**Research Competence and Engagement among Mathematics Teachers in a State University: Basis for Research Training Engagement Program**

Abstract

*This study aims to determine the research competence and engagement of mathematics teachers of the West Visayas State University system. Employing a descriptive research design, this study utilised thirty-five mathematics teachers. Data was gathered using a modified questionnaire. Descriptive statistics were used to measure means and standard deviations. Results revealed that the faculty with ranks of Assistant Professor I-IV are moderately competent in research, and the faculty with more than 10 research-related training sessions are highly skilled. Further, all participants have a positive attitude towards research. Results showed that the research involvement of mathematics teachers with ranks of Assistant Professor I-IV and with a monthly income of less than Php 30,000.00 is “less actively involved”. However, those with the Associate Professor I-V rank, with more than 10 research-related training and those with a monthly income above Php 40,000.00 are “moderately actively involved” in research, and all participants are extrinsically motivated in conducting research.*

*Keywords: Competency in research, Teacher’s engagement in research, Research training program*

**1. INTRODUCTION**

One of the functions of the state universities and colleges is research, in response to the Commission on Higher Education's call for policies and mandates primarily geared towards improving research productivity. With the challenge of globalisation in education, teachers need to improve and explore their teaching practices. Many studies on teachers' competence focus on teachers' role in the classroom rather than teachers' competencies, including research competence.

Research competence is one of the integral parts of educational activities and its implementation to integrate research, training and production in higher education. State Universities and colleges perform the trilogy of research, instruction and extension functions. With these current educational functions, the faculty in higher education institutions generally neglect or, if not, have a weak research competence. Mathematics teachers with strong research competence possess a deep understanding of their subject and can stay updated with current research findings. They can integrate these findings into their teaching practices, ensuring students receive the most up-to-date and effective instruction (Begunova, 2021).

Research Engagement, on the other hand, is the feeling of positive emotions toward research work; investing personal resources, energy, and time in doing research as a meaningful activity; considering the research workload to be manageable while taking advantage of collaborative, faculty, and institutional support; and having hope that the research work will attract better opportunities in future (Atibuni. Olema, Ssenyonga, & Kibanja, 2019).

Additionally, teachers with research competence are skilled at explaining concepts and helping students develop a deeper understanding of mathematics. They can also conduct their research, contributing to advancing knowledge in mathematics education. The research competence of mathematics teachers is crucial in providing students with a high-quality mathematical education. Qualified professionals have not just memorised a specific sequence of actions; they must have some experience and ability to solve everyday tasks and creative approaches to unusual ones. Situations that arise before him. It is a competency model of education that provides expertise and abilities to future professionals to address their challenges. (Webster Dictionary, 2020).

On the other hand, research engagement is one of the vehicles always open to teachers for professional development. It influences professional development by increasing the number of teaching plans, educational objectives, strategies, and teachers’ knowledge of what is being taught (Rubi, 2021).

At the current stage of research in mathematics education, its main contribution to practice may be to raise teacher awareness and deepen teacher understanding of the complicated nature of mathematical knowledge, knowing, and learning. It is unrealistic to expect research to provide simple answers to complex questions. However, helping teachers become knowledgeable about what research says about issues has the potential to contribute to practice both by problematising things taken as simple and by clarifying puzzling ones; because of this, the researcher would like to conduct this research among the faculty of the satellite campuses of the West Visayas State University. This research is timely because of the issues related to cultural factors, traditional curriculum, conventional assessment system, passive learners, untrained teachers in research, and disadvantaged learners in teaching and learning mathematics.

The impact of this study may benefit the teachers and supervisors at this institution and both basic and higher education learning institutions, and may contribute to their new knowledge. Further, the study's results may be a basis for developing an intervention program to enhance teachers' research competence. Besides, the study may be necessary to develop teachers' research competence, which may improve curricula and education quality.

The result of this research will be the basis for the training programs that will benefit not only mathematics teachers but also teachers in other fields of education and other educational institutions as a whole. Further, the research findings will also help the teachers identify their difficulties in conducting research. Research competence is interpreted by Aleksandrova and Sluchayna (2018) as the ability to conduct independent research and provide its results. Research competence is the main task of developing professional and methodological competence and other professional, cultural and general competencies (Gorshkova, 2017).

