**Resolving Learners Differences in the Learning of Mathematics**

**Abstract**

Mathematics is essential for higher studies especially in the field of science and technology. It is applicable for all disciplines. Through various data collected in different schools, it is seen that students are indifferent in learning mathematic. Considering this fact, my study is based on survey research design with positivism philosophy. The main objective of this paper is to identify the factors that create indifference towards learning Mathematics and also to resolve it. The data is collected from 50 students and 20 teachers from ten different schools of Kaski district. Questionnaire was used for the research participants to achieve the research objective. After the analysis and interpretation of the obtained data, we were able to identify the cause of indifference towards learning Mathematics. Likert scale was applied to analyze the data obtained. Mean weight was used to locate the central position of the response to the statement of the students and the teachers as a whole in the rating skill. The questioner consists of 37 statements related to foundation of Mathematics education. Overall 32 statements assisted to overcome the indifference in learning Mathematics. If the calculated mean weightage is equal to or greater than two, it is assumed that the statement indicates the problems for the indifference toward learning mathematic. The ways to overcome the indifference were related to foundation of Mathematics education.

***Key words:*** *Indifference, positivism, Foundation, Learning differences, Positivism, Mathematics.*

1. **INTRODUCTION**

Mathematics is a process of learning and it is an expression of human mind concerned chiefly with ideas, processes and reasoning. Mathematics is an organized structure of knowledge in which each proposition is deduced logically from previously proved propositions and it companies’ skills, techniques and arts by which man conveys ideas, concepts of fact. (Bhatia &Bhatia, 1987). Mathematics is highly intellectual display (Pokhrel et al., 2024). The study of Mathematics can be traced out from the very ancient period (Poudel et al. 2023). Mathematics is multicultural subject. Mathematics is the backbone of daily life in the field of science and technology so, Mathematics is compulsory subject in school level. Acharya (2006) studied the attitudes of secondary school students towards learning Mathematics. He found that the students studying Mathematics had negative attitudes towards Mathematics. Ghimire (1997) explored the factors like school environment, family background, motivation factor, physical factors, and interest of the learners affect the Mathematics learning. Poudel (2010) has identified five factors for creating interest in Mathematics including lack of fundamentals, Mathematics learning disabilities. He identified that motivation, student’s interests, instruction methodology and materials also effects on the learning and teaching Mathematics. Those factors may effect student’s interest towards learning Mathematics. In Nepal, the enrollment of students in Mathematics at school level to university level is not satisfactory and the pass percentage is comparatively less. The number of dropouts in Mathematics at higher school level is high (Panthi & Bastet, 2000). School lack qualified and competent teachers to teach Mathematics. The failure percentages of the students in Nepal in three consecutive years 2011, 2012, and 2013 in Mathematics are as 29.62%, 38.79% and 42.09% which is greater than other subjects(Office of Controller of Examination, 2014). NASA (2017) has reported that the average achievement score in Mathematics is lower than other subject in Nepal.

Nepalese Mathematics students of secondary level expresses their difficulties in understanding the Mathematics situation. So the number of students failing in Mathematics examination is remarkably high. Many students in their school days have difficulties in the Mathematics situation. (Khanal, 2015). Many students have no interest in Mathematics (CERID, 1999). The reason behind this awful situation in the Mathematics could be the content issues, evaluation system, classroom instruction and effective learning strategies. These issues reflects the poor achievement and are the causes of indifference towards Mathematics. Teaching and learning towards the Mathematics is related with foundation of Mathematics education(Pokhrel et al., 2024). Mathematics education has its own foundation. Math education is related to culture, society, philosophy, technology, methodology and psychology. Pandit (2007) argue that some foundations of Mathematics education like philosophical, psychological, mathematical, sociological, cultural and technological foundation are of key aspect for Mathematics learning. Indifference toward learning Mathematics are related to foundation of Mathematics education. So this study identifies the cause of indifference toward learning Mathematics and way to resolve it.

