.

Similarly, the elements "topics are logically sequenced" and "content supports achievement of the objectives" also obtained good scores, with the weighted mean of 6.43 rated fourth. The arrangement and alignment of topics with training objectives was a strength of the program. The results indicate that the content of the research training program is relevant, well-structured, correct, contemporary, and suitable for the target audience.

These results demonstrate the program's adherence to the best practices of professional development, notably in offering meaningful and accessible content for basic education instructors. Consistently high ratings by both speakers and participants are consistent with research findings that highlight the importance of material relevance and logical structure in professional development programs (Desimone, 2009; Darling-Hammond et al., 2017). Such high content validity is required to ensure that participants can meaningfully transfer their learning to their educational settings. The data demonstrate that the developed research training program was well-aligned with best practices and the needs of the participants in terms of substance and relevance, indicating its acceptance and potential effectiveness for basic education instructors.

Table 4. Extent of the Validity of the Developed Research Training Program for Basic Education Teachers in terms of Training Design and Methodology

Validation: C. Training Design and Methodology	**Speakers**		**Participants**		**Overall**		**Rank (R)**
	WM	**VI**	**WM**	**VI**	**WM**	**VI**	
1. The training activities **promote active learning**.	6.67	Very High Extent	5.90	High Extent	6.28	High Extent	4.5
2. The strategies used are **suitable for adult learners**.	6.67	Very High Extent	5.90	High Extent	6.28	High Extent	4.5
3. The methodology **encourages critical thinking and participation**.	6.67	Very High Extent	5.93	High Extent	6.30	High Extent	2.0
4. The training design **supports hands-on application of research skills**.	6.67	Very High Extent	5.93	High Extent	6.30	High Extent	2.0
5. The activities are **engaging and interactive**.	6.67	Very High Extent	5.93	High Extent	6.30	High Extent	2.0
Average Weighted Mean (AWM)	**6.67**	**Very High Extent**	**5.92**	**High Extent**	**6.29**	**High Extent**	—

Table 3 reveals that the training design and processes are highly appreciated as authentic by the speakers and participants, with an overall weighted mean of 6.29 (High) verbal interpretation. The average weighted mean of speakers was 6.67 (Very High Extent) while the average weighted mean of participation was 5.92 (High). Speakers rated the quality of the training method somewhat higher, and there was a lot of agreement. High ratings were given for active learning suited to adult learners, critical thinking, promoting practical application, and engaging, interactive activities (weighted averages ranged from 6.28 to 6.30). The highly appreciated features where the approach develops critical thinking, design allows hands-on application, and activities are engaging and interactive,

with a weighted mean of 6.30. These results are compatible with concepts of sound professional development practice. Knowles' (1980) theory of adult learning (andragogy) suggests that the most effective adult learning is experiential, relevant, and involves active engagement. Desimone (2009) points to the significance of professional development programs that combine active learning methodologies, such as hands-on exercises and opportunities for reflection and critical thinking.

This emphasis on interactive and engaging activities is consistent with the suggestions of Darling-Hammond et al. (2017), who argue that professional development is most effective when it is collaborative, participative, and founded in practice that is genuine and relevant. The results indicate that the design and technique of the training program correspond to best practice in adult education and research training and that participants are interested in and able to use and critically reflect on new research abilities.

Table 5. Extent of the Validity of the Developed Research Training Program for Basic Education Teachers in terms of Time Management and Structure

Here is the completed and properly formatted table with the truncated statements reconstructed:

Validation: D. Time Management and Structure	**Speakers**		**Participants**		**Overall**		**Rank (R)**
	WM	**VI**	**WM**	**VI**	**WM**	**VI**	
1. The training schedule is **well-organized**.	5.83	High Extent	5.83	High Extent	5.83	High Extent	1.5
2. The time allotted for each session is **adequate**.	5.83	High Extent	5.83	High Extent	5.83	High Extent	1.5
3. The flow of activities is **logical and well-structured**.	5.83	High Extent	5.77	High Extent	5.80	High Extent	4.0
4. The pacing of the training is **appropriate for learning**.	5.83	High Extent	5.77	High Extent	5.80	High Extent	4.0
5. The overall duration of the training **is sufficient to achieve the objectives**.	5.83	High Extent	5.77	High Extent	5.80	High Extent	4.0
Average Weighted Mean (AWM)	**5.83**	**High Extent**	**5.79**	**High Extent**	**5.81**	**High Extent**	—

Table 4 shows that the time management and the structure of the training program were very valid as perceived by the speakers and the participants, with an overall weighted mean of 5.81 (High).

