

Secondary-level Teachers' Perceptions and Challenges of Using ICT in Mathematics Classroom

Deepak Ghimire

Mid-West University, Nepal

Email: dghimire355@gmail.com

Article History: Received: 5 October 2025, Revised: 5 September 2025, Accepted: 20 January 2026

Corresponding Author: Deepak Ghimire. ✉: dghimire355@gmail.com

Copyright Information: Copyright 2026 © The author(s). This journal is licensed under a [Creative Commons Attribution 4.0 International \(CC BY 4.0\) License](https://creativecommons.org/licenses/by/4.0/).

Abstract

This article investigates secondary-level mathematics teachers' perceptions of ICT use and the barriers preventing effective classroom integration in Surkhet district, Nepal, focusing on Chingad Rural Municipality and Birendranagar Municipality. The study employed a mixed-methods research design, using survey questionnaires and semi-structured interviews for data collection. The population consisted of all secondary mathematics teachers in the selected municipalities, from which 20 teachers were purposively selected as key informants. Data were analyzed thematically. The findings reveal that teachers generally hold positive perceptions of ICT and recognize its potential to enhance student motivation, engagement, and discovery-based learning in mathematics. Most teachers expressed a strong willingness to use ICT to support reading, writing, and problem-solving activities. However, actual classroom integration of ICT was limited and inconsistent. Major barriers included inadequate technical knowledge and skills, low confidence, and a lack of ICT-focused training, particularly in rural schools. Although many schools had ICT resources, these were mainly confined to computer laboratories or libraries and were rarely used in regular mathematics classrooms. The study concludes that the availability of ICT infrastructure alone is insufficient for effective integration. Meaningful use of ICT in mathematics education requires adequate teacher training, direct access to technology in classrooms, and ongoing technical support. Addressing these challenges is essential for achieving sustainable and pedagogically effective ICT integration in secondary-level mathematics teaching and learning in Nepal.

Keywords: ICT Integration, Digital Pedagogy, Perception, E-Learning, Motivation

Introduction

Information and Communication Technologies (ICT) that are used in the process of communication, transmitting, storing, creating, or sharing information. The general term ICT covers technologies such as radio, television, video, telephone (fixed and mobile), computer, and network-hardware and software, as well as the tools and services associated with the technology. Today, it is an essential component in most organizations (Apeanti, 2014). Mathematics is a fundamental discipline that plays a vital role in daily life, higher education, and technological advancement. From everyday problem-solving to complex scientific and engineering applications, mathematics provides the tools for logical reasoning, analytical thinking, and decision-making (Celestine et al., 2024). Beyond its practical applications, mathematics is essential for nurturing critical thinking and problem-solving skills, which are crucial for personal and societal development. While mathematics itself focuses on abstract thinking, knowledge creation, and the exploration of fundamental concepts, mathematics education addresses the pedagogical aspects of teaching and learning, including curriculum design, instructional strategies, and the social, psychological, and philosophical dimensions of learning (Pandit, 2007). This distinction highlights the importance of understanding

not only what mathematics is but also how it should be taught effectively to foster meaningful learning.

In recent decades, ICT has emerged as a transformative tool in education, particularly in mathematics. ICT includes a broad range of technologies used to create, store, transmit, and share information, such as computers, software applications, the internet, video conferencing, and educational digital tools (Iahad, Shallsuku & Oye, 2012). Integrating ICT into mathematics education allows teachers to provide more interactive, visual, and engaging learning experiences, enabling students to explore abstract concepts, visualize patterns, and develop problem-solving and higher-order thinking skills. Furthermore, ICT facilitates a student-centered approach, encouraging collaborative learning, exploration, and creativity.

