

Inventive
Peer-Reviewed, Open Access Journal
ISSN: 2773-7977 (Print)
ISSN: 2773-8183 (Online)
Volume 3, January, 2021, PP: 7-16

Analysis of Factors Affecting the Achievement of Basic Level Science Learning

Gem Prasad Gurung (Ph.D)

Teacher at Sanothimi Campus, Bhaktapur, Nepal

Lila Pantha

Teacher, Nirmal Secondary School, Damauli, Nepal

Abstract

In this study, it was aimed to analyze the factors affecting students' science achievement at the basic level. The qualitative research method was used to fulfil the adopted study objectives. The sample consisted of 12 informants from 3 basic schools of Damauli, Tanahun. The data were obtained by using the interview protocol and an observation checklist. Data analysis and interpretation were done systematically as well as thematic design. The result of the study shows that the affecting factors that are inside the school and outside the school environment which are responsible for this issue. Government policy and local educational governance must be improved their perspective to solve this problem.

Keywords: School factors, social factors, home environment, school environment, teacher competency,

Received 18 November 2020,

Reviewed 24 December 2020,

Published 21 January 2021

Introduction

Education is the process of educating or instructing someone to obtain practical knowledge, skill and attitudes. Education helps to develop the capabilities that an individual holds to prepare to act according to the environment around them (Poudel, 2017). Education will be prioritized with strategic importance for further development to build up a cohesive relationship among education, economy, and society. Education should adopt future needs. Education is necessary for modern living, which has revolutionized our lifestyle and brought about tremendous changes in our way of thinking, attitude, and outlook. Education plays an important role for school children in developing their knowledge, thinking, attitude, habits, etc. It helps school children to be familiar

with our environment and natural phenomenon as well as to survive in this modern world (Sharma, 2003).

At present, explosion of knowledge is being achieved through the development of science and technology. Instructional technology has come out with bubbling ideas. Pupils have varied personalities which need different styles of learning. The teacher should use such strategies of teaching which would match the instructional objectives of learning styles. There are many powerful models of teaching designed to bring about particular kinds of learning and to help students become more effective learners (Basapur, 2018).

According to Sharma (2003) the modern world is scientifically civilized, science has become integral part of our life. Its effect can be observed in transportation, industrialization, agriculture, environment, information, technology, food technology, bio technology etc. thus chief aim of science education is to enable school children to develop attitude of mind to think objectively and familiar with our environment. Science education at School is much important in shaping positive thinking, attitude, developed open mindedness, creative thinking intellectual, honesty, curiosity, unbiased and impartial judgment among students because of these values of science it finds and important place in school science curriculum.

The school science curriculum includes four sectors i.e.; physics, chemistry, biology, astronomy and geology. At the basic level, science as a subject carries a total of 100 marks, out of which 75 marks are allocated for theory and 25 marks for practical. In theory, 30 marks allocated to physics, 15 marks to chemistry, 22.5 marks to biology, and 7.5 marks to astronomy and geology (CDC, 2071 B.S).

Many factors affect a student's achievement in School Science. Students' performance varies at any time. Educators, trainers, and researchers have long been interested in exploring variables contributing effectively to the quality of performance of learners. These variables are inside and outside the school and are likely to affect a student's quality of academic achievement. These factors are termed as student's factors, family factors, school factors, and peer factors (Bastola, 2000). The school-related factors have also been contributing factors towards student's achievement, which could be the school administration, teachers, school environment and so on. Likewise, parents, family, economy, culture, peers etc. are out of school factors because they influence students' learning daily lifestyle and even their self-perception (ibid).

The result of SLC is affected by various factors such as instructional materials, classroom management, initiative program and the number of students in the classroom. Also, the use of the traditional ways of teaching in the schools and the less professional encouragement of science teachers (CERID, 1981) affect their teaching. Likewise, Mishra (2017) also observed that students' learning is affected by various factors like home environment, social environment, peer group, school environment, physical facilities, students' attitude towards learning, pedagogy, and teaching materials. It is viewed that without appropriate management of the above-mentioned factors and facilities, it is impossible to achieve the expected goals of education.