1. **OBJECTIVE OF THE STUDY**

The main objective of this paper is to identify the learners’ differences in the learning of Mathematics and methods to ameliorate the issue.

**Methodology**

It is a philosophical and intellectual framework to collect the data for the basis of the research study. To meet my research question, we have adopted positivist research paradigm It is a quantitative and design is descriptive survey. Out of 623 secondary schools in Kaski districts, 10 secondary schools were chosen for sample in which five are public and five are private. Five students were selected from each schools by purposive sample with the help of Mathematics teachers of the respective schools. Also two secondary Mathematics teachers were selected from each schools. As a result, ten schools, twenty teachers and fifty students were selected for the sample. Questionnaire was the main tool of the study. Researcher develop the questioner based on foundation of Mathematics education and some related literatures. The questionnaire consists of various items related to the problem faced by the students and the teachers of Mathematics of secondary levels under the foundation of Mathematics education. The questionnaire was given to the Mathematics teachers to fill. The collected data was tabulated and analyzed according to the objective of study. Three point scale was used for the analysis of the data. The weightage of 3, 2, 1 was assigned to statement for agree, disagree, neutral respectively. For the statement opposing to this point of view, the items are scored to opposite order. Mean weight was used to locate the central position of the response to the statement of the students and the teachers as a whole in the rating scale. The questionnaire consisted of 37 different statements which centered on learning differences. Also 32 statements were able to ameliorate learners differences in learning Mathematics and provide ways of ameliorating the issue. If the calculated mean weightage is equal to or greater than two, it is assumed the statement indicated the problems. These data were calculated item wise in various problems faced by the students and the teachers.

1. **Result and Discussion**

Mathematic is compulsory subject in secondary level in Nepal. There are series of learning differences among learners learning Mathematics at different levels.

This study focuses to analysis and interpreted the cause of indifference toward learning mathematic and way to overcome toward indifference toward learning mathematic. The data were collected for the study from twenty teachers and fifty students of ten schools of Kaski district. The data were analyzed and interpreted by using statistical tools of mean based on the 3 point scale adopted in this study. Questionnaire was related to foundations of Mathematics education. The collected data were analyzed under the two main heading based on foundation of Mathematics education. The areas of the study are

Learning differences in Secondary Mathematics.

* Ways of ameliorating the learning differences.

**CAUSES OF INDIFFERENCE**

The causes of learning differences attributed to students learning Mathematics. So it is based on questionnaire from the students. The student’s abilities differ in learning due to age, intelligence, maturity, socio economic status. Problems which are related to the causes of indifference toward leaning Mathematic have 37 statements based on foundation of Mathematics. For the convenience, the response were analyzed by using mean weightage for each items. The formula used is illustrated below: (Kothari, 2001)