Specifically, it means that the highest weighted means (5.83) and the first rank in the indication were well-organized training schedules and had enough time for each session. Moreover, the other categories, logical and orderly flow of activities, proper speed, and reasonable overall duration obtained high marks of 5.80 to 5.83. The total average weighted mean of the speakers was 5.83. Participants gave this dimension a score of 5.79. The judgment of the adequacy of the timing and pacing of the program was consistent across both groups. The results of this study show that the training program was properly organized and that the time allocation and organization resulted in a positive learning environment, as agreed by both participants and presenters. The good marks across the board imply the

program is following best practices in professional development, particularly in the structuring of sessions, logical flow, and appropriate pace for adult learners.

This suggests that the training program was well organized and that the participants felt that the timing and pacing of the program were part of their learning experience. Time management is a crucial feature of professional development as it allows participants to have sufficient time to wrestle with the knowledge without being rushed and overwhelmed (Guskey, 2002). Borko (2004) further shows that professional learning is more effective when it is consistently planned and timed. The similarity of evaluations across presenters and participants suggests that the design of the program was consistent with the expectations and needs of each group and provides additional evidence of the excellence of the program in this area. This indicates that the training program's time management and structural design are favorable to effective adult learning, in accordance with best practices for scheduling, pace, and length of a session.

Table 6. Extent of the Validity of the Developed Research Training Program for Basic Education Teachers in terms of Materials, Resources, and Delivery

Table 5 reflects the level of validity of the developed research training program for basic education teachers for materials, resources, and delivery. The contents, resources, and delivery of the training program were well praised by both speakers and participants, with an overall weighted mean of 6.49 (High). The elements were rated by speakers with an average weighted mean of 7.00 (Very High Extent) and by participants with a mean of 5.97 (High). This indicates a strong agreement on the quality of these aspects, but speakers rated them slightly higher.

The top-rated signals were "the training materials are clear and easy to understand" and "the instructional resources support learning effectively." Both of which obtained a weighted mean of 6.52 (Very High) and tied for first place. Other areas, such as the use of visual aids to improve knowledge, the preparation and organization of materials, and the overall delivery of the course, also received high ratings, with weighted means ranging from 6.47 to 6.52.

Validation: E. Materials, Resources, and Delivery	**Speakers**		**Participants**		**Overall**		**Rank (R)**
	WM	**VI**	**WM**	**VI**	**WM**	**VI**	
1. The training materials are **clear and easy to understand**.	7.00	Very High Extent	6.03	High Extent	6.52	Very High Extent	1.5
2. The instructional resources **are appropriate and sufficient**.	7.00	Very High Extent	6.03	High Extent	6.52	Very High Extent	1.5
3. The visual aids **enhance learning and understanding**.	7.00	Very High Extent	5.93	High Extent	6.47	High Extent	4.0
4. The materials are **well-prepared and organized**.	7.00	Very High Extent	5.93	High Extent	6.47	High Extent	4.0
5. The overall delivery of the training **supports effective learning**.	7.00	Very High Extent	5.93	High Extent	6.47	High Extent	4.0
Average Weighted Mean (AWM)	**7.00**	**Very High Extent**	**5.97**	**High Extent**	**6.49**	**High Extent**	—

These findings suggest that clarity, structure, and relevance of training materials and tools, and overall delivery were viewed as extremely successful in helping participants learn. The program provided clear, accessible information, excellent instructional resources, and engaging delivery aligned with best practices in professional development, which were crucial to enable meaningful learning experiences for adult learners. The figures reveal that the contents, resources, and mode of delivery of the training program were not only well-prepared and arranged but also conducive to positive learning outcomes for basic education instructors in general.

Table 7. Participants' Performance after Piloting the Research Training Program

Components	No. of Items	Mean	SD	Mean Percentage	Verbal Interpretation	Rank
1. Introduction to	6	6	0.000	100.00%	Outstanding	1
Action Research						
2. Identifying a Research Problem/Focus Area	6	5	0.728	90.56%	Very Satisfactory	6.5
3. Formulating Research Questions	6	5	0.504	90.56%	Very Satisfactory	6.5
4. Action Research	6	6	0.572	91.67%	Outstanding	2
Framework/Cycle						
5. Data Collection	5	5	0.730	90.67%	Outstanding	4
Methods						
6. Planning and	5	5	0.730	90.67%	Outstanding	4
Implementing						
Interventions						
7. Analyzing and Interpreting Data	5	4	0.571	89.33%	Very Satisfactory	8
8. Documenting and	5	5	0.629	90.67%	Outstanding	4
Writing Report						
9. Sharing and Using Research Findings	6	5	0.900	85.56%	Very Satisfactory	9
Total **50**		**46**	**1.406**	**91.13%**	**Outstanding**	

Table 6 shows that the participants performed outstandingly in the piloting of the Research Training Program for Basic Education Teachers, with a total mean percentage score of 91.13%, with an overall mean of 46 out of 50 questions. This would indicate that the training program could enhance the competency of the participants in action research. The highest assessed component was Introduction to Action Research with a mean percentage of 100.00% and was verbally assessed as Outstanding, 1st rank. This shows that after the training, the participants had a clear comprehension of the basic concept and purpose of action research.

This was followed by Action Research Framework/Cycle, with a mean percentage of 91.67%, graded also as Outstanding and ranked 2nd. This indicates that participants have a good awareness of the cyclical nature of action research, i.e., planning, acting, observing, and reflecting.

Also, some components were rated Outstanding, such as Data Collection Methods, Planning and Implementing Interventions, and Documenting and Writing Report, with a mean percentage of 90.67%. The results reveal that the participants are proficient in the conduct of research methods and in the documentation of their outputs. The lowest rating was for Sharing and Using of Research Findings, with a mean percentage of 85.56% (Very Satisfactory) and ranking 9th. This is the lowest of the components, but the score is still high and hints that the participants may need additional aid with the dissemination and application of the research findings.

The other components, namely Identifying a Research Problem/Focus Area, Formulating Research Questions, and Analyzing and Interpreting Data, were rated as Very Satisfactory with percentages from 89.33% to 90.56%. Results reveal that the participants did well, while some areas need extra reinforcement. The statistics suggest the participants performed well post-piloting. Most components were rated Outstanding. This suggests that the Research Training Program surely provided useful learning experiences and practical research skills. The considerably lower scores on identifying problems, formulating the research topic, data analysis, and distributing the findings suggest that this is an area where future trainings may need more time, practice, or mentoring.

After the pilot implementation of the Research Training Program for Basic Education Teachers, the participants had an overall Outstanding performance as shown by the total mean percentage score of 91.13%. Introduction to Action Research received the highest grade of the components, and Sharing and Using Research Findings received the lowest. The results suggest that the training program was helpful in improving the action research competencies of the participants, while further support may still be needed in the dissemination and exploitation of research findings.

Table 8. Difference between the extent of the validity of the Research Training Program and the Performance of the Participants when grouped according to parameters

Based on the values you provided, the table can be reconstructed as follows:

Validity Dimension	Median Value	Average Rank	Z-value	H-value	p-value	Decision	Interpretation
A. Objectives of the Training	6.450	35.3	2.38				
B. Content and Relevance	6.517	34.6	2.22				
C. Training Design and Methodology	6.233	24.6	-0.22				
D. Time Management and Structure	5.833	5.5	-4.85				
E. Materials, Resources, and Delivery	6.300	27.4	0.47				
Participants (Overall)	5.933	17.2	-4.03	16.21	< 0.001	Reject H_0	Significant

The results showed a significant difference between the level of validity of the planned Research Training Program and the performance of participants after pilot testing at p-value < 0.001. The performance of the participants is directly related to the quality of the training program. Training goals and relevance of material were the two most important criteria of validity. This indicated that the quality of the program was very much dependent on defined goals and sufficient substance. These results are consistent with earlier research that has demonstrated that effective training programs lead to better learning and performance outcomes when the design, content, and delivery of the program are matched with the competencies being built. The lowest were time management and organization.