Shrestha (2011) found that students taught in small size classes can get more achievement than the large class size. It so because the numbers of students are the standard of the class, they will get a sound environment for their learning while if the class has large numbers of students, they cannot get a proper environment for the study.

Khadka (2012) also found that student achievement in science at the secondary level is poor in Dang district. The mean score of secondary students is less than fifty percent and there is a difference between the private and public school student's performance in science, comparatively. The private school students performed significantly better than the public school student. Li and Qiu (2018) also mentioned that family background/family environment is the most important factor in students' academic achievement. According to them, many researchers found that the family's social-economic status many effects children's academic achievements. Because the family from better earning and high economic status invest on the facilities for their children and also provides caring and extra classes facilities. But just contrary, students from the poor earning, they could not invest a lot. The students also required to support a proper family environment for their education. All the above-given subjects of the literature are well covered in this dissertation. Coleman and Hoffer (Marsden, 2005) developed the general model of student's achievement. This model explains that the school sector may affect a student's achievement. Mainly, six major factors are mentioned in the model, they are; student's background, other student's background, student's behaviour, other student's behaviour, school types and school polices. So, it seems that they emphasize school policies, such as; the amount of homework, curriculum and disciplinary practices, indirectly affect a student's achievement by influencing that student's behaviour.

In the study of Juan and Visser (2017) the achievement of students in science is significantly influenced by school-related factors like teaching competence, library facility, etc. and out of school-related factors like educational attainment of parents, family background and environment etc. It has been depicted in various researches that student achievement in Science in Nepal is relatively low and unsatisfactory. There is a deeper relation between achievement and learning variables. Most of the students feel it as a difficult subject and some of the students get a low grade in science in Basic Level Examination (BLE). By this problem, a great deal of time, money effort and manpower of the nation have been wasted. And it seems that it is affected by various factors. We cannot achieve the expected goal without improving appropriately the management of these factors to facilitate the students learning. To minimize such problems, the Government of Nepal collaborating with various NGOs and INGOs has practised so many educations developing programs, but the result is still beyond the expectations. Therefore, the researchers endeavour to investigate the factor that affecting science learning at the basic level based on finding the answers to the questions:

- What is the status of students' achievement on science learning?
- What are the factors that influence on students' science achievement?

Objectives of the study

To solve the above questions following objectives are adopted.

- i) To identify the factors affecting on achievement of science learning in basic level
- ii) To analyze the factors that effect on basic science learning

Methodology

According to the nature of the research objectives, the qualitative research design is adopted in this study (Creswell, 2012). Qualitative research takes an interpretative, naturalist approach to its subject matter and study field. Regarding this, qualitative researchers study things in their natural setting, attempting to make phenomena in terms of meaning that people bring to them (Flick, 2010). Hence the chapter explains the plan and method of study which helped to achieve the objectives of the study.

The population of this study covers the basic level students and their parents, headteachers and science teachers of Tanahun district. As per the convenience sampling method three public schools selected for this study because the informants of those schools can meet the expected objectives (Patton cited in Creswell, 2012).

This study used the experience of 3 headteachers, 3 teachers, 3 parents, and 3 students of three different public secondary schools (Shree Nirmal secondary school, Shree Jaldevi secondary school, and Shree Janajagriti Ganga secondary school) that made a total of 12 respondents. This number of the respondent was enough because in the qualitative research even a single respondent is enough for a researcher to generate findings (Patton, 2002). Also, the informants sampling in this study was a purposeful sampling technique.

Findings and Discussion

Achievement of science in basic level

As the field was visited the researchers interviewed the stakeholders for the status of science achievement at the basic level. The participants of all the schools viewed the low achievement of science at the basic level. Researchers found that the science achievement of 2075 B.S and 2074 B.S was low.

As per institutional stakeholders (informants) interview, the affecting factors on science achievements were managed as the following themes. They are adopted in school-related factors and schools factors:

School related factors

a) Class size

The effect of class size on students' achievement in student achievement is seen in the large scale survey data (Asaduliah, 2005). But in the Nepalese context, it is hard to apply for the standard

student number in the classroom. The head teacher of the respective schools informed that it is the limitation of classroom and furniture. They added that the local authority also required to support the logistic facility of the schools for institutional growth. Similarly, the team of respective science teachers also has to give much more focus to the student of these classes. Despite all those concerns, they have been dealing to create a sound and harmonious environment in the classes of grade 8 because there are almost all teachers are talented and qualified and experienced in their respective job.

