Chapter 1 Introduction

1.1 Introduction

Quality education constitutes a fundamental right of every child as articulated in numerous national and international policy documents including the Right to Education Act (2009) in India. The assurance of quality education is not only a moral but also a strategic necessity for achieving sustainable development, promoting social justice and fostering inclusive growth. Within this framework, teachers occupy a central and transformative role. They serve as facilitators of learning, provides educational experiences and act as a mediators between educational policies and their practical enactment within classroom settings. The beliefs, attitudes and professional behaviour of teachers significantly influence the success and sustainability of educational innovations.

As contemporary education systems increasingly integrate digital technologies to enhance teaching and learning processes the role of teachers becomes even more critical. In response to the increasing demand for integrating technology into educational practices various initiatives have been launched at national and state levels to equip both teachers and students with digital tools and resources. One of the most significant initiatives in this direction is the Digital Infrastructure for Knowledge Sharing (DIKSHA) platform.

Despite the app's potential, the successful implementation of such digital tools relies heavily on the attitudes of teachers. Research indicates that teacher's perceptions, beliefs and experiences significantly influence their willingness to adopt and integrate new technologies into their classrooms. Factors such as perceived usefulness, ease of use and the availability of training and support play critical roles in shaping these attitudes.

As mathematics education faces challenges such as student engagement, diverse learning needs and varying levels of digital literacy, understanding teacher's attitudes toward tools like the DIKSHA app is crucial. Mathematics teachers play a pivotal role in implementing these technological resources in their classrooms and their perceptions can significantly influence the effectiveness of such initiatives.

1.2 DIKSHA

DIKSHA (Digital Infrastructure for Knowledge Sharing) is a national digital platform developed by the Ministry of Education, Government of India and launched in September 2017. It is designed to provide a robust and inclusive digital infrastructure that supports teaching, learning and teacher professional development across the country. The initiative aligns with the vision of the National Education Policy (NEP) 2020, which emphasizes the integration of technology in education to improve quality, access and equity.

DIKSHA caters the needs of teachers, students, school heads, and educational administrators by offering high-quality, curriculum-aligned digital resources in multiple Indian languages. The platform can be accessed through the DIKSHA mobile application as well as its web portal, making it widely accessible to users across urban and rural areas.

1.2.1 DIKSHA App

The primary aim of the DIKSHA (Digital Infrastructure for Knowledge Sharing) app is to provide a comprehensive, accessible and inclusive digital platform for enhancing teaching and learning across India by offering high-quality, curriculum-aligned educational resources and facilitating continuous professional development of teachers.

1.2.2 Key Features of DIKSHA App

1. DIKSHA provides interactive, curriculum-mapped content for classes 1 to 12 including lesson plans, e-books, audio-visual resources, worksheets, and practice questions, all aligned with NCERT and state curricula.
2. The platform offers self-paced online training modules, certification courses and capacity-building programs for in-service teachers. These modules are designed to enhance pedagogical knowledge, content understanding and classroom management skills.
3. To address the linguistic diversity of India, DIKSHA is available in over 35 Indian languages, ensuring inclusivity and wider reach among teachers and students from different regions.

4. One of the most innovative features of DIKSHA is its integration with textbooks through QR codes. By scanning these codes, users can access supplementary digital resources directly related to textbook topics.
5. The platform enables tracking of teacher participation in training modules and automatically generates digital certificates upon course completion. This promotes accountability and encourages continuous professional learning.
6. Recognizing the limitations of internet connectivity in many regions, DIKSHA allows users to download content and access it offline, making it particularly beneficial for rural and remote areas.
7. DIKSHA supports adaptive learning pathways, enabling users to select content based on their learning needs, grade level, and preferred language, thus promoting a personalized learning experience.
8. Many state education departments have adopted DIKSHA as their official learning platform. It has been customized to meet state-specific requirements and used extensively for teacher training and student learning.