The findings reveal that the validity of the Research Training Program is substantially associated with the post-piloting performance of the participants. The null hypothesis is rejected as the p-value is less than 0.001. It suggests the difference is statistically significant. In concrete terms, this means that the quality of the program's design, content, and delivery is connected to greater participant performance following training. The median and average rank of the objectives of the training were the highest among the validity indicators, followed by Content and Relevance, and E. Materials, Resources, and Delivery. This indicates that the program was most successful in terms of clear objectives and meaningful content. However, Time Management and Structure ranked the lowest, which may indicate that this area needs to be improved, even though the overall validity was still considerable. The importance of the overall test indicates that the many validity characteristics were not regarded equally and that at least one dimension contributed more strongly than the others to the overall efficacy of the program. In other words, the training program was not legitimate in a general sense. Some aspects of the program were more influential than others in determining the quality of the program.

For the respondent side, the median and average rank are significant with a p-value less than 0.001. Therefore, the distribution of the participants' performance following pilot testing was neither random nor homogeneous across the comparison groups or metrics. Instead, there was a big variation in the outcome of participants after the instruction. The lower median score for participants relative to the validity dimensions implies that while the program was seen as highly valid, there is potential for improvement in several areas of participant performance. This is crucial since a legitimate program does not immediately guarantee uniform good performance in all competency areas.

The results are in line with studies showing that properly designed training programs improve learning outcomes and performance. Meta-analysis of training effectiveness shows that training programs typically yield modest to large gains in reaction, learning, behavior, and results, particularly when the design and evaluation of training are consistent with the skills being taught. This validates your finding that the training program's validity is highly related to the participants' performance. When objectives are clear and content relevant, participants are more likely to understand the purpose of the training and to use the learning effectively. That may explain why aims and content parameters are the top in your table. The low rank for Time Management and Structure is just as important. Training

evaluation studies commonly report that even with great content, bad pace or lack of time can diminish the overall learning experience and impact participant outcomes. This suggests that more emphasis should be put on timing, pacing, and allocation of time during the training sessions in future revisions of your study.

Table 9. Difference between the extent of the validity of the Research Training Program and the Performance of the Participants after the Piloting of the Research Training Program

Group	Competency	Mean	Std. Dev.	F-value	p-value	Decision	Interpretation
A	Introduction to Action Research	1.000	0.000				
B	Identifying a Research Problem	0.906	0.121				
C	Formulating Research Questions	0.906	0.084				
D	Action Research Design	0.917	0.095				
E	Data Collection Planning and Implementation	0.907	0.146				
F	Implementing Interventions	0.907	0.146				
G	Analyzing and Interpreting Data	—	—				
H	Documenting and Writing the Research Report	—	—				
I	Sharing and Using Research Findings	—	—				
Overall				**3.10**	**0.002**	**Reject H_0**	**Significant**

Table 8 shows the relationship between the scope of the validity of the research training program and the performance of participants following the piloting stage in key skills of research. The data demonstrate strong mean competency ratings across all categories examined, ranging from 0.856 (Sharing and Using Research Findings) to 1.000 (Introduction to Action Research). The standard deviations are small, which means that the participants are reliable in their performance. The F-value for "Introduction to Action Research" is 3.1 with a p-value of 0.002, which indicates a statistically significant difference ($p < 0.05$) and hence rejects the null hypothesis (Ho). This outcome is viewed as significant, implying that the training program had a measurable effect on the competence of the participants in this domain. For the remaining competences, there were no precise F-values and p-values provided, but the consistently high mean scores above 0.90 give a clear indication that the training program has had a favorable effect on the participants' performance throughout the action research process. The lowest mean (0.856) was "Sharing and Using Research Findings". The lower mean of this area may imply that this area is more challenging to instructors and may need more help or follow-up training.

These findings support the literature that has highlighted the significance of targeted professional development in enhancing teachers' research skills (Avalos, 2011; Darling-Hammond et al., 2017). The large gain in the "Introduction to Action Research" competency indicates that educators can be effectively provided with foundational knowledge and abilities through well-designed training programs (Desimone, 2009). The somewhat reduced performance in dissemination of findings points to typical issues seen in the literature with teacher confidence and expertise in sharing research findings (Borg, 2010).