The research on the Development of Students’ Research Competence conducted by Маrushkevych, Zvaryc, Romanyshyna, Malaniuk, and Grynevych (2022) showed that it is possible to develop research competence in the process of teaching humanities, depending on the types of training, whether theoretical or practical. Organising the students' cognitive activity during theoretical training while applying the problem-teaching method in practical classes is necessary.

The study conducted by Rubi (2021) on teachers' competence towards research engagement revealed that teachers are competent in doing research. Moreover, their attitudes were optimistic despite the difficulties they encountered. Furthermore, it was found that most teachers are motivated to research for various reasons.

**Figure 1:** *The research paradigm*

Thus, based on the aforementioned theories, a research paradigm is presented.

 Independent Variable Dependent Variable



The research paradigm illustrates the independent variables (educational attainment, marital status, and economic socio status) and the research competence of mathematics teachers as the dependent variable.

**2. OBJECTIVES OF THE STUDY**

This study sought to determine the research competence of the mathematics teachers of the satellite campuses of the West Visayas State University system.

Specifically, this study aimed to answer the following questions:

1. What is the level of research competence of the mathematics teachers in the satellite campuses of the West Visayas State University as a whole group and when grouped according to sex, age, Highest educational qualification, number of years in service, socio-economic status (monthly income) and many research-related training?
2. What is the level of attitude towards research engagement?
3. What are the motivations for conducting research, and what are the difficulties and non-difficulties?
4. What research engagement does the researcher propose?

**3. METHODOLOGY**

**3.1 Participants of the study**

The study participants are the identified mathematics faculty members of the satellite campuses of West Visayas State University.

**3.2 Procedure**

The researchers employed a descriptive research design. This design is the most appropriate research because it provides facts and essential knowledge about the nature of data. Descriptive research is a quantitative method that collects quantifiable information for statistical analysis of the population sample.

Descriptive research involves collecting data to determine whether and to what degree a relationship exists between two or more quantifiable variables (Gay, 1992).

This study aimed to determine the research competence of West Visayas State University's mathematics teachers at different external campuses as a basis for research training engagement.

The research competence of the mathematics teachers, in terms of research capability, attitudes towards research, motivation towards research, and difficulty and non-difficulty in research, will be measured using an adapted questionnaire from Pedrajas (2022).

The first part of the questionnaire concerns the respondents' profiles, such as age, gender, highest educational attainment, marital status, length of teaching experience, and academic rank. The second part deals with statements that measure their research competence. These statements are grouped according to knowledge, skills, and attitudes.

All data of the participants shall be considered in terms of ethical considerations and data privacy.

Descriptive statistics, such as frequency counts, percentages, and means, will be applied as statistical treatment.

Purposive sampling was employed because mathematics teachers available to the researcher on every Campus at the time of the study were taken as participants. Of the 35 participants, 14 were male, and 21 were female. The data gathered from the participants was strictly confidential. The researcher will always follow the data privacy law.

* 1. **Difficulty in Conducting Research**

***3.3.1 Resource-Related Difficulties:***

* Funding and Grants: Securing financial support for research projects is often challenging. Competition for limited funding is intense, and researchers may face delays or restrictions based on the availability of funds.
* Access to Equipment and Materials: Lack of access to necessary tools, laboratories or research materials can hinder research progress.
* Data Availability: For some research areas, access to quality, up-to-date or comprehensive data can be complex, especially in fields requiring proprietary or restricted data sets.

***3.3.2 Conceptual Difficulties***

* Formulating the research problem.
* Developing theoretical frameworks.
* Designing research hypotheses.

***3.3.3 Methodological Challenges:***

* Choosing the Proper Methodology: Selecting an appropriate research design, method, and tools can be complex, especially in interdisciplinary or novel areas of study.
* Data Collection Issues: Gathering accurate, reliable, and valid data can be time-consuming, especially in large-scale studies, fieldwork, and experiments.
* Data Analysis: Complex data sets, especially in quantitative research, can be challenging to analyse effectively, requiring specialised knowledge in statistical methods or computational tools.

***3.3.4 Time and Project Management:***

* Time Constraints: Research often takes longer than expected due to unexpected obstacles, delays in data collection, or the need for repeated experiments or revisions.
* Balancing Multiple Responsibilities: Researchers, especially in academia, may struggle to balance research with teaching, administrative duties, and other professional commitments.