1.2.3 Significance of DIKSHA App

DIKSHA plays a pivotal role in India's efforts to digitize education especially in the wake of the COVID-19 pandemic which highlighted the urgent need for accessible online learning platforms. It has enabled millions of teachers and students to continue teaching and learning remotely. By offering structured and scalable digital content DIKSHA supports the development of competent, confident, and well-equipped teachers which is a critical component of quality education. Moreover, DIKSHA contributes to the goals of Digital India, Samagra Shiksha, and PM eVIDYA, helping to bridge the digital divide and enhance educational outcomes in both rural and urban settings.

1.3 Attitude

Attitude refers to a person's mental and emotional outlook or disposition toward a particular object, person, idea or situation. It reflects how someone thinks, feels and is likely to behave in relation to something or we can say that attitude is the way we react to things positively, negatively or neutrally based on our beliefs, feelings and past experiences.

The term attitude is defined by educationist and psychologists in various different ways:

Thurstone (1946): Attitude is the degree of positive or negative affect associated with some psychological order.

Allport (1935): An attitude is a mental and neural state of readiness organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related.

Gardner (1985): Attitudes are components of motivation in language learning. They influence how much input students are willing to receive and how actively they engage in the learning process.

Skinner (1953): Attitudes are components of motivation in language learning. They influence how much input students are willing to receive and how actively they engage in the learning process.

Crow & Crow (1973): Attitude is the mental and emotional readiness to respond, organized through experience, and exerting a directive or dynamic influence upon the individual's response to situations.

1.3.1 Characteristic of Attitude

- Attitudes are not innate; they are acquired through experience, education, and social interaction. This learning may occur through direct instruction, observation, or personal experience within the educational setting.
- Attitudes tend to be consistent over time, they are not permanent and can change due to new experiences, education, persuasion, or social influence.
- Attitudes reflect a favourable or unfavourable evaluation of a person, object, situation, or idea. For instance, a student may have a positive attitude toward group work or a negative attitude toward exams.
- Attitudes significantly influence an individual's choices, actions, and responses in educational contexts. For example, a teacher's attitude toward inclusive education can affect their classroom practices.
- Attitudes can be specific to particular subjects or contexts, such as attitudes toward science, learning languages, school environment, or authority figures.

- Attitudes can be quantified using scales or questionnaires, such as the Likert scale, semantic differential scale, or Thurstone scale, often used in educational research.
- Attitudes are shaped by family, peers, teachers, media, and cultural norms, all of which play a crucial role in shaping students' and teachers' perspectives.

1.3.2 Component of Attitudes

Attitudes are composed of three interrelated components, referred to as the ABC model:

1. Affective Component (Feelings): This component refers to the emotional or feeling segment of an attitude. It reflects how a person feels about a particular object, subject, person, or event.

2. Behavioral Component (Actions or Intentions): This component refers to the way the attitude influences how a person acts or behaves. It reflects a person's predisposition to act in a certain way toward the object of the attitude.

3. Cognitive Component (Beliefs or Thoughts): This component consists of the beliefs, thoughts, or knowledge an individual holds about the attitude object. It involves rational evaluation and logical reasoning.

1.3.3 Significance of Attitude in Education

Attitude plays a vital role in the field of education as it significantly influences both teaching and learning processes. A teacher's attitude toward their profession, students, and subject matter deeply affects their teaching effectiveness, classroom management, and interactions with learners. Positive attitudes contribute to the creation of a supportive and encouraging classroom environment, where mutual respect and open communication thrive. Moreover, attitudes shape students' emotional and social development, influencing their behavior, interpersonal relationships, and ability to adapt to new challenges. In an ever-evolving educational landscape, learners and educators with open and flexible attitudes are more likely to embrace innovation and lifelong learning. Attitudes also play a role in character formation, helping students develop values such as responsibility, empathy, and perseverance. Ultimately, cultivating positive attitudes in education is essential for promoting academic success, personal growth, and a well-rounded, value-based learning experience.