where nm = number of people who selected response m

wm = weighting of response n , N= total number of respondents.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| S.N. | Statements | Response No. | | | Mean weightage | Remarks |
| Agree | Disagree | Neutral |
| 1 | Inadequate description of the role played by Mathematics in modern technology. | 34 | 6 | 10 | 2.48 | Favorable |
| 2 | Lack of proper motivation towards Mathematics. | 28 | 15 | 7 | 2.42 | Favorable |
| 3 | Lack of description of inter relationship of pure Mathematics and applied Mathematics. | 37 | 5 | 8 | 2.58 | Favorable |
| 4 | Teaching programmed is only limited to the new content and to upgrade the class. | 27 | 14 | 9 | 2.36 | Favorable |
| 5 | Due to lack of managing the linguistics problems in teaching Mathematics. | 31 | 4 | 15 | 2.32 | Favorable |
| 6 | Lack of qualified and trained teacher. | 40 | 4 | 6 | 2.68 | Favorable |
| 7 | There is no clear concept about the compulsory presence of mathematic in every scientific invention. | 30 | 17 | 13 | 2.54 | Favorable |
| 8 | Teachers are indifference towards stimulus, response and generalization of the subject matter to their needs. | 32 | 16 | 6 | 2.52 | Favorable |
| 9 | The level wise curriculum and context is not according to the interest, knowledge level and age of the students. | 22 | 17 | 11 | 2.22 | Favorable |
| 10 | Teachers are indifference towards the knowledge of students. (Language, mathematical, knowledge visual, extrovert knowledge) in the teaching learning process. | 30 | 8 | 12 | 2.36 | Favorable |
| 11 | Due to misconception of Mathematics as an extra burden. | 30 | 10 | 10 | 2.40 | Favorable |
| 12 | Mathematics is only for extra ordinary students. | 23 | 18 | 9 | 2.28 | Favorable |
| 13 | In time of class activities, teachers focus on talent learners and less emphasis to the slow learners. | 32 | 11 | 7 | 2.50 | Favorable |
| 14 | Teaching methods are applied without having ancient mathematical knowledge and recorded history of Mathematics. | 10 | 20 | 20 | 1.8 | Unfavorable |
| 15 | Mathematics is a difficult and vast subject which cannot be learnt in short time. | 36 | 11 | 3 | 2.66 | Favorable |
| 16 | Lack of providing concrete concept to the students constructing modern mathematical laboratory. | 33 | 7 | 10 | 2.52 | Favorable |
| 17 | Due to the compulsory of strict discipline and continuous attention. | 25 | 16 | 9 | 2.32 | Favorable |
| 18 | Due to unsatisfactory progress of the students who are studying Mathematics in the society. | 21 | 21 | 9 | 2.24 | Favorable |
| 19 | Lack of proper reinforcement, reward and punishment in the classroom. | 34 | 8 | 8 | 2.52 | Favorable |
| 20 | Inadequate right concept and practical use of Mathematics. | 45 | 3 | 2 | 2.86 | Favorable |
| 21 | Focusing on exam oriented teaching learning activities instead of the depth knowledge of the topic. | 33 | 12 | 5 | 2.56 | Favorable |
| 22 | Social variation and its effects in classroom teaching. | 34 | 2 | 14 | 2.4 | Favorable |
| 23 | Due to the unaware of divisions of the society. | 12 | 15 | 23 | 1.78 | Unfavorable |
| 24 | Course is not finished in time due to various reasons like band, strike and absence of teachers. | 45 | 3 | 2 | 2.86 | Favorable |
| 25 | Mathematics is failed to solve the social problems. | 23 | 25 | 2 | 2.42 | Favorable |
| 26 | Due to uncertainty about the inter relationship between Mathematics and different aspects of society. | 35 | 5 | 10 | 2.50 | Favorable |
| 27 | Carelessness about the effects of society and culture in teaching Mathematics. | 24 | 14 | 12 | 2.24 | Favorable |
| 28 | Clear concept about the role played by Mathematics to solve the daily life problems. | 34 | 6 | 10 | 2.48 | Favorable |
| 29 | Teacher are failed to use the different method. | 40 | 3 | 7 | 2.66 | Favorable |
| 30 | Teacher are failed to give the significant knowledge about the disciplinary aspects of Mathematics. | 35 | 12 | 3 | 2.64 | Favorable |
| 31 | Teaching is related to the solution of numerical but not concerning about how were mathematical concepts invented or discovered? | 31 | 10 | 9 | 2.44 | Favorable |
| 32 | Teacher, book writer, curriculum designer are failed to give the idea about ethno Mathematics. | 37 | 2 | 11 | 2.52 | Favorable |
| 33 | Modern technology like and ICT are not used properly in teaching learning process. | 36 | 8 | 6 | 2.60 | Favorable |
| 34 | Teaching learning reference materials are not properly used in class room. | 40 | 5 | 5 | 2.70 | Favorable |
| 35 | Mathematic is taught in primitive way instead of concerning the changing society, curriculum, content and new approach. | 27 | 14 | 9 | 2.36 | Favorable |
| 36 | Integrating the present mathematical concept, reformulating in suitable discipline to foster the students are not done. | 25 | 14 | 11 | 2.28 | Favorable |
| 37 | By focusing on lecture method rather than modern instructional materials. | 34 | 9 | 7 | 2.54 | Favorable |