Globally, the United Nations emphasizes ICT as a key driver of sustainable development and national progress. The 2030 Agenda for Sustainable Development highlights the role of ICT in promoting equitable access to science, technology, and innovation, particularly in developing countries, while enhancing the capacity of nations to leverage technology for education, economic growth, and social development (UN, 2015). ICT in education has a multiplier effect throughout education system, by enhancing learning and providing students with new set of skills; by reaching students with poor or no access (especially those in rural and remote regions); by facilitating and improving the training of teachers; and by minimizing costs associated with traditional instruction. In the same line, highlights that “Research suggests that simply putting computers into schools is not enough to impact student learning. That said, specific applications of ICT can positively impact student knowledge, skills and attitudes, as well as teaching practices, school innovation, and community services”. Teachers can move from seeing content, pedagogy, and technology as independent domains of knowledge to recognizing the transformative potential of the interdependence among three domains (UNESCO, 2014).

In Nepal, ICT in education has gradually evolved from early radio and television programs in the 1950s to more structured initiatives such as the School Sector Reform Plan (2009–2015), Ministry of Education ICT Plans (2013–2017), and the Nepal Information and Technology Policy (2015). These policies aim to enhance access to quality education, improve teaching and learning processes, and ensure that students acquire essential 21st-century skills. Despite these policy measures, effective use of ICT in mathematics classrooms remains limited. Factors such as inadequate teacher training, insufficient technical skills, lack of confidence, and restricted access to ICT infrastructure hinder its meaningful integration (Koirala et al., 2016; Madhukar, 2019).

Teachers’ perceptions, attitudes, and readiness are crucial to the successful integration of ICT in classrooms. Positive perceptions and willingness to adopt technology can enhance student motivation, engagement, and learning outcomes, while negative perceptions or low confidence may prevent teachers from using ICT effectively, even when resources are available (Kislenko et al., 2005; UNESCO, 2014). Studies in Nepal have shown mixed results. For example, Ojha (2018) found that community schools in Dadeldhura were prepared for ICT integration, with supportive infrastructure and motivated teachers. Conversely, Moila (2006) and Madhukar (2019) highlighted the lack of training, planning, and availability of appropriate technological tools as significant

barriers in rural and semi-urban schools. Experimental research also demonstrates that ICT positively influences student performance in mathematics. Moktan (2018) found that students exposed to ICT-based geometry instruction performed better than those receiving traditional teaching, while Basnet (2018) reported that GeoGebra software improved students' conceptual understanding and engagement.

Despite its demonstrated benefits, ICT integration in mathematics education faces persistent challenges, particularly in developing countries such as Nepal. Teachers require ongoing professional development, adequate technical support, and accessible ICT infrastructure to ensure effective implementation. Understanding the perceptions and challenges of secondary-level mathematics teachers regarding ICT use is critical to improving instructional quality, fostering student-centered learning, and achieving better educational outcomes. Meaningful ICT integration not only enhances the quality of mathematics education but also aligns with global efforts to leverage technology for sustainable development, innovation, and equitable access to education.

Ghavifekr et al. (2016) found that there were challenges of using use of ICT tools in teaching and learning. With this finding, the implementation of Information and Communication Technology in teaching and learning is challenged by the following: ICT in teaching and learning is challenged by the following: connection, limited technical support, limited time and lack of competency of the teachers. With the aim of using ICT, Khokhar & Javaid remarked that teachers "are plagued by challenges such as the use of information and communications technology devices being limited to the classroom" teaching. Conversely, some educators have argued that in order for ICT to be used effectively in the teaching process, more hours need to be allocated were required for the instruction. It implies much teaching responsibility and skills are required for the instruction should make use of the technological tool (Sim & Theng, 2007). Teachers have to struggle with the following difficulty: face when integrating ICT in education is that some schools have forbidden mobile phones, iPods. They say that these gadgets interfere with their lessons (Kolog et al., 2018; Mura & Diamantini, 2014). Besides, this could go ahead and be stretched to the teachers' practice of spending much of their teaching hours online, principally to play games, be active on social networks, and watch movies or listen to -listening to music rather than searching for study materials. According to the opinions of Kizlik According to Lewis & Passey, (2008), it is crucial that teachers teach their pupils to appropriate ICT capability. Before applying, it is important to first understand it in other subjects. Despite there being a strong relationship This is perhaps challenging for some teachers between ICT the subject and ICT in subjects.

Thus, this study should provide information on the perceptions and challenges of using ICT tools into teaching and learning processes of mathematics classrooms in the schools at Chingad rural municipality and Birendranagar Municipality. The changes occurring in modern society have had a dramatic impact on the lives of technology, they require updated information that will enable them to be adjusted to the changing world. This knowledge can enhance communication skills and abilities in the 21st century by e-commerce, self-employment in the ICT sector.

Objectives

The objectives of this study are as follows:

- To find out the status of the use of ICT in Mathematics classroom at Chingad rural municipality and Birendranagar Municipality.
- To identify the challenges of using ICT in teaching Mathematics.

Methodology

This study applied mixed methods research using collection tools: survey questionnaires and interview. Since the research was explored the status of ICT use in school with opportunities' and attitude of mathematics teachers in ICT integration, which is a part of the Learner-Centered Approach. This research was anchored in the constructivism theory.

Sample Population and Strategies

The population of this study was all secondary level mathematics teachers of Chingad Rural Municipality and Birendranagar Municipality in Surkhet district. The secondary level mathematics teachers were engaged to teach on grade IX to XII. These teachers were selected to take the information to complete this study. In Chingad rural municipality, there are total 7 secondary schools. The researcher had selected all the 7 secondary schools in Chingad rural Municipality, because the researcher had access to visit all the secondary school of this area. The researcher selected 13 secondary school of Birendranagar Municipality using purposive sampling method. The secondary level mathematics teachers who have been teaching Math's from grades IX-XII, at 20 schools are the sample population of this study selected by purposive sampling method. The researcher used the pseudo name of the teachers on the basis of first letter of his/her name.

Table 1: Demographic Information of the Respondents

S.N	Teachers'	Schools	Years of experience	Age	Gender
1	T1	Sagarmatha S.S. Surkhet	32	53	Male
2	T2	Sagarmatha S.S. Surkhet	23	47	Male
3	T3	Sagarmatha S.S. Surkhet	36	59	Male
4	T4	Sagarmatha S.S. Surkhet	27	52	Male
5	T5	Manashlu S.S. Surkhet	17	40	Male
6	T6	Manashlu S.S. Surkhet	11	31	Female
7	T7	Manashlu S.S. Surkhet	12	34	Female
8	T8	Dhaulagiri S.S. Surkhet	31	54	Male
9	T9	Dhaulagiri S.S. Surkhet	31	51	Male
10	T10	Sagarmatha S.S. Surkhet	11	36	Female
11	T11	Sagarmatha S.S. Surkhet	10	35	Male
12	T12	Sagarmatha S.S. Surkhet	8	38	Male
13	T13	Sagarmatha S.S. Surkhet	9	39	Female
14	T14	Sagarmatha S.S. Surkhet	12	45	Male
15	T15	Manashlu S.S. Surkhet	15	42	Male
16	T16	Manashlu S.S. Surkhet	17	41	Female
17	T17	Manashlu S.S. Surkhet	13	39	Female
18	T18	Dhaulagiri S.S. Surkhet	14	46	Male
19	T19	Dhaulagiri S.S. Surkhet	11	38	Male
20	T20	Sagarmatha S.S. Surkhet	8	33	Male

Source of Data Collection

Primary sources

The data depends upon survey methods of collection. Researcher visited to respondents for data collection in secondary schools. The study about the perception and challenges of using ICT in mathematics classroom related factors are affecting to the learning achievement. The information collected data for using first hand direct and personal source of data with closed and open questionnaires.

Secondary Sources

The secondary data was used such as published or unpublished materials. The data collected by using journal, books, internet websites, bulletin, thesis, related to the ICT reports.

Data Collection Tools and Techniques

Questionnaire

Two forms of questionnaire were developed in which one was given to teacher. They are self-administered questionnaires. They are structure questionnaires that both were composed of close format, open-ended format and rating scale type of questions. The questionnaires were based on instruments for assessing the impact of technology in education, but it was contextualized for Nepal's' secondary school of especially on Chingad rural municipality and Birendranagar Municipality.

Semi-structured Interview

I took interviews with 20 mathematics teachers who are teaching mathematics in secondary level. Then, I made an audio recording via cell phone. Each session lasted approximately 7-15 minutes. Finally, I offered my gratitude, thanking them for their kind cooperation.

Data Processing and Analysis

After collecting the data, it was carefully checked to remove the possible errors. Data analysis according to research objectives was done. The collected data were analyzed by applying appropriate mathematical and statistical tools (frequency, percentage etc.). After analyzing the data, the frequency percentages were used to describe the nature of data. After collecting data from interview, I made raw data. Then, the obtained raw data were coded in different themes and sub-headings. The obtained responses were presented thematically discussed and compared with others' key findings.

Results

After compared the collected data from questionnaires and interview, the following heading and sub-heading have been made:

The main reasons of searching internet resources

To find out the total numbers of teachers used of ICT for the purpose of using internet in school, the main reasons of searching the ICT internet resources to prepare teaching material. They were asked the questions and their responses collected from the respondents are presented in the following table:

Table 1: *The main reasons of searching internet resources*

S.N.	Status	No. of Teachers	Percent
------	--------	-----------------	---------

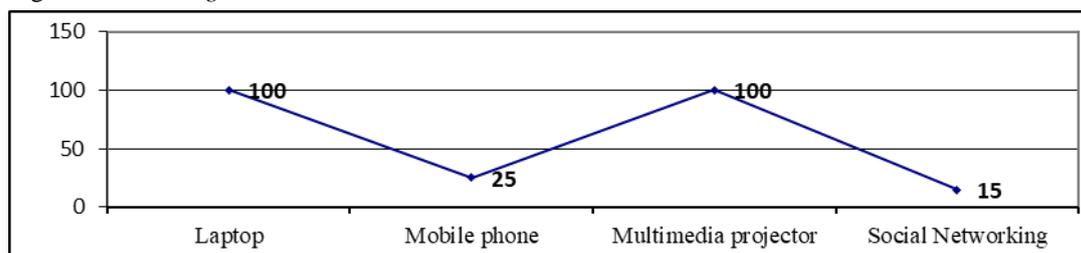
1	Easy to understand	8	40
2	Time saving	4	20
3	Authentic	3	15
4	Attractive	4	20
5	Conceptual	1	5
Total		20	100

The analysis of the information mentioned in table 1 shows the *main reasons of searching internet resources*. According to the obtained data it shows that the most of the teachers i.e. (40% of them use internet resources because internet resources are attractive (20%) and easy to understand (40%). Other important reasons include time-saving and enhancing conceptual understanding (5% each), while 15% teachers' emphasized authenticity. Overall, teachers prioritize usability and engagement when selecting online resources.

The use of technologies in the mathematics classroom

The sixth question was related to the use of the technologies in the mathematics classroom teaching. The researcher collected the data from the teachers are transcribed into percentage in the following table.

Figure1: *Technologies Used in the Classroom*



Most of the secondary level mathematics teachers used laptops and multimedia projectors (100%), while mobile phones (25%) and social networking tools (15%) were used less. ICT supports communication, problem-solving, and student engagement in mathematics.

Reasons behind the use of the ICT

Teachers expressed their views on the use of the ICT resources because it makes teaching communicative, collaborative, authentic, and easy to understand about related subject matter and save the time of the teachers and students. Materials are available in the ICT, the Google and other authentic sites for the related contexts can be searched and downloaded freely and shared among students. The use of ICT is modern technology in teaching and learning. It is used to find out new information related to mathematics teaching and learning. The use of the ICT solves day to day hidden problems. Some teachers use the ICT to look for the best approaches to teach various items and choose the best available materials in mathematics teaching and receive materials which are not available in the market and library. It also helps to encourage them to learn in teaching skills. So, all the teachers want to use the ICT. The respondents collected from the respondents on the use of the ICT use in mathematics classroom and teacher's agreement and disagreements in different points of views are transcribed into percentage in the following table:

Figure 2: Using computers for learning because it makes work easy

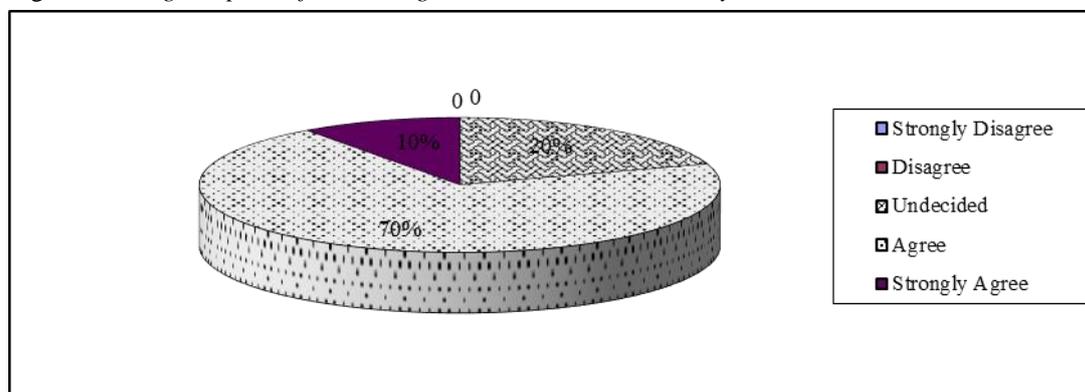


Figure 6 indicates that 20% teachers strongly agreed on the importance of ICT that I use computers in my learning because it makes my school work easy. 70percent teachers agreed of this statement and 10% of teachers strongly agreed on the use of ICT teaching techniques in mathematics classroom. Therefore, the researcher pointed out that using ICT teaching strategies, pedagogical teaching, materials, and communicative teaching skills by exploring, exchanging ideas, motivating, collaborating with among the students.

Using computers at school improves my teaching

To find out the use of ICT in the mathematics classroom on students concentrate. The responses collected data from the 'Using computers at school improves my teaching' the teachers are categorized in the following table:

Table 2: Using computers at school improves my teaching

S.N.	Statement	No. of Teacher	Percent
1	Strongly Disagree	-	-
2	Disagree	-	-
3	Undecided	11	55
4	Agree	6	30
5	Strongly Agree	3	15
Total		20	100

The table shows that the statements "Using computers at school improves my teaching" is also above 55% of teachers were undecided, 30 % were agree and 15% teachers were strongly agreed on this statement which shows that the ICT Tools helps the students to facilitate their class work and homework.

Educational technologies provide better records of learners' progress

The research asked about the question about the 'Educational technologies provide better records of learners' progress '. The teacher's responses of this statement in are given below:

Table 3: Educational technologies provide better records of learners' progress

S.N.	Statement	No. of Teacher	Percent
------	-----------	----------------	---------

1	Strongly Disagree	-	-
2	Disagree	-	-
3	Undecided	-	-
4	Agree	12	60
5	Strongly Agree	8	40
Total		20	100

Above table shows on this statement 'educational technologies provide better records of learners progress ' that 60 percent of the respondents agree, 40 percent teachers strongly agree with this statement. Most of the teachers are agreed in this statement.

Educational technologies engage learners' attention and motivate them

To find out the educational technologies engages learner's attention and motivate them. The responses collected data from the teachers are categorized in the following table:

Table 3: *Educational technologies engage learner's attention and motivate them*

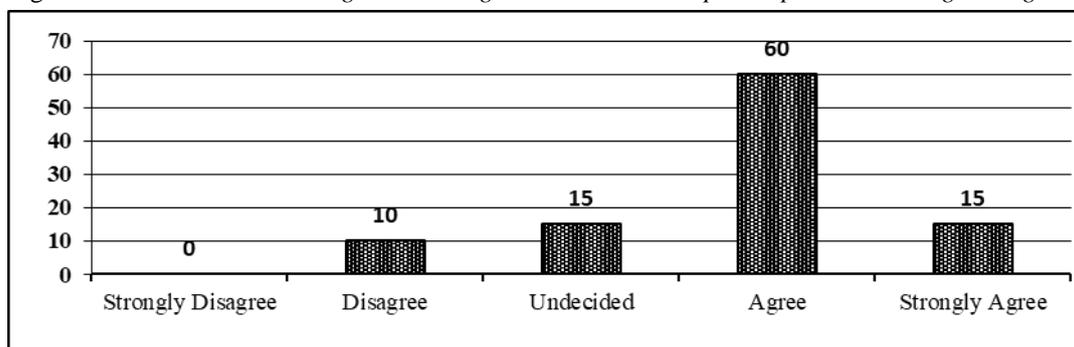
SN	Statement	No. of Teacher	Percent
1	Strongly Disagree	-	-
2	Disagree	-	-
3	Undecided	-	-
4	Agree	15	75
5	Strongly Agree	5	25
Total		20	100

Above table statement as “educational technologies engage learner’s attention and motivate them” with the all respondents deliver their opinion through tick mark on the desired option where 75% of them were agree and 25% of themstrongly agree. The statement was positive accordance to the respondent.

Educational technologies encourage learners to develop their problem-solving strategies

Students can easily solve problems by using different techniques in the classroom during teaching and learning. Technology helps students develop problem solving strategies. The use of technology in teachers also makes learning easier. The teachers' perception that the use of technology develops problem-solving strategies in students was found to be as follows.

Figure 3: *Educational technologies encourage learners to develop their problem solving strategies*



Above figure statement about 'Educational technologies encourage learners to develop their problem-solving strategies' 10% teachers had disagreed, 15% undecided, 60% agree and 15% strongly agree with this statement which shows that the educational technology helps the students concept formation by providing different models and images and it improves the teachers' efficiency.

Computers replace the teachers Overload

The researcher asked about the question 'Computers will replace the teachers' that the teachers' responses with this statement are given below:

Table 4: *Computers will replace the teachers*

S.N.	Statement	No. of Teacher	Percent
1	Strongly Disagree	13	65
2	Disagree	4	20
3	Undecided	3	15
4	Agree	-	-
5	Strongly Agree	-	-
	Total	20	100

Above table indicated that the statement of 'Computers will replace the teachers'. The 65 percent of respondents were strongly disagreed, 20 percent of disagree and 15 percent of respondents were undecided with this statement. Most of the teachers were strongly disagree in this statement.

Challenges of Using ICT in Teaching Mathematics

As found in this study through interviews with Mathematics teachers, there were different areas that become a barrier or challenges to integrate ICT into the Mathematics Class. First challenge was teachers' Lack of infrastructure to add or operate ICT Tools, after that lack of training. Lack of training of teachers was found to be a crucial aspect which needs to be seriously considered during policy formulation or implementation. ICT is a new development in the education sector and most of the teachers were overwhelmed or rather shocked by the idea of including it in their lesson presentations. At the time this study was conducted, only a few teachers had been trained and most of them were trained from a private institute on the basis of their interest, not trained from governmental or specially to make the teacher curious to teach the students, but even then, they were not integrating ICT into their lessons as there was no on-going support to strengthen what had been learned. The second challenge was that teachers could not operate ICT facilities. They wanted to use ICT in Mathematics lessons to improve learning, but even with the equipment, they lacked the skills to use it. The third challenge was the lack of ICT resources, especially in rural schools. Most ICT tools were kept in computer labs instead of classrooms, which limited their use in lessons. The fourth challenge was theft. Expensive ICT tools were often stolen due to poor control and monitoring. The fifth challenge was lack of support from school management. Management did not encourage or monitor ICT use, so teachers lost interest. The sixth challenge was little parental support. Many parents did not understand the value of ICT and did not help schools buy facilities. The seventh challenge was the language barrier. ICT terms were difficult for teachers and learners, especially younger students taught in their mother tongue. The eighth challenge was overcrowded classrooms. With 40–50 learners per class and few resources, it was hard for teachers to use ICT effectively.

Discussion

The findings of this study indicate that teachers primarily use ICT and internet resources in the classroom because they are easy to understand, attractive, and time-saving. Specifically, 40% of teachers preferred resources that are easy to understand, while 20% prioritized resources that are visually appealing. This aligns with previous research by Warschauer and Healey (1998), who found that teachers are more likely to adopt digital resources that are user-friendly and engaging for students. Similarly, Chapelle (2001) highlighted that the usability and accessibility of ICT materials significantly influence teachers' willingness to integrate them into classroom instruction. Therefore, this study supports the idea that perceived usefulness and student engagement are key determinants in teachers' ICT adoption.

The study also revealed that secondary mathematics teachers predominantly use laptops and multimedia projectors (100%), while tools such as mobile phones and social networking platforms are less common. This finding is consistent with Ertmer et al. (2012), who reported that teachers tend to favor ICT tools that enhance visual learning, classroom communication, and problem-solving activities. The teachers in this study also perceived ICT as motivating for both teaching and learning, enhancing students' engagement and problem-solving abilities. This agrees with Liu and Szabo (2009), who emphasized that integrating technology in classrooms encourages active participation, collaboration, and critical thinking among students.

Despite the benefits, the study highlighted several challenges, including lack of technical support, limited ICT skills, and insufficient confidence among teachers. More than half of the teachers were undecided about the statement "Using computers at school improves my teaching," suggesting uncertainty about ICT effectiveness. This resonates with findings from Voogt et al. (2013), who identified teacher competence and confidence as major barriers to effective ICT integration. Similarly, UNESCO (2018) emphasized that lack of training and support significantly reduces teachers' ability to implement technology meaningfully, particularly in developing countries.

Finally, while teachers overwhelmingly rejected the idea that computers could replace them, they acknowledged the role of ICT in enhancing instructional quality and record-keeping. About 60% of teachers agreed that educational technologies provide better records of student progress, and 75% agreed that ICT engages learners' attention. These findings mirror Ertmer and Ottenbreit-Leftwich (2010), who concluded that ICT serves as a complementary tool to support teachers rather than replace them, improving classroom management, student monitoring, and interactive learning.

Conclusion

This study exposed something strange about ICT tools which were very unexpectedly in use among the teachers and students but it also unveils that ICT integration in education still has a long way to go. Although this study revealed general issues on ICT integration, these issues also directly affected the teaching of reading and writing. This was because the majority of teachers were unable to integrate ICT in their teaching practices. The main obstacle towards the successful integration of ICT was lack of training which resulted in teachers lacking the necessary skills and competencies. The study also revealed that many of the mathematics teachers participating in the study were willing to make use of ICT for teaching and learning purposes even though they encountered many

challenges in the process. They indicated that technology in education was a motivating tool both for them and for their learners as they became part of the global village where everything is technologically advanced. Although most of the schools benefitted from the deployment of ICT resources from the government, this study demonstrated that during the distribution of these resources there were imbalances between rural and urban schools. This conclusion was drawn after it was observed that urban schools were equipped with more ICT resources than their counterparts in rural schools. The study concluded that without proper infrastructure, facilities such as electric power, connectivity and computer related materials and human support, ICT integration into teaching in general, and the teaching of mathematics lesson in particular, will not succeed.

Author's Biography

Deepak Ghimire is an MPhil Scholar at Nepal Open University and holds dual Master's degrees in Mathematics from Mid-Western University and Tribhuvan University. He is a permanent secondary-level Mathematics teacher with a strong commitment to academic excellence. His research interests focus on mathematics education, curriculum development, pedagogical innovation, and evidence-based instructional practices in school education.

References

- Aydın, E. (2005). The use of computers in mathematics education: A paradigm shifts from computer assisted instruction towards student programming. *The Turkish Online Journal of Educational Technology (TOJET)*, 4(2).
- Bansal, D. (2018). Benefits of ICT in education. *Bhartiyam International Journal of Education & Research*, 5(2).
- Basnet, D. (2018). *Effectiveness of Geogebra in learning geometry* (Master's thesis). Institute of Education, Tribhuvan University.
- Iahad, N., Oye, N. D., & ShallSuku, Z. K. (2012). The role of ICT in education: Focus on university undergraduates taking mathematics as a course. *International Journal of Advanced Computer Science and Applications (IJACSA)*, 3(2).
- Khanal, S. (2008). *A study on the mathematical concepts and process used by Potter* (Unpublished Master's thesis). Department of Mathematics Education, Tribhuvan University.
- Koirala, B., Bhandari, A., Lingthep, P., Khanal, B., Bhagat, B., & Shrestha, S. (2016). *A study on the use of information communication technology (ICT) and its sustainability in school education*. Department of Education, Sanothimi, Bhaktapur, Nepal.
- Madhukar, A. (2019). *Use of ICT in mathematics classroom: Opportunities and challenges* (Master's thesis). Institute of Education, Tribhuvan University.
- Ministry of Education (MoE). (2013). *ICT in education master plan (2013–2017)*. Government of Nepal.
- Moila, M. M. (2006). *The use of educational technology in mathematics teaching and learning: An investigation of South African rural secondary schools*.
- Moktan, K. (2018). *Effectiveness of ICT in teaching geometry* (Master's thesis). Institute of Education, Tribhuvan University.

- National Planning Commission (NPC). (2007). *Three years (2007–2010) interim plan*. Government of Nepal, Singha Durbar.
- National Planning Commission (NPC). (2014). *Information & communication technology (ICT) in education: ICT in education master plan*. Government of Nepal, Ministry of Education.
- Ojha, N. (2018). *Preparation and readiness of community schools for using ICT in teaching and learning*. Department of Mathematics and ICT Education, Central Department of Education, University Campus, Kirtipur.
- Pandit, R. P. (2007). *Foundation of mathematics education*. Kathmandu: Annanta Prakashan.
- Passey, D., & Saways, W. (1997). Information technology supporting change through teacher education. In *Chapman and Hall* (pp. 40–45). London, UK.
- Pulkkinen, J. (2007). Cultural globalization and integration of ICT in education. In *Educational Technology: Opportunities and Challenges* (pp. 13–23). University of Oulu, Finland.
- Rokaya, B. B. (2011). *A study on mathematical concepts and process used by Jumli shepherd* (Unpublished Master's thesis). Department of Mathematics Education, Tribhuvan University.
- United Nations (UN). (2015). *Transforming our world: The 2030 agenda for sustainable development (A/RES/70/1)*.
- UNESCO. (2011). *UNESCO ICT competency framework for teachers*. United Nations Educational, Scientific and Cultural Organization.
- UNESCO. (2014a). *ICT in primary education: Analytical survey, vol. 3: Collective case study of promising practices*. Russian Federation: UNESCO.
- UNESCO. (2014b). *A comparative analysis of ICT integration and e-readiness in schools across Asia*. UNESCO Institute for Statistics, Montreal, Canada.