1.4 Mathematics

Mathematics is a broad and diverse field of study that seeks to explore, understand, and explain various phenomena in the world through the use of numbers, symbols, shapes, and logical reasoning. It involves the study of patterns, structures, quantities, and changes. Mathematics is not limited to solving practical problems but extends into abstract realms where concepts do not necessarily have immediate practical applications. The key characteristic of mathematics is its use of logical reasoning, often abstract and symbolic, to discover relationships, solve problems, and develop theories that can be universally applied.

In everyday life, mathematics helps us with simple tasks such as counting, measuring, budgeting, and analyzing data. However, it also plays a crucial role in more complex activities, such as computing, designing algorithms, exploring theoretical physics, and understanding the natural world.

The term mathematics is defined by different mathematician in various different ways:

- Aristotle: Mathematics is the science of quantity.
- Benjamin Peirce (American mathematician): Mathematics is the science that draws necessary conclusions.
- Carl Friedrich Gauss (The “Prince of Mathematicians”): Mathematics is the queen of the sciences.
- Bertrand Russell (Philosopher and logician): Mathematics is the subject in which we never know what we are talking about, nor whether what we are saying is true.
- David Hilbert (German mathematician): Mathematics is a game played according to certain simple rules with meaningless marks on paper.
- Alfred North Whitehead: The science of pure mathematics, in its modern developments, may claim to be the most original creation of the human spirit.
- G.H. Hardy (British mathematician): A mathematician, like a painter or a poet, is a maker of patterns.
- Richard Feynman (Physicist): Mathematics is not real, but it feels like it is.

1.4.1 Significance of Mathematics

Mathematics holds a vital place in our daily lives, education, and the advancement of society. It is the foundation of all scientific and technological progress, providing the tools needed to understand and solve real-world problems. From simple tasks like budgeting, measuring, and shopping, to complex fields such as engineering, medicine, data science, and space exploration, mathematics is everywhere. It sharpens logical reasoning, critical thinking, and problem-solving abilities, which are essential skills in both academic and professional settings. Mathematics also contributes to economic development by aiding in financial planning, statistical analysis, and decision-making processes. Moreover, it reveals the hidden patterns in nature and art, enhancing our appreciation for symmetry, structure, and beauty. In essence, mathematics is not just a subject—it is a powerful language that helps us interpret, shape, and improve the world around us.

1.4.2 Mathematics Teacher

A mathematics teacher plays a critical role in the educational development of students by fostering their understanding of numbers, patterns, structures, and logical reasoning. Unlike many other subjects, mathematics requires a unique combination of abstract thinking and practical application, and it is the responsibility of the mathematics teacher to bridge this gap for learners. A good mathematics teacher not only explains complex formulas and theories but also nurtures a positive attitude toward the subject, encouraging students to appreciate the beauty and usefulness of mathematics in everyday life.

The responsibilities of a mathematics teacher extend far beyond delivering lectures. They must carefully plan lessons, design activities, and select examples that cater to different learning styles and levels of ability. Mathematics teachers use a range of teaching aids such as visual models, interactive software, and hands-on activities to make abstract concepts more tangible. They must also create an environment where students feel comfortable asking questions, making mistakes, and exploring different methods of solving problems. Regular assessments, timely feedback, and individualized support are key aspects of their role to ensure that all students can progress and build their confidence in mathematics.

Moreover, mathematics teachers must continually enhance their own skills. The world of mathematics is vast and ever-evolving, with new methods, technologies, and educational strategies emerging all the time. Effective mathematics teachers engage in professional development activities like workshops, seminars, and peer collaboration to stay current. They also play a role in developing critical life skills in students, such as logical reasoning, analytical thinking, problem-solving, and decision-making, all of which are essential in personal and professional life. By inspiring curiosity and resilience, a mathematics teacher helps students not only master the subject but also prepare for a future where mathematical thinking is increasingly important.