***3.3.5 Collaboration and Communication Issues:***

* Team dynamics: Collaboration with other researchers, institutions, or industries may lead to conflicts, miscommunication, or difficulties in coordinating efforts, particularly in large portions of interdisciplinary teams.

***3.3.6 Ethical and Regulatory Challenges:***

* Ethical Approval: Navigating the ethical review process for human or animal studies can be time-consuming and may involve strict guidelines that delay research.
* Compliance with Regulations: Adhering to legal and institutional regulations (such as data privacy laws or safety standards) can be a significant hurdle.
	1. **Non-difficulty in Conducting Research:**

***3.4.1 Access to Knowledge and Literature:***

* Existing Literature and Resources: Researchers often have access to a vast body of existing literature and research tools (e.g., online databases and journals) that can guide the design of their study and help identify gaps in knowledge.
* Open Access to Information: Many resources, including research papers, data and tools. They are increasingly available through open-access platforms, making it easier to build on previous work.

***3.4.2 Technological Support:***

* Advanced Technology: Technological tools such as software for data analysis (e.g. SPSS, R, Python, etc.), data management platforms, and even AI-assisted research tools can significantly simplify various aspects of the research process.
* Online Collaboration Tools: Platforms like Google Scholar, ResearchGate, and Zoom facilitate collaboration, literature reviews and communication with peers, even across distances.
	+ 1. ***Pre-existing Frameworks and Guidelines:***
* Clear Methodological Guidelines: Researchers can follow well-established methodologies and best practices for many common research areas, making the process more straightforward.
* Institutional Support: Universities, research institutions, and organisations often provide guidance, mentorship, and infrastructure to ease the research process.
	+ 1. ***Well-defined Research Questions:***
* Clear and focused problem: In some cases, researchers may find that their research questions are well-defined, relevant and timely, allowing them to focus directly on answering those questions rather than struggling with formulation.
* Availability of Established Theories: In specific fields, theoretical frameworks and models are well-established, giving researchers a clear direction and reducing ambiguity in their work.
	+ 1. ***Support From Mentors and Networks:***
* Access to Expert Advice: Researchers who have access to experienced mentors or academic advisors can overcome challenges more easily, as these mentors can provide valuable insight and guidance.
* Collaboration with Peers: A strong network of peers or collaborators, whether within one's institution or globally, can provide support, feedback, and assistance throughout the research process.
	+ 1. ***Funding and Resource Availability:***
* Institutional Support: The university may have institutional funding streams that make the financial side of research more straightforward.
* Mentorship or guidance.
* Opportunities for training or skill development.
* Industry partnerships: In research, partnerships with industry can sometimes provide ample resources, expertise, and practical support for research initiatives.

**3.5 Data Analysis Procedure**

The data gathered from this study were subjected to the following statistical treatment.

Means

The means obtained were used to determine participants’ research competence in mathematics. The following scale was employed:

List 1: Research competence in mathematics

|  |  |
| --- | --- |
| Scale | Interpretation |
| 5 | Highly Competent |
| 4 | Competent |
| 3 | Moderately Competent |
| 2 | Less Competent |
| 1 | Not Competent |

All computations were done through the Statistical Package for Social Sciences (SPSS) software with alpha set at .05.

**4. RESULTS AND DISCUSSION**

The study primarily aimed to determine the research competence of mathematics teachers at the satellite campuses of the West Visayas State University system. It used a Likert questionnaire adopted from Pedrajas (2022).

In the present study, mean scores of 5 indicate that mathematics teachers are highly competent, 4 moderately competent, 3 competent, 2 less competent, and 1 not competent in terms of their research competence.

**4.1 Descriptive Data Analysis**

The study's descriptive findings, using the mean scores, showed the levels of the participants’ research competence of mathematics teachers of the satellite campuses of the West Visayas State University system.

Mean is a statistical measure that represents the average value of a dataset. It is used to summarise quantitative data and identify the central tendency of a variable, providing insight into the general trend or typical value within a group. It is the average scores of research competence, the average levels of engagement in research activities, and the average responses to survey items or assessments.

Standard deviations were employed to determine the participants’ homogeneity or heterogeneity in the research competence of mathematics teachers.