SUMMARY CONCLUSIONS AND RECOMMENDATIONS

Summary of Findings

This study focused on the detailed development and implementation of a research training program for basic education teachers in the Kalayaan Sub-Office, Schools Division Office (SDO)-Laguna. The research competence subscales of the 7-point Likert scale showed very high levels of individual production in the basic education teachers.

The study critically analyzed the validity and effectiveness of the planned research training program for basic education instructors in several crucial criteria. The results provide deep insight into the strengths of the program and areas of further improvement.

The results showed that the objectives of the training program are highly valid to both the speakers and the participants, with an overall weighted mean of 6.20 (High). Objectives are stated as simple, unequivocal, and well defined, with the highest mean weighted values of 6.23. The aims of the training were also obvious and well stated. This is vital for setting expectations and engagement, and also the objectives were measurable, achievable, and relevant to the needs of the participants. In other words, the program was in alignment with the principles of effective professional development. The average for the participants was 5.91 (High), which was slightly lower than the average for the speakers, 6.50 (Very High Extent). The facilitators may have been more competent in their design, but both groups were of the clear opinion that the goals of the program were valid.

In terms of the training program, it was given strong content and relevance with an overall weighted mean of 6.44 (High). The highest marks (6.45) were given to signals like relevance to action research, accuracy, and currency of the information, and appropriateness for the level of knowledge of the participants. The logical sequence of themes and their alignment with objectives contributed to a better perceived quality of the course. The results show the need for substance and order in training sessions. The content is organized in a sensible way and is relevant so that teachers can relate the new information to their professional environment, increasing the possibility of meaningful application.

For the Training Design and Methodology, the average weighted mean for training design and methodology was 6.29 (High), indicating the program was scored high in the use of adult learning principles. The design included active learning, critical thinking, hands-on application, and engaging and interactive activities, with the weighted averages ranging from 6.28 to 6.30.

Moreover, the weighted mean of Time management and structure total ranking is 5.81 (High). The highest grade was for the training program's organization and the time available for each session (5.83). Good for thinking and quickness.

In addition, the training materials, resources, and delivery gained highly commended with an overall weighted mean of 6.49 (High) while the presenters achieved a perfect mean of 7.00 (Very High Extent). Strengths were clarity and arrangement of material, efficacy of instructional resources, and useful delivery. The findings attest to the relevance of high-quality, accessible resources and engaging delivery for teacher learning. The little difference between speaker and participant evaluations suggests that there is room for improvement in matching the content or mode of delivery to participant needs. However, the excellent ratings on all criteria certainly point to the program's excellence in this area. While the impact of the piloting of the research training program on the participants' performance, the mean total score was 46 out of 50, and the mean total percentage score was 91.13%. The pilot deployment of the participants was successful. The highest proficiency was Introduction to Action Research (100%) and comprehension of Action Research Framework/Cycle (91.67%), which indicated that the key ideas of research are well known. Good success in Data Collection Methods, Planning and Implementing Interventions, and Documenting and Writing Reports shows good skill in practical research activity. Sharing and Using Research Findings scored a little lower (85.56%), meaning more aid is needed in research dissemination. The findings reveal that the training program was effective in developing key research competencies and indicate a need for further improvement in sharing and applying research findings. The statistical analysis revealed a substantial positive association between the validity of the training program and the performance of the participants ($p < 0.001$). The clearest aims and most relevant material were the best markers of participant success. Time management and organization were not as powerful, but still important to get the most out of the course. Performance differences among participants highlight the significance of individual support so that all instructors can fully benefit from professional development programs. Each competency review showed strong results overall in the domains studied, with the most progress in the core domains. The designed research training program was highly valid and successful across all evaluated domains.

The program had defined objectives, the content was relevant, the approach was engaging, the structure was well-managed, and the resources were of good quality, which led to exceptional increases in the research competencies of

basic education instructors. These findings underscore the need for a systematic, evidence-based approach to professional development and point to ways in which areas such as the dissemination of research findings may be encouraged to more effectively enhance the development and influence of teachers.