A mathematics teacher is much more than an instructor; they are a guide, a motivator, and a mentor. Through their dedication, creativity, and expertise, they can transform mathematics from a subject many fear into one that students enjoy, understand, and apply throughout their lives.

1.5 Need of the Study

In the Indian context, especially in semi-urban and rural areas, additional challenges such as limited digital literacy, infrastructural constraints, and varied professional development opportunities further complicate the process of technology integration. Teachers' experiences and attitudes towards platforms like DIKSHA may thus differ widely based on geographical, socio-economic, and institutional factors. There is limited research focusing specifically on mathematics teachers' perceptions of the DIKSHA app. Understanding the attitude of teachers is essential for identifying barriers to effective implementation and for developing strategies that enhance teacher engagement with digital resources. This study focuses on exploring the attitudes of mathematics teachers of Ranchi district of Jharkhand towards the DIKSHA app, examining their experiences, challenges, and the perceived impact of the app on their teaching practices.

1.6 Present Study

The Present study investigates how teachers perceive the DIKSHA app in terms of its usability, relevance, and effectiveness in enriching their teaching practices. By examining their attitudes, the study aims to contribute to the body of knowledge

regarding the integration of technology in mathematics education and provide insights for future professional development initiatives.

Through surveys method, this study gather qualitative and quantitative data about the teachers experiences about the DIKSHA app. These findings highlight the recommendations for improving its utilization in mathematics education. Ultimately, this research seeks to enhance the pedagogical strategies employed by mathematics teachers, ensuring that students receive a robust and engaging learning experience.

1.7 Statement of the Problem

This study seeks to determine:

"Study of Attitude of Mathematics Teacher toward DIKSHA App in Ranchi District of Jharkhand".

1.8 Operational Definition of Key Terms

Mathematics Teachers: In this particular study, mathematics teacher is represented as a government teachers of Ranchi district who were using DIKSHA app for teaching and learning resources.

Attitude: In this study, the teacher attitude refers to interest, motivation, usability and accessibility towards the DIKSHA app.

DIKSHA App: The terminology DIKSHA App is used for resources such as e-content, tutorial, quizzes, question banks etc. which are related to mathematics content only.

1.9 Objective of the Study

1. To evaluate the impact of the DIKSHA app on teachers' instructional strategies, usability and accessibility.
2. To assess the effectiveness of online courses, interactive quizzes and question banks. understanding the mathematical concepts.

1.10 Hypothesis

1. Mathematics teachers with greater teaching experience are less likely to adopt the DIKSHA App as compared to less experienced teachers due to traditional teaching preferences.

2. Mathematics teachers who perceive the DIKSHA App as effective in enhancing student learning exhibit a more positive attitude toward using the app.

1.11 Research Question

1. How do mathematics teachers in Ranchi District perceive the utility of the DIKSHA app in enhancing their teaching effectiveness?
2. What challenges do mathematics teachers face while using the DIKSHA app, and how do these challenges affect their attitudes towards it?
3. How do mathematics teachers perceive the integration of the DIKSHA app into the existing curriculum in Ranchi District schools?

1.12 Delimitation

1. The study is confined to Ranchi District of Jharkhand only.
2. In this study government teachers of Ranchi District were included.
3. Present study is confined to secondary and senior secondary mathematics teachers only.

1.13 Conclusion

This study has explored the attitudes of mathematics teachers in Ranchi district towards the DIKSHA app, a key digital platform aimed at enhancing teaching and learning. The findings highlight how teachers perceive the app's usefulness, ease of use, and the challenges they face in integrating it into their classrooms. Understanding these attitudes is crucial because teachers' acceptance and engagement directly impact the success of digital initiatives like DIKSHA. By addressing the concerns and building on the positive perceptions, policymakers and educators can better support teachers in using technology effectively. Ultimately, fostering a positive attitude towards such tools will contribute to improving the quality of mathematics education and ensuring that students benefit from innovative and accessible learning resources.