Likewise, most of the teachers had a common consensus that there are limited resources in the science laboratory. Due to the large class sizes, all the students could not get proper access to limited resources. Similarly, students could not get a proper environment for science practical. Furthermore, in the current days, the flow of students on those schools are getting higher and a limited number of teachers could not have proper caring and attention as expected. In addition to that, it's challenging to handle the students because talented students always communicate with a teacher but just contrary poor students remain in shadow. The teachers can't give proper attention to all students equally at the same time. However, all of those challenges they are trying hard to teaching and treating all those students with proper care. But it's hard to maintain on the daily classes.

During the observation also found that in some schools, the class size was too big. The classroom was noisy. Shrestha (2011) also found that class size plays a vital role in the achievement of science at the secondary level. Students taught in small class size can get more score than the student taught in large class size.

b) Teaching methodology

A teaching method comprises the principles and methods used for instruction. Ahmad (2011) said a crucial part to the students for the development of better understanding. Students centred methodology like collaborative, laboratory methods etc. are appropriate to science learning (Ahmad, 2011). Therefore, it has to use as need in the science learning classroom. Teaching Methodology is the central part of science teaching. It is playing a very important role to understand the context of the text. In the past days, there was a traditional model of the lecture teaching method. Time has been changing and the global society has a unique and advance form of teaching. Traditionally, it was lecture-based and one-way delivery systems in the teaching but currently, it's changing day by day.

Regarding the teaching methodology, a headteacher viewed that; The teachers are given various training related to teaching methods to the respective teachers for their skill development. Similarly, the school has been launching related guideline for its betterment. But achievement (result) is not getting as we have expected.

c) Text book

A textbook is a manual of instruction in any branch of study. The textbook has been a crucial role in learning any subject. The textbook is important because it is a reservoir of knowledge. It sharpens the minds of students. It helps to supply the reflection of society, nation and university. Regarding the above view Buhnke (2018) advised that textbooks affect learning and teaching in many different ways. Apart from this, textbook should be clear language, clear figures, physically and academically appropriate. Science teachers reported that the syllabus is outdated. It should be reformulated. New topics as well as essential chapters should be incorporated and added to the course. Some of the chapters should be vertically and horizontally well arranged.

Teachers informed that currently, the school has been following the textbook published by “Sangam Publication” where exercises are very lengthy. Somewhere answers are mistaken, and the binding of the book is not good. The volume of the course seems to be unpractical. Along with this, it is difficult to complete the course within the regular school days. Likewise, students opined that they cannot do the exercises properly. These are the various opinions of stakeholders regarding the effectiveness of the textbook in the achievement of students.

d) Teacher competency

Competence is understood as an excellent capability. It includes knowledge, skills, attitudes, and experiences which has to be the target category of the profession of an educator. Competency is to complete with knowledge about the course and it supplies the scientific knowledge among the students (Walberly, 1981). The headteachers expressed that there are well qualified, talented and experienced teachers in their schools. Therefore, they can teach their students very effectively. Similarly, science teachers themselves were claiming that they are confident enough for the teaching. Among those survey implemented three schools, there were almost all teachers are highly graduated. Many teachers are BEd, MEd, and MSc graduated. Also, they had taken various training by the government. Likewise, parents have their judgment upon the teacher's competency. They should be responsible for the career and future of the students. Similar to the parent's opinion, students have also similar types of understanding. They said that teacher competency is primarily essential to conduct their science class effectively. Regarding informants view Sultan and Shafi (2014) state that “competencies are particular and self-evident qualities or properties inexorable for instructing experts to make a persuading and student favorable climate” (p. 10). While judging those voices, I found that teachers are qualified, talented, and highly experienced and fully competent.

e) Institutional policies

School's policies play a vital role in the learning process. A critical study of all aspects such as; administration relations, student's performance, staff's relations etc. and development of operational policies can reduce all the problems that can prevail at school. In this regard, Woersmann (2016) observed that institutional policies are indeed important to maintain quality

education. An institution can manage scholarship, tiffin program, management of human resources, teachers training, fundraising for school for the construction of infrastructure. Head teachers of the three schools stated that they were starting semi-hostel facilities at minimum cost for the students aiming to 100 per cent result with the help of teachers. Due to financial limitations, some parent can't send their children for extra class. Some of the parents were unknown about the school policy.

Especially, the school provided extra classes to support the better learning of the students. The school management committee seems to be passive in their responsibility. Also, few of the teachers trying to avoid the rules and regulation of the schools. Because they are politically influencing.

Socio-cultural/ home environmental factor

a) Home environment

The home environment helps to develop better study habit. A cordial environment, i.e., a healthy relationship between the parents and the child is necessary for the all-round development of the child. Regarding this view Biedinger (2011) observed that parents' attitudes and home environments influenced the child learning achievement. If parents are educated, the probability rises that their children will also be educated. Educated parents provide educational resources and initiate their children to study and improve their study habit. The parents' ability to plan, organize, and manage time will benefit the child in every area of life. A good home environment influences good study habit in the child.

Regarding the issues of a home environment, head teachers reported that the family members could not give proper counselling and guidance for them. The time of the family members is spending on farming and regular livelihood. There is a poor home environment in their home for the study. Likewise, science teachers opined that the home environment is a crucial part of their learning. It helps to boost up their learning. Likewise, parents also have similar types of expression. Parents complained that they have limited time to pay for their children's education due to their working for livelihood such as agriculture, business etc.

Economic status of the family also influences students' learning because families cannot afford for their children's school expenses as required. The field visit found that the home environment for the study has an essential part of learning. Some students were worried about their home environment due to poor financial status. And few were worried due to the lack of understanding from their family members.

b) Interest of the Learner

Students' interest also works well at instructional planning based on readiness and learning profiles. Mulyani, Mahdum and Delfi (n.d) mentioned that students' interest and their achievement

in education is highly correlated. Without clients' interest, the main achievement will be nothing. Likewise, parents said that after getting back from the schools, their children go to play till the late evening. Some of the girls have a keen interest to watch serials on TV. They hardly complete the home works. But during the time of their examination, they become dedicated to their study. It is found from the interview that the interest of the learner is an essential part of learning. Gifted students are focused on their learning, but poor ones neglect study. After observation, we found that most of the students spend their time playing games, using the social network, and watching TV serial.

Socio-Cultural Factors: Socio-culture factors consists of combining social and cultural factors which means common traditions, habits, patterns and beliefs present in a population group. Odanga (2018) said that sociocultural factors are very important for the academic achievement of students. When the sociocultural environment is good or supportive of educational promotion, learning is effective, but when students were engaged in neighbourhood violence and peer rejection their academic performance decline.

The Head Masters of the selected schools said that during the period of festival students of the Mangolian community goes to perform various cultural dance and drama in their community. Because of this too, They got irregularity in the class study. But most of the students from the Aryan communities have been involving in the study. Even though, they got a celebration of their festival according to their cultural value but easy to get punctuality on them. Similarly, science teachers are quite positive to the students because students are found doing homework given earlier. The train of early marriage is still in their community. Also, there are few records of girl and boyfriend falling in love affection within their teenage.

Conclusion

The study was intended to provide the factors that influence the achievement of science students like class size, textbook, teaching methodology, teacher competency, school policy for learning science under school-related factors and home environment, socio-cultural factors and interest of learners under out of school-related factors. As the nature of the study area, it has adopted a qualitative research methodology. Population and study fields we selected as purposive sampling. Collected data were analyzed by coding and decoding systematically and they were interpreted systematically.

The study concluded that the unit test and class test is done according to the teacher's interest. Parents were hardly sustaining their livelihood by agriculture. Due to the low income, they have unable to invest in their children's extra class. All the teachers are qualified but some teachers do not follow the required teaching methods. The teacher, students, parents must join hands together to uplift the educational system. Then must be developed new policies for the improvement of the teaching-learning process.

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