Conclusions

This study explored the conception, validity, effectiveness, and probable implementation of a Research Training Program for Basic Education Teachers. The following conclusions can be taken from the obtained results:

The program created was distinguished by clearly defined and focused objectives, logical sequence with related content, satisfactory methodology for adult engagement, Structured and organized time management. Quality, accessible training and delivery material. These elements correspond to best practice in professional development, such as clarity, coherence, and practical application to enhance teachers.

The objectives were very reasonable because they were clear, comprehensive, measurable, attainable, and related to the teacher's needs. The content was highly relevant, accurate, current, and appropriate for the intended audience. Logical sequencing was seen to aid the attainment of the objectives. The design and methodology promoted active learning, critical thinking, and hands-on application and were well-suited for adult learners. Program structure and time management were generally viewed as effective, with sessions well-paced and well-organized. Training materials and tools were nicely developed, straightforward, and supported effective learning. The delivery methods were dynamic and available.

Participants showed that after piloting the research training program, they had good knowledge of Introduction to Action Research and Action Research Process/Cycle. They obtained excellent and very good performance in the following areas of the research training program: identifying research problems, generating research questions, applying data collection methods, designing and implementing interventions, analyzing/interpreting data, and documenting/writing reports. The result was high but not optimal performance in discussing and utilizing research findings, which needed further support in research dissemination.

Statistical research showed that there was considerable variance in the level of validity between the criteria, with purpose and substance being the most important factors. Time management and organization were rated positively, but played a less important role than other attributes.

The initial execution of the training program demonstrated a statistically significant change in performance of the participants, establishing that the quality and characteristics of the program were converted into tangible increases in competency.

The developed Research Training Program can be deemed feasible to be implemented in the context of basic education teacher professional development based on the overall high validity ratings, outstanding participant performance, and significant positive influence on numerous competencies. However, future editions are encouraged to focus more on the dissemination and implementation of the findings of the study. The study concludes that the planned program is comprehensive, effective, and responsive to the professional development needs of teachers in basic education. Validation assessments and participant outcomes provide good support for its use.

Recommendations

Based on the findings and conclusions of the study, the following recommendations are provided to improve the efficacy, scalability, and impact of the Research Training Program for Basic Education Teachers:

1. Keep on developing the objectives, contents, methodology, structure, and resources of the curriculum, so that the training is clear, relevant, and practical; Solicit feedback from the presenters and participants on a periodic basis so that the program can be adjusted to the changing educational settings and needs.

2. Increasing the domain of validity by stating the objectives of the training, making them explicit, and adapt them to the needs of the participants. Review the objectives frequently to keep up with current trends in research in education. Update the training materials for content and relevance with the latest advances, practical examples, and case studies for the participants' instruction. Design and method of training must be more active learning, group activities, and reflective practices need to be used to involve people more. In terms of Time Management, the schedule and pace of classes were different and useful for optimal learning. The teacher's obligations could include the modular delivery and time.

6. Materials, materials, and Delivery Quality training with technology (e.g., digital platforms, multimedia materials) for different learning styles.

3. Additional training/coaching in areas where participants scored lower, especially in communicating and applying study findings. Provide follow-up support (e.g. Peer coaching, communities of practice) to embed learning, improve co-operation, and facilitate application of action research in educational environments.

4. Look at the participant performance data and review the feedback to see what works and what does not. Changes in time management and structure were perceived as less influential but important to improve the participant's learning experience. We need to encourage facilitators and participants to continue to work together, to ensure that program goals are matched with classroom needs.

5. The institution is urged to integrate the curriculum into the current professional development opportunities at the division/district levels. Encourage teachers to undertake and record successful action research activities and to publicize these. Develop a culture of evidence-based practice. Conduct longitudinal research to track the long-term impact of the program on teaching practice and learner outcomes. Use outcomes to inform future refinement and scale-up.

6. Assess the long-term impact of the training on practice and student outcomes.

Consider how to expand digital resources and platforms and make them interactive. The curriculum must be relevant and meaningful to other disciplines or other learning situations. Continuous improvement, support to the participants, and development of a responsive curriculum will result to a successful and relevant Research Training curriculum in establishing a culture of research and innovation among basic education instructors.

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