**Table-1** Causes of Learning Differences

From table-1, the favorable statements were identified for student’s indifference toward learning Mathematics. The causes of differences toward learning Mathematics (according to students views) were; inadequate right concept and practical use of Mathematic, incomplete course completion, teaching learning reference not properly managed, lack of classroom activities, lack of qualified and trained teacher, lack of proper teaching methods, concept that Mathematics is difficult which cannot be learned in short time, teachers not familiar with subject matter, teacher failed to give the significant knowledge on disciplinary aspects of Mathematics, teacher focus on talent learners and vice versa, lack of modern technology and ICT(Pokhrel & Poudel, 2024), exam oriented teaching learning activities, student was unknown about presence of Mathematics in every scientific invention, focus on lecture methods, lack of proper reinforcement, reward and punishment in the class room, misconception about Mathematics in an extra burden, unclearly about the application of Mathematics, inadequate knowledge modern technology, lack of concrete concept to the students via Mathematics laboratory, lack of proper motivation, concepts as Mathematics fails to solve the social problem ,mathematical problems are not connected to daily life, level wise curriculum and context are not according to interest ,knowledge level and age of students, social variation and its effect in classroom teaching are not managed, lack of managing the linguistic problems in teaching Mathematics, carelessness about the effect of society and its culture in teaching Mathematics, unsatisfactory progress of the student who are studying Mathematics, mathematic is only for extra ordinary students, compulsion of strict displace and continuous attention, Teacher behavior, lack of motivation, current Mathematics curriculum, low socio-economies status of parent, Bad teachers teaching strategy, low parents qualification, bad home environment, low Mathematics achievements, Mathematics anxiety, non-practical mathematical curriculum, low self-efficacy, poor school administration, class room management, lack of participation, traditional teaching methods, present practice of teaching and math's myths. Hence, Students' indifference toward learning Mathematics stems from a combination of inadequate conceptual understanding, ineffective teaching methods, and lack of motivation, socio-economic factors, curriculum misalignment, and prevailing myths about Mathematics.

**5.2 Analysis and interpretation: The ways to ameliorate Learning Differences in Mathematics in secondary level.**

The ways related on overcoming learning differences in Mathematics are categorized into six different foundation of Mathematics education. These foundations helps to identify the response of teachers. For the analysis, response mean weightage for each questionnaire is calculated.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| S.N | Statements | Response | | | Mean weightage | Remarks |
| Agree | Disagree | Neutral |
| 1 | The role of Mathematics in modern technology should be acknowledge to the students. | 19 | 0 | 1 | 2.9 | Favorable |
| 2 | Motivation on Mathematics should be done in a proper way. | 19 | 0 | 1 | 2.9 | Favorable |
| 3 | Mathematics curriculum should be updated. | 18 | 0 | 2 | 2.8 | Favorable |
| 4 | There should be qualified and trained teachers | 19 | 0 | 1 | 2.9 | Favorable |
| 5 | Linguistic problems should be managed in teaching Mathematics. | 18 | 0 | 2 | 2.8 | Favorable |
| 6 | Interrelationship of pure and applied Mathematics should be clear. | 18 | 0 | 2 | 2.8 | Favorable |
| 7 | The application of mathematic in every scientific invention should be described clearly . | 17 | 1 | 2 | 2.75 | Favorable |
| 8 | Counseling and feedback should be given to the weak students. | 20 | 0 | 0 | 3 | Favorable |
| 9 | According to the needs of students, motivation, and response should be given. | 20 | 0 | 0 | 3 | Favorable |
| 10 | Curriculum should be based on interest, mental ability and age of the students. | 19 | 0 | 1 | 2.9 | Favorable |
| 11 | Mathematics is the eye of society and civilization. | 15 | 0 | 5 | 2.5 | Favorable |
| 12 | Reinforcement, award, and punishment should be used relevantly. | 16 | 2 | 2 | 2.7 | Favorable |
| 13 | The achievement gained by students should be recognized in the society. | 15 | 0 | 5 | 2.5 | Favorable |
| 14 | Teachers should identify the level of students on the basis of their knowledge. | 16 | 1 | 3 | 2.65 | Favorable |
| 15. | Interrelation among various subjects and skills should be used for designing the curriculum. | 16 | 2 | 2 | 2.7 | Favorable |
| 16. | Teacher should be able to concentrate towards the importance and future use of Mathematics. | 20 | 0 | 0 | 3 | Favorable |
| 17 | By constructing the modern mathematical laboratory, concreate concept of Mathematics should be given to the students. | 18 | 1 | 1 | 2.85 | Favorable |
| 18. | Mathematical concept should be developing by constructing and using instructional materials. | 20 | 0 | 0 | 3 | Favorable |
| 19 | The behavioral skill of daily life should be taught in simple way and the study should be cheapest. | 15 | 3 | 2 | 2.65 | Favorable |
| 20. | Use of different teaching methods according to the content and topics.. | 20 | 0 | 0 | 3 | Favorable |
| 21. | Teachers shouldn’t be oriented only for talent students and for exam, It should able to carry all students in main streams. | 20 | 0 | 0 | 3 | Favorable |
| 22. | The tactful management should be done in the class room according to social variability. | 14 | 1 | 5 | 2.55 | Favorable |
| 23. | The curriculum, content and teaching learning process must be changed with the changing society. | 19 | 0 | 1 | 2.95 | Favorable |
| 24. | Teacher should make clear that the need of Mathematics in each steps of daily life. | 20 | 0 | 0 | 3 | Favorable |
| 25. | Teacher should have ancient Mathematics knowledge and skill which is must applied in teaching learning process. | 16 | 1 | 3 | 2.65 | Favorable |
| 26. | Teacher should able to give the clear concept about that how and why Mathematics invented Mathematics? | 20 | 0 | 0 | 3 | Favorable |
| 27. | Teacher should able to give significant knowledge about the disciplinary aspect of Mathematics. | 18 | 0 | 2 | 2.8 | Favorable |
| 28. | Teacher, book writer, curriculum designers should able to give the ideas about ethno Mathematics | 15 | 1 | 4 | 2.55 | Favorable |
| 29. | ICT and modern technology should be used in teaching and learning process. | 18 | o | 2 | 2.8 | Favorable |
| 30 | The language problem in mathematic teaching should be well management. | 15 | 0 | 5 | 2.5 | Favorable |
| 31 | Suitable teaching method and examination system be used in teaching learning process. | 20 | 0 | 0 | 3 | Favorable |
| 32 | Course should be completed on time. | 16 | 2 | 2 | 2.7 | Favorable |

**Table-2:** Analysis and Interpretation

From table 2, the favorable statements were the ways to overcome to indifference toward learning Mathematics for the student from the teacher’s views. Above result gives how to decrease the indifference of student for learning Mathematics. From the two types of questionnaire, the cause of indifference toward learning mathematic was determined. The student’s views and teacher views about indifference toward learning mathematic are similar. The ways to overcome the indifference toward learning Mathematics is counseling and providing feedback to the weak students. Teachers should concentrate in mathematical concepts while teaching and teaching manual should be constructed with instructional materials, suitable teaching method with suitable contents. The teaching should not be only focused to talent students, and teachers should teach Mathematics according to the needs of the students. The teacher should focus not only how to solve problems but with proper motivation, teacher should be well trained, qualified and professional, Curriculum and content should be interesting with mental skills and age of the students, curriculum, content and teaching learning process should be based in society, Pure Mathematics is to be connected with applied Mathematics, traditional method should be minimized by using ICT and recent approach of teaching, course must be completed on time, concrete concept about Mathematics given to student by developed mathematical laboratory, mathematical knowledge connected to cultural heritage, linguistically and language problems should be managed, Mathematics should be connected with other disciplines in teaching and learning, modern technology should be used while teaching Mathematics, teacher, book writer, curriculum designers should be able to give the ideas about ethno Mathematics , Teacher should able to give the clear concept about that how and why Mathematics invented?, Teacher should be able to give significant knowledge about the disciplinary aspect of Mathematics, reinforcement, award and punishment should be used relevantly, the achievement gained by students should be rewarded in society, teaching learning process was done using contextual local with related to universal skill, teacher focused and analyzed to diversity about classroom and managed diversity of intelligent, The tactful management should be done in the class room according to the social variability.

Hence, overcoming students' indifference toward learning Mathematics requires effective counseling, concept-focused teaching, student-centered methods, integration of ICT and real-life applications, curriculum alignment with student needs, and a well-trained, professional teaching approach.

1. **CONCLUSION AND IMPLICATION**

From foundational to university level, most learners have different learning needs. Dropout rate and fail rate in Mathematics are greater. The cause of indifference toward learning Mathematics is low self-efficacy, low Mathematics achievement, maths anxiety, teacher’s qualification and teaching method, inefficient school administration, poor physical facilities, poor class room managements, culture, social discrimination and social environment, teacher behavior, lack of motivation, Mathematics curriculum, low socio-economies status of parent, wrong teaching strategy, uneducated parents, unfavorable home environment, non-practical mathematical curriculum, poor school administration, unmanaged class room, traditional teaching methods, poor socio-economic status, course incompletion, improper teaching learning materials, lack of classroom activities, lack of qualified and trained teacher ,teachers were failed to used different teaching methods under different condition, teachers being unknown about stimulus ,response and generalization of the subject, teacher are failed to give the significant knowledge about the disciplinary aspects of Mathematics, teacher focus on talent learners and less emphasis to slow learners, modern technology and ICT not used properly in teaching learning process, lack of interrelationship of pure mathematic and applied Mathematics. Focus on exam oriented teaching learning activities, lack of awareness that of Mathematics is involved in every scientific invention, based in lecture methods, lack of proper reinforcement, reward and punishment in the class room, taking Mathematics as an extra burden, inadequate knowledge on importance of Mathematics in modern technology, lack of concrete through modern Mathematics laboratory, lack of proper motivation in Mathematics and mathematical problems are not connected to daily life.

From the teacher’s view, the ways to overcome in indifference toward learning Mathematics were the foundation of Mathematics education such as Counseling and feedback to weak students in time, teacher should concentrate the students in the application of Mathematics, mathematical concept should be developed by constructing and using instructional materials, suitable teaching method were used according to contents, teaching should be oriented not only to talent students, teachers should teach according to the need of the students with proper methodology, teacher should be trained, qualified and professional, curriculum and content should be in accordance with the interest, mental ability and age of the students, Pure Mathematics connected to applied Mathematics in teaching times, traditional method should be minimized by using ICT and recent approach of teaching, course must be completed on time, concrete concept about Mathematics given to student by developed mathematical laboratory, Mathematics should be linked with culture and language, Mathematics should interrelate other disciplines and modern technologies based on curriculum should be used while teaching. The teacher should motivate the child through reinforcement, prize and the student’s achievement should be publicized in society. The teaching learning process is a skill that a teacher should excel. The tactful management should be done in the classroom according to social variability.

Hence, Students' indifference toward learning Mathematics stems from factors like low self-efficacy, ineffective teaching methods, and socio-economic challenges, while teachers emphasize overcoming these issues through counseling, student-centered approaches, ICT integration, curriculum alignment, and effective classroom management to enhance engagement and achievement. In this work we have listed the methods to minimize the indifference towards learning Mathematics. Hence, this study will be beneficial to the government, mathematician, Mathematics educator, policy maker and curriculum designer for addressing educational problems.

**Disclaimer (Artificial intelligence)**

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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