**Table 1**

*Research Competence of Mathematics Teachers of the Satellite Campuses of West Visayas State University System*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Category** | **f** | **Mean** | **SD** | **Description** |
| 1. **Entire Group**
 | **35** | **4.00** | **0.68** | **Competent** |
| 1. **Sex**
 |  |  |  |  |
|  Male | 14 | 3.97 | 0.86 | Competent |
|  Female | 21 | 4.02 | 0.55 | Competent |
| **C. Age** |  |  |  |  |
|  Young (23-27 years old) | 14 | 3.97 | 0.70 | Competent |
|  Middle (38-52 years old) | 13 | 4.10 | 0.58 | Competent |
|  Old (53 years and above) | 8 | 3.80 | 0.88 | Competent |
| **D. Highest Education Qualification** |  |  |  |  |
|  Master’s Degree | 16 | 3.78 | 0.51 | Competent |
|  Doctorate Degree | 19 | 4.13 | 0.79 | Competent |
| **E. Teaching Experience/No. of years in service** |  |  |  |  |
|  Less than 10 years  | 11 | 4.05 | 0.82 | Competent |
|  10-20 years  | 19 | 4.06 | 0.52 | Competent |
|  21-30 years  | 5 | 3.76 | 1.02 | Competent |
|  31 years and above  | - | - | - | - |
| **F. Academic Rank**  |  |  |  |  |
|  Instructor I-III  | 19 | 4.04 | 0.69 | Competent |
|  Assistant Professor I-IV  | 4 | 3.30 | 0.33 | Moderately Competent |
|  Associate Professor I-IV  | 12 | 4.16 | 0.64 | Competent |
|  Professor I-VI  | - | - | - | - |
| **G. No. of Research-Related Training**  |  |  |  |  |
|  Less than 5 | 15 | 3.65 | 0.67 | Competent |
|  5-10 | 17 | 4.19 | 0.58 | Competent |
|  More than 10 | 3 | 4.67 | 0.41 | Highly Competent |
| **H. Monthly Income**  |  |  |  |  |
|  Less than 30,000  | 3 | 3.77 | 0.49 | Competent |
|  30,000-40,000  | 16 | 4.10 | 0.72 | Competent |
|  Above 40,000  | 16 | 3.95 | 0.69 | Competent |

*1.00-Not Competent;2.00-less Competent;3.00-competent;4.00-moderately competent;5.00-highly competent*

Results revealed that the faculty with ranks of Assistant Professor I-IV are moderately competent in research, and the faculty with more than 10 research-related pieces of training are highly competent. This outcome means that these faculty may possess knowledge, skills, attitudes, and behaviours that enable an individual to design, conduct, analyse, and communicate research effectively. It encompasses systematically investigating a problem, generating new knowledge, and applying research findings in practical or theoretical contexts. Research competence is critical for faculty, as it facilitates meaningful contributions to their fields and supports evidence-based teaching and decision-making.

***Table 2***

*Attitude of Faculty Towards Research of the Satellite Campuses of West Visayas State University System*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Category** | **f** | **Mean** | **SD** | **Description** |
| 1. **Entire Group**
 | **35** | **3.96** | **0.60** | **Positive** |
| 1. **Sex**
 |  |  |  |  |
| Male | 14 | 3.74 | 0.71 | Positive |
| Female | 21 | 4.10 | 0.48 | Positive |
| **C. Age** |  |  |  |  |
|  Young (23-27 years old) | 14 | 4.10 | 0.36 | Positive |
|  Middle (38-52 years old) | 13 | 3.99 | 0.46 | Positive |
|  Old (53 years and above) | 8 | 3.55 | 1.03 | Positive |
| **D. Highest Education Qualification** |  |  |  |  |
|  Master’s Degree | 16 | 3.82 | 0.54 | Positive |
|  Doctorate Degree | 19 | 4.05 | 0.66 | Positive |
| **E. Teaching Experience/No. of years in service** |  |  |  |  |
|  Less than 10 years  | 11 | 4.15 | 0.31 | Positive |
|  10-20 years  | 19 | 3.98 | 0.51 | Positive |
|  21-30 years  | 5 | 3.53 | 1.24 | Positive |
|  31 years and above  | - | - | - | - |
| **F. Academic Rank**  |  |  |  |  |
|  Instructor I-III  | 19 | 4.06 | 0.40 | Positive |
|  Assistant Professor I-IV  | 4 | 3.54 | 0.81 | Positive |
|  Associate Professor I-IV  | 12 | 3.93 | 0.76 | Positive |
|  Professor I-VI  | - | - | - | - |
| **G. No. of Research-Related Training**  |  |  |  |  |
|  Less than 5 | 15 | 3.90 | 0.73 | Positive |
|  5-10 | 17 | 3.94 | 0.50 | Positive |
|  More than 10 | 3 | 4.32 | 0.30 | Positive |
| **H. Monthly Income**  |  |  |  |  |
|  Less than 30,000  | 3 | 4.04 | 0.52 | Positive |
|  30,000-40,000  | 16 | 4.06 | 0.40 | Positive |
|  Above 40,000  | 16 | 3.83 | 0.77 | Positive |

