AD EDUXIAN JOURNAL
(A Quarterly Multidisciplinary Blind Peer Reviewed & Refereed International Journal)
www.educarepublication.com
ISSN: 3048-7951
Volume-1, Issue-2, August-October 2024

"Practices and Challenges of Science Teachers for Activity-based Teaching and Learning in Nepal"

Mina Shrestha[1],

Ph.D. Scholar, Graduate School Of Education, Tribhuvan University, Nepal.

Kamal Prasad[2]

Acharya, Faculty of Education, Tribhuvan University, Nepal.

Abstract

This article explores the practices and challenges of science teachers for activity-based teaching and learning in public schools in Nepal. It also examines science teachers' practices and challenges in action-oriented science teaching and learning. A qualitative research design is used in this study. For this, I purposefully selected three teachers teaching science at high school for more than fifteen years. Data are collected using in-depth interviews with audio recordings. Narrative analysis was also done in this study. The finding shows very little practice of activity-based science teaching and learning in public schools in Nepal. Also, it is found that there is a shortage of training for action-oriented teaching and learning. It is believed that activity-based teaching and learning are essential to transform traditional methods into innovative ideas. Among other things, this research contributes to improving education by overcoming challenges faced by science teachers in their classrooms. Based on the findings of this study, it is recommendedthat science teachers change mindsets by including hands-on activities to develop scientific outlooks and behavioral changes. This study paves the way for further research on how activity-based teaching can be used to contextualize science teaching by addressing the challenges faced by teachers.

Keywords: Activity-based teaching, science teacher, action-oriented learning

Introduction

In my 20 years of teaching experience, I discovered that student learning becomes sustainable when they are actively engaged and carry out activities independently, think critically, and work in collaboration. Science teaching requires action-oriented learning (Lindemann, 2002). Hayat et al., (2017) described that activity-based learning is essential to find the relationship between active learning and student engagement. Every science teacher dreams of developing

his/her students' creativity through teaching, but many are unable to actualize their dreams because they employ informational teaching methods (Sayidova & Mirzayeva, (2020). Although many teachers practice action-oriented education, they still face many challenges. Activity-based instruction 'liberates' students from 'lecture' to 'practice' (Acharya, 2019). Acharya's participatory action research focused primarily on elementary school chemistry-related school gardening programs. In my experience, fieldwork introduces students directly to nature and helps them explore the natural world. But without personal involvement in activities permanent knowledge cannot be constructed.

During my twenty years of teaching experience and 10 years as a teacher trainer, I have found that teaching science should be done in innovative ways rather than traditional ways using conventional teaching methods. Traditional teaching and learning methods are still dominant in our country. Traditional pedagogical approaches to teaching and learning are both formal and archaic, involving a directed one-way flow of information from teacher to students by way of markers and whiteboards (Shneiderman et al., 1998). Science is also taught in closed classrooms in our country, which still adheres to traditional teaching methods.

Al-Qahtani, (2016) explains that teachers are facilitators, delegates, and personal role models. Teachers must adapt to changing classrooms and student needs to ensure that students enjoy and participate in their courses. This activity-basedteaching method differs from traditional teaching methods by the active role and participation of students in the classroom and cooperation among students in the learning environment. In an activity-based classroom, students are active rather than passive learners(Prince, 2004). Activity-based learning is a successful teaching model in science (Ali & Muhammad, 2018). When students are involved in activities, they can contextualize the content in their daily activities and make their learning sustainable.

National Curriculum Framework 2076 has also given more preference for activity-based teaching and learning by including project work, different activities, and practical work in pedagogy and assessment in the curriculum of school-level science. It is implemented in grade 6 from 2078. Science teachers use empirical practices to simulate everyday work experiences.

In my current research, I was interested in exploring the types of activities performed in science classes in community schools. I focused my study on activity-based teaching in science in line with the constructivist view of learning, which states that the purpose of education is not to convey information, but to promote the formation and development of knowledge (Barak, 2017).

Purpose of the Study

While reviewing different articles I found that much research has been done on the practices and challenges of activity-based learning, but few have been done on the practices and challenges of science teachers in activity-based teaching. hardly found any commendable studies focusing primarily on teachers' practices and challenges in activity-based teaching in science in the Nepalese context. Therefore, I had chosen to explore the challenges faced by them while practicing activity-based teaching.

The results of this study would be helpful to the concerned authorities to evaluate the effectiveness of the implementation of science and technology curricula and to design a curriculum for teacher training focusing on activity-based teaching.

The central research objectives that guided my study were;

1. To explore the practice of science teachers in activity-based teaching.
2. To discover the challenges faced by teachers while implementing action-based teaching in the classroom.

Methodology

This study was based on a qualitative research design using an interpretive paradigm. Interpretive paradigm in research is a way of understanding scientific knowledge and reality(Tuli, 2010). It is a research model that gives a deep understanding of reality and its causes, rather than sticking to general and causal explanations (Eggins & Slade, 2004). In this study, I seek to explore the subject in depth to fully understand it.

This research relied on in-depth interviews to gather the narrative experiences of three teachers. I purposefully selected three teachers from ten teachers based on three criteria: (a)

the teachers teaching science for more than fifteen years; (b) Experienced problems in the classroom related to activity-based science teaching; and (c) Faced challenges in performing activities while teaching science in different ways. I kept these criteria to make my study more specific and scientific. Among the three participants, two were from the community school of Kathmandu metropolitan city and the third was from Hetuada municipality. I chose them because they were very close to me and they would not hesitate to reveal their experience and practice of activity-based teaching. Out of three participants, two were male and one was female which helped me to find out the challenges based on gender as well

Semi-structured interviews were conducted and recorded on mobile for twenty to thirty minutes each. Narrative records experience stories of an individual or small group, through interviews, revealing the person's living experience or specific perspective (Clandinin & Connelly, 2004). My study concentrated on obtaining real stories of participants in activity-based science teaching (hands-on activity, project work, practical work, gaming, field visits, and many other activities) and also on the challenges faced by them.

In the first phase, I spoke informally with 10 science teachers about the learning process of science education during in-service teacher training. When I had a casual conversation with them, I picked three on purpose. I created some interview guidelines with some open-ended questions. With the help of this guideline, I conducted interviews through various media such as phone, messenger, and Zoom until I reached the saturation point. At first, they were reluctant to open up, but slowly they opened up and I encountered them during their conversation about the practice of action-oriented teaching. I especially focused on narrative analysis to interpret the experiences of participants in the form of a story. I transcribed and translated all interviews with a diary noticing even their emotions. After this, I sent **a** written version to them for members' check. I made corrections based on their comments**.**

Findings

From the participant's conversation, it was clear to me that they enjoy teaching science although it is very challenging as they have to be dedicated and have to adopt innovative ideas for teaching science leaving long-practiced traditional methods of teaching. The findings of my study are described in the following themes:

Motivation towards Activity-based Teaching

All the participants were well experienced in teaching science. They expressed that it is a very difficult task to make students understand science as the understanding level of students is very low. One of the male teachers expressed his anger and frustration:

> *Science teacher has to be engaged for more time. Every teacher has the same salary scale, and the same respect why should only science teachers give more time to be always busy, to be blamed for not achieving good scores even though working for more hours than others, it makes me frustrated.*

Science teacher has to be engaged with students every time in different activities, it is very difficult to manage time. Even they cannot take rest in their leisure period like other teachers. But there is no reward for their work as evaluation is done through marks obtained by students.

The hegemony of the lecture method

While talking about methods used in the classroom, all teachers responded that to obtain good marks students preