

# Perception of Teachers towards the Use of Instructional Materials in Teaching Mathematics at Secondary Level

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## Abstract

*The major objective of the study is to identify the perception of mathematics teachers towards the use of instructional materials in teaching mathematics for the students of secondary level and to compare their perceptions on the basis of their teaching experience. The study has adopted descriptive survey design. A set of the questionnaire with 24 statements regarding the use of instructional materials in teaching mathematics was the tool for collecting the data. The statements in the questionnaire were categorized into four categories as availability, appropriateness, self-confidence in using instructional materials, and motivation to use it. The questionnaire forms were distributed to 68 secondary school mathematics teachers of public schools. The data were collected, tabulated, ordered, compared, calculated and analyzed by using different statistical tools. Finally, it was found that teachers have negative attitudes towards the statements under the subheadings availability which indicates teachers do not feel comfortable in gathering the instructional materials in teaching mathematics and they were found to have positive towards the statements under the subheadings appropriateness, self-confidence in using, and motivation which means mathematics teachers are in the favor of appropriate use instructional materials in teaching mathematics, and they were found confident in using instructional materials. And also teachers are found motivated to use instructional materials in teaching mathematics at secondary level. The study also concluded that the perception of the teachers regarding the use of instructional materials in teaching mathematics at secondary level differs according to the teaching experience of the teachers. Interestingly, the teacher with less teaching experience were found more positive in using instructional materials in teaching mathematics at secondary level.*

**Keywords:** perceptions, instructional materials, teaching experience, secondary level

## Background of the Study

Teaching-learning activities are interesting when instructional materials are used effectively and efficiently in a classroom-teaching situation. It is necessary for the teacher in teaching/ learning of mathematics to use instructional materials as an instructional tools in order to make their teaching more interesting which may support students to arouse their learning

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interest, sustain their attention for effective learning, encourage creative thinking and facilitate students' understanding (Behm and Lloyd, 2009). But in the context of Nepal, use of an instructional material in teaching mathematics is not happening in an expected manner because of having unavailability of the appropriate teaching materials and mathematics teacher's hesitation in using them due to some challenges (Adhikari, 2009).

As a teacher of Mathematics, we are always ready to believe that an appropriate use of instructional materials help and encourage our students for the better understanding of the subject matter. However, many of us do not feel comfortable in selecting the best instructional materials and use in our classroom activities. I (researcher) have been continuously witnessing a huge gap between their (teachers) 'theoretical understanding' and 'classroom practices' regarding the use of instructional materials in teaching mathematics. Obviously, there might have many factors enforcing teachers to act accordingly, one of the major reasons might be the perception of teachers towards the use of instructional materials. While unpacking the perception of the teacher, with the help of the various literatures and experiences, the perception scale is categorized into four subheadings as availability, appropriateness, self-confidence in using instructional materials, and motivation to use such materials. In this regard, with the aims to identify the perception of mathematics teachers towards the use of instructional materials for the meaningful teaching-learning process, a research study is conducted among teachers who have been teaching mathematics at secondary level and the major findings of the study are explored in the article.

### **Statement of the Problem**

Although most of the recent research studies claimed that the appropriate use of the instructional materials in teaching mathematics ensure better learning outcomes. In most of the Nepali mathematics classroom it is not used properly and sufficiently. Ertmer et al. (2012) argued that teacher's perception regarding the use of instructional materials is one of the major aspects of its proper use. In this scenario, the present study assumed the major problem as how do the mathematics teacher perceive the use of instructional materials in teaching mathematics in secondary level?' What are the factors that cause most of the teachers being hesitant in using instructional materials for making classroom teaching more meaningful? Does the teaching experience of the teachers contribute to form the perception in the use of instructional materials in teaching mathematics?

### **Objective of the Study**

The main objective of the study is to identify the teacher's perception towards the use of instructional materials in teaching mathematics at the secondary level. And, the study also aims to compare the perception of the teachers towards the use of the instructional materials on the basis of their teaching experience.

## Hypothesis of the Study

For the second objective of the study, the following hypothesis was formulated:

**Null Hypothesis:** There is no significant difference in the perception of teachers towards the use of instructional materials according to their teaching experience.

**Alternative Hypothesis:** There is a significant difference in the perception of teachers towards the use of instructional materials according to their teaching experience.

## Review of Literature

National Council of Teachers of Mathematics (NCTM, 2000) in the document 'Principle and Standards for School Mathematics' listed instructional materials as one of the key principles to enhance the quality of mathematics. This further suggests that teachers should use instructional materials to enhance their students' learning opportunities by selecting or creating mathematical tasks that take advantage of materials.

Matthew, Boggan, Harper, & Whitmire (2009) highlight importance of instructional materials saying, instructional materials improve children's long-term and short-term retention of math. Many of the researcher suggest that the students need to participate actively in the process of learning and this active participation can be enhanced by the appropriate use of materials, Lusin (2013) supporting to this view argue that pupils need to be actively involved in their learning and manipulate objects in their surroundings so that they can generate better understanding of mathematical concepts. The activity-based instruction using manipulative instructional material might enhance the teachers' professional development on project work of material through paper cutting and any other activities. Educational research indicated that the most valuable learning occurs when students actively construct their own mathematical understanding, which is often accomplished through the use of instructional materials (Matthew et al., 2009).

Olive and Makar (2010) argue that mathematical knowledge and mathematical practices are inextricably linked, and this connection can be strengthened by the use of instructional materials. They have found that when instructional materials make abstract ideas tangible, teachers can more easily connect students' prior knowledge with present information which can connect different mathematical concepts and can relate abstractness in mathematics with students' real-life experiences. Reyes (2017) state that there is a common belief that the use of instructional materials in education contributes to a more constructivist learning and increases activeness and greater responsibility on students. The benefits of using concrete objects are that it provides a practical context for the learner to understand

real-world knowledge. Similarly, concrete objects allow learners to discuss and construct knowledge of abstract concepts (Fu, 2013).

Amatya (1978) conducted a research study entitled 'A study of the effectiveness of teaching mathematics with and without the use of instructional materials' with the aim to find out whether instructional materials are helpful to develop the mathematical concepts and to measure the difference in concept development among students. The experiment was conducted during four weeks time. The conclusion of the study was that the performance of students taught with the use of instructional materials was significantly improved when compared with the performance of the students taught without the use of instructional materials.

Yadav(1985) did a research entitled 'A study on the use of visual aids in the instruction of mathematics in primary schools of Dhanusha District' with the aim to get information about the use of teaching aids. One hundred three teachers were selected from the selected schools as the sample. He concluded that the trained teachers used teaching aids more frequently than the untrained teachers. He further concluded that in some of the schools, even the materials are available they are not used properly because of having the lack of teacher training programme.

From the above-mentioned review of the various literature, it can be assumed that the appropriate use of instructional materials in teaching mathematics may lead to the better learning outcomes. But, the studies were not enough intended to observe how the common mathematics teachers perceive the use of instructional materials in actual classroom teaching. So, the present study was oriented in seeking the perspective of the mathematics teachers towards the use of instructional materials at the secondary level.

## **Research Design**

The researcher selected survey research design to fulfill the objectives of this study. The survey was conducted among 78 mathematics teachers who are teaching at secondary level in Kathmandu district.

## **Tools**

Data were collected with the help of a questionnaire form entitled 'Mathematics teacher's perception towards the use of instructional materials in teaching mathematics' which consisted of 24 statements within four different categories as availability, appropriateness, self-confidence in using, and motivation.

## Data Collection and Analysis Procedure

After getting permission from the respondents, the survey questionnaires were given to fill up properly. And, the responses of the respondents are considered as the data for the study. By the help of the different statistical measurements (Frequency, mean, standard deviation, inferential statistics), the data collected through the survey instrument were analyzed.

## Analysis, Interpretation, and Discussion

The analysis and interpretation of the collected data were done into two different sections corresponding to the set objectives;

**Perception of the teachers towards the use of instructional materials.** With the help of the data collected from the survey, following statistical results were obtained corresponding to the mentioned subheadings:

**Table 1: Responses of the teachers towards the use Instructional materials**

Subheadings	% of responses in Likert scale					Average
	SA	A	N	D	SD	
Availability	3	19	8	22	48	1.43
Appropriateness	18	37	12	23	10	3.12
self-confidence in using	21	41	3	19	16	3.45
Motivation for students	34	31	11	17	7	3.82

From the table, it was obtained that the average value of teacher's responses towards the statements under the subheadings availability is 1.43, which shows that teachers used to perceive negatively to the availability of instructional materials in teaching mathematics, this finding of the study is matched with a view of Adhikari (2009). In the same way, the average value of teacher's responses towards the statements under the subheadings appropriateness is 3.12, which shows that teachers used to have positive perception towards the statements under appropriateness of using instructional materials in teaching mathematics and this finding of the study is supported by the many researchers (Olive & Makar, 2010; Boggan & Harper, 2009; NCTM, 2000) with the same types of findings. The average value of teacher's responses towards the statements under the subheadings self-confidence is 3.45, which shows that teachers were found positive regarding their confidence in using instructional materials in teaching mathematics as the view of Mikre (2011). Finally, the average value of teacher's responses towards the statements under the motivation for students is 3.82, which shows that teachers used to perceive the use of instructional materials in teaching mathematics motivate students for the better academic outcomes. This kind of finding was drawn by the researchers (Shadaan & Leong, 2013) as they viewed instructional materials in the process of learning mathematics are the great

motivational tool to enhance the students' learning outcome by enabling them to understand the concepts better. Overall, the sampled teachers were used to perceive positively to the appropriate use of instructional materials in teaching mathematics for secondary for the creating meaningful teaching-learning environment.

**Comparison of teacher's perception towards the use of instructional materials on the basis of their teaching experience.** To compare the teacher's perception towards the use of instructional materials, first, the sampled teachers were categorized into two groups on the basis of their teaching experience as more than or equal to five years ( $\geq 5$  years) and less than 5 years ( $< 5$  years). A significant difference in their perception was determined with the help of the inferential statistics at 0.05 level of significance in the following way:

**Table 2: Comparing the perception of the teacher on the basis of teaching experience**

Experience of the teachers	No. of Teachers	Mean	S.D.	d. f.	z-value	Decision
$\geq 5$ years	32	3.07	0.98	76	2.817	$> 1.96$
$< 5$ years	46	3.59	0.43			

The table shows, the hypothesis that there is no significant difference between the perception of the teachers towards the use of instructional materials on the basis of their teaching experiences is not accepted. This helped us to conclude that the perception of the teachers regarding the use of instructional materials in teaching mathematics at secondary level differs according to the teaching experience of the teachers. On the basis of the average score on the statements, teachers with less teaching experiences seems to have more positive perception in comparison with teachers having high teaching experience regarding the use instructional materials at secondary level, the finding of the study is somehow matched with the view of Guha (2000) as he argued, most of the teacher who have been teaching since long period of time, motivated to following the more traditional way of teaching and they do not emphasize using recent methods and teaching materials in their teaching. Bannon & Thomas (2014) also argues that the older teachers with high teaching experiences in comparison with younger teacher may not feel comfortable in using recent instructional materials mostly ICT based resources in their teaching which means age factor also can be cause of not as much use of the relevant resources/ materials in teaching mathematics.

## Conclusion

With the help of the above-mentioned analysis and interpretation of the data, the study concluded that most of the teachers have taken positively the use of instructional materials

in teaching mathematics for the students of secondary level. The researcher realized based on the study that the availability of instructional materials is not adequate. Finally, the study clearly shows the teaching experience of the teacher affects their perception about the use of instructional materials in mathematics classroom at the secondary level.

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