*1.00-2.66-Negative; 2.67-3.33-Neutral; 3.34-5.0-Positive*

Attitudes toward research vary widely depending on individual perspectives, experiences, and contexts. These attitudes reflect how researchers perceive and approach research.

Results revealed that all of the participants have positive attitudes towards research. This result means they are deeply curious and excited about discovering new knowledge. They may enjoy problem-solving, exploration and learning. Further, these individuals may view research as a vital contribution to the progress of society, science or a specific field. They are motivated by the desire to make meaningful contributions to the body of knowledge. They also believe in the power of research to provide solutions, and they often exhibit a can-do attitude when facing challenges. They may approach problems confidently, even in the face of obstacles. They may also view research as an opportunity for personal and professional growth, constantly striving to expand their knowledge, skills and expertise.

They may not consider research a necessary part of their job or profession. While they may not have a strong passion for the research, they are just practical about its importance and focus on achieving results. Some of them may approach their work from a perspective of duty or obligation, especially in environments where research output is required for tenure, promotions, or institutional expectations.

In the same vein, results showed that they may have a favourable view of research, either not questioning its value or being misled by the process.

**Table 3**

*Research Involvement of Mathematics Teachers of the Satellite Campuses of West Visayas State* *University System*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Category** | **f** | **Mean** | **SD** | **Description** |
| 1. **Entire Group**
 | **35** | **3.29** | **1.09** | **Actively Involved** |
| 1. **Sex**
 |  |  |  |  |
|  Male | 14 | 3.46 | 1.32 | Actively Involved |
|  Female | 21 | 3.18 | 0.94 | Actively Involved |
| **C. Age** |  |  |  |  |
|  Young (23-27 years old) | 14 | 3.21 | 0.84 | Actively Involved |
|  Middle (38-52 years old) | 13 | 3.14 | 0.95 | Actively Involved |
|  Old (53 years and above) | 8 | 3.23 | 1.17 | Actively Involved |
| **D. Highest Education Qualification** |  |  |  |  |
|  Master’s Degree | 16 | 2.82 | 0.75 | Actively Involved |
|  Doctorate Degree | 19 | 3.43 | 0.96 | Actively Involved |
| **E. Teaching Experience/No. of years in service** |  |  |  |  |
|  Less than 10 years  | 11 | 3.11 |  | Actively Involved |
|  10-20 years  | 19 | 3.43 |  | Actively Involved |
|  21-30 years  | 5 | 3.45 |  | Actively Involved |
|  31 years and above  | - | - | - | - |
| **F. Academic Rank**  |  |  |  |  |
|  Instructor I-III  | 19 | 3.11 | 0.85 | Actively Involved |
|  Assistant Professor I-IV  | 4 | 2.48 | 0.67 | Actively Involved |
|  Associate Professor I-IV  | 12 | 3.86 | 1.33 | Actively Involved |
|  Professor I-VI  | - | - | - | - |
| **G. No. of Research-Related Training**  |  |  |  |  |
|  Less than 5 | 15 | 2.91 | 0.94 | Actively Involved |
|  5-10 | 17 | 3.49 | 1.22 | Actively Involved |
|  More than 10 | 3 | 4.07 | 0.42 | Actively Involved |
| **H. Monthly Income**  |  |  |  |  |
|  Less than 30,000  | 3 | 2.47 | 0.61 | Actively Involved |
|  30,000-40,000  | 16 | 3.23 | 0.85 | Actively Involved |
|  Above 40,000  | 16 | 3.51 | 1.33 | Actively Involved |

*1.0-Not Actively Involved;2.0-Less actively Involved;3.0-Actively Involved;4.0-Moderately actively Involved;5.0-Highly Actively Involved*

Results showed that the research involvement of mathematics teachers with Assistant Professor I-IV ranks and a monthly income of less than Php 30,000.00 is “less actively involved” with a mean (*M=2.48* and *M=2.47*), respectively. However, the mathematics teachers who have a rank of Associate Professor I-V, with more than 10 research-related pieces of training and those with a monthly income above Php 40,000.00 are “moderately actively involved” in research, with means (*M=3.86, M=4.07*, and *M=3.51*) respectively.

**Table 4**

*Research Motivation Among Faculty Towards Research of the Satellite Campuses of West Visayas State University System*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Category** | **f** | **Mean** | **SD** | **Description** |
| 1. **Entire Group**
 | **35** | **3.88** | **0.79** | **Extrinsic** |
| 1. **Sex**
 |  |  |  |  |
|  Male | 14 | 3.60 | 0.94 | Extrinsic |
|  Female | 21 | 4.07 | 0.63 | Extrinsic |
| **C. Age** |  |  |  |  |
|  Young (23-27 years old) | 14 | 3.93 | 0.60 | Extrinsic |
|  Middle (38-52 years old) | 13 | 4.06 | 0.64 | Extrinsic |
|  Old (53 years and above) | 8 | 3.40 | 125 | Extrinsic |
| **D. Highest Education Qualification** |  |  |  |  |
|  Master’s Degree | 16 | 3.68 | 0.65 | Extrinsic |
|  Doctorate Degree | 19 | 4.02 | 0.91 | Extrinsic |
| **E. Teaching Experience/No. of years in service** |  |  |  |  |
|  Less than 10 years  | 11 | 3.93 | 0.68 | Extrinsic |
|  10-20 years  | 19 | 4.03 | 0.65 | Extrinsic |
|  21-30 years  | 5 | 3.35 | 1.39 | Extrinsic |
|  31 years and above  | - | - | - | - |
| **F. Academic Rank**  |  |  |  |  |
|  Instructor I-III  | 19 | 3.91 | 0.63 | Extrinsic |
|  Assistant Professor I-IV  | 4 | 3.40 | 0.99 | Extrinsic |
|  Associate Professor I-IV  | 12 | 4.00 | 0.95 | Extrinsic |
|  Professor I-VI  | - | - | - | - |
| **G. No. of Research-Related Training**  |  |  |  |  |
|  Less than 5 | 15 | 3.75 | 0.98 | Extrinsic |
|  5-10 | 17 | 3.87 | 0.57 | Extrinsic |
|  More than 10 | 3 | 4.60 | 0.53 | Extrinsic |
| **H. Monthly Income**  |  |  |  |  |
|  Less than 30,000  | 3 | 3.87 | 0.61 | Extrinsic |
|  30,000-40,000  | 16 | 3.91 | 0.65 | Extrinsic |
|  Above 40,000  | 16 | 3.85 | 0.97 | Extrinsic |

*1.0-2.5-Intrinsic; 2.6-5.0-Extrinsic*

Results revealed that all mathematics teacher participants are extrinsically motivated to conduct research. They are not driven by a genuine interest in understanding phenomena, solving problems, or advancing knowledge for its own sake, to expand one's understanding and capabilities. They may not consider it as personal growth and learning.

On the other hand, they may consider recognition and prestige in pursuing professional recognition, awards and status within the academic scientific community. Also, they may consider funding resources and career advancement in funding and resources, financial support, grants, and access to resources that enable further research or career advancement. They may need to meet academic or professional requirements (e.g., tenure, promotions) and have the opportunity to enhance credentials and build a professional reputation.

Further, they may also desire acknowledgement by peers, institutions, or the broader academic community and aspire to publish in reputable journals or win awards.

The following themes emerged from the responses of the participants on the Difficulty and Non-Difficulty in Conducting Research:

* 1. **Difficulty in Conducting Research**

***4.2.1 Resource-Related Difficulties:***

Researchers often face challenges related to **financial and resource limitations**. Securing **funding and grants** is highly competitive, and limited resources can cause potential delays or constraints in project execution. Access to **essential equipment, laboratories, or materials** can also obstruct research progress. In many fields, difficulty obtaining **reliable and comprehensive data**—especially when data is proprietary or restricted—further complicates the research process.

* + 1. ***Conceptual Difficulties***
			1. ***Formulating the Research Problem***
			2. This phase involves identifying and defining the issue or question the research aims to address. A well-formulated research problem is specific, relevant, and researchable, serving as the foundation for the entire study.
			3. ***Developing Theoretical Frameworks***
			4. A theoretical framework provides a structured explanation of the key concepts and variables involved in the study. It is based on existing theories and literature, guiding the direction of the research and helping to interpret findings.
			5. ***Designing Research Hypotheses***
			6. This step involves creating testable statements that predict the relationship between variables. Hypotheses are derived from the theoretical framework and provide a basis for data collection and analysis.
			7. *Methodological Challenges:*

Selecting the proper research methodology can be difficult, particularly in interdisciplinary or emerging fields, as it involves carefully aligning design, methods, and tools with research objectives. Data collection poses additional challenges, especially in large-scale or field-based studies, where ensuring accuracy, reliability, and validity is time-consuming. Analysing complex data sets—a standard in quantitative research—requires specialised statistical or computational expertise, making this phase particularly demanding for many researchers.

* + - 1. *Time and Project Management:*

Researchers frequently face **time constraints**, as research projects often take longer than planned due to unforeseen challenges, delays in data collection, or the need for repeated revisions. Additionally, **balancing multiple responsibilities**—such as teaching, administrative tasks, and other professional duties—can make it difficult for academic researchers to dedicate sufficient time and focus to their research work.

* + - 1. *Collaboration and Communication Issues:*

Team dynamics in research collaborations, especially within large or interdisciplinary groups, can present challenges such as conflicts, miscommunication, and coordination difficulties among researchers, institutions, or industry partners.

* + - 1. *Ethical and Regulatory Challenges:*

Obtaining ethical approval for studies involving humans or animals can be lengthy and complex due to stringent guidelines, causing potential delays in research. Additionally, ensuring compliance with legal and institutional regulations—such as data privacy and safety standards—poses significant challenges that researchers must carefully navigate.

***4.3 Intellectual and Cognitive Struggles:***

*4.3.1 Theoretical or Conceptual Issues:*

Researchers may struggle with defining their research questions clearly or developing a coherent theoretical framework for their study.

*4.3.2 Lack of Novelty:*

Finding a unique angle or contribution to existing knowledge, particularly in well-researched fields, can make the research process more difficult.

* 1. ***Non-difficulty in Conducting Research:***

*4.3.1. Access to Knowledge and Literature:*

Researchers benefit from extensive access to existing literature and research tools, such as online databases and academic journals, which support the development of their studies and help identify knowledge gaps. The rise of open-access platforms has made a wide range of research papers, data, and tools more readily available, facilitating easier and broader use of prior research.

*4.3.2. Technological Support:*

Advanced technology and online collaboration tools greatly enhance the research process. Technological tools like SPSS, R, Python, and AI-assisted applications simplify data analysis and management. Meanwhile, online platforms such as Google Scholar, ResearchGate, and Zoom support efficient collaboration, literature review, and communication among researchers, even across geographical boundaries.

*4.3.3. Pre-existing Frameworks and Guidelines:*

Clear methodological guidelines and institutional support make the research process more manageable. Established methodologies provide researchers with structured approaches and best practices to follow, especially in common research areas. Universities and research institutions offer essential support through mentorship, guidance, and infrastructure, helping researchers navigate their work more effectively.

*4.3.4. Well-defined Research Questions:*

A clearly defined and timely research problem enables researchers to concentrate on addressing specific questions without the difficulty of formulating them. Additionally, the availability of established theories and models in specific fields provides a solid foundation and direction, minimising uncertainty and streamlining the research process.

*4.3.5. Support From Mentors and Networks:*

Access to expert advice and collaboration with peers greatly enhances the research process. Experienced mentors or academic advisors offer valuable guidance that helps researchers navigate challenges more effectively. Likewise, a strong network of peers—locally or internationally—provides support, constructive feedback, and collaboration opportunities, contributing to the overall success and quality of the research.

*4.3.6. Funding* and *Resource* Availability:

Institutional support is crucial in facilitating research. It provides financial assistance through dedicated funding streams, offers mentorship and guidance from experienced faculty, and creates training and skill development opportunities. Additionally, partnerships with industry can enhance research efforts by contributing resources, expertise, and real-world applications, further strengthening the overall research environment.

**4.4 Proposed Research Training Engagement Program (RTEP)**

**Title: Empowering Mathematics Educators through Research: A Training and Engagement Initiative**

**Objectives:**

1. Enhance mathematics teachers’ research competence and engagement through targeted training, mentoring, and collaborative research activities.

2. Foster collaborative research among faculty members to address educational challenges in mathematics.

3. Promote the dissemination and application of research findings within the academic community and beyond.

**Components/Activities:**

1. **Research Training Workshops**

Topics: Research design, statistical analysis, academic writing, and publishing.

Schedule: Monthly workshops with expert facilitators.

Facilitators: Experienced researchers or invited experts in mathematics education research.

**2. Mentorship Program**

* Pair novice researchers with experienced faculty members for one-on-one guidance.
* Focus: Guidance on research projects, proposal writing, and manuscript preparation.
* Provide continuous support for crafting proposals, conducting studies, and publishing findings.

**3. Collaborative Research Teams**

* Form teams to address specific themes such as innovative teaching strategies, technology in mathematics instruction, or assessment methods.
* Allocate institutional funding for team-based projects.
* Outcome: Present findings at conferences or publish in journals.

**4. Research Seminars, Lectures and Colloquia**

* Host regular sessions for faculty to present ongoing or completed research.
* Invite guest speakers to share best practices in research.
* Invite renowned researchers to discuss trends in mathematics education research.

**5. Research Symposium/** **Research Presentation Series**

* Quarterly events where teachers present their research progress.
* Showcase the research outputs of the mathematics faculty and provide a platform for feedback.
* Publish proceedings or journals featuring faculty research.

**6. Incentive Program**

* Rewards for publications, presentations, and significant research contributions.

**7. Annual Research Summit**

* Showcase teachers’ research outputs.
* Include awards for outstanding research.

**Expected Outcomes:**

* Improved confidence and competence of mathematics teachers in conducting research.
* Increased number of research outputs in mathematics education.
* A stronger culture of research collaboration within the university.

**5. CONCLUSION**

Many researchers, particularly those in academia or industry, may feel burdened by administrative tasks, ethical reviews, or regulatory compliance, leading to a negative attitude toward the institutional side of research.

The inherent uncertainties in research can lead to anxiety or a fear of failure, particularly for early-career researchers or those who have faced difficulties in getting their work published or funded. Some individuals may resist new methodologies, technologies or paradigm shifts, preferring to stick with traditional approaches. This perception can hinder progress or make them less open to new ideas and techniques.

While research can be an exciting and rewarding experience, it is often fraught with challenges, from resource-related difficulties to methodological complexities. However, many researchers benefit from various supports and systems that ease the process, especially technological tools, institutional frameworks, and clear research goals.

**6. RECOMMENDATIONS**

Based on the conclusions, the following recommendations are advanced:

Professional development is enhanced through regular and specialised training workshops on research methodologies, statistical tools, and academic writing tailored to mathematics education. Institutional support plays a key role by providing research funding and resources and reducing teaching workloads to allow teachers more time for research activities. Promoting a strong research culture involves offering incentives such as awards and recognition and creating opportunities for collaboration through research teams or communities of practice.

Mentorship programs pair experienced researchers with novice teachers to guide them throughout the research process, while networking events help connect teachers with experts in mathematics education research. Access to updated research materials, journals, and statistical and qualitative analysis software training further supports research efforts. Integrating research into the curriculum encourages teachers to include research engagement in faculty development plans and involve students in collaborative research projects.

Ongoing monitoring and evaluation ensure the effectiveness of research programs through progress assessments and participant feedback, allowing for continuous improvement. Finally, encouraging community engagement motivates teachers to conduct research addressing local or regional educational challenges and to establish partnerships with external organisations or universities, thereby broadening the impact of their research.

**7. DISCLAIMER (ARTIFICIAL INTELLIGENCE)**

The study used the QuillBot Free version to test for manuscript plagiarism, focusing on summarising lengthy paragraphs and paraphrasing terms. The name, version, model, source, and input prompts of the generative AI technology were explained when it was used to write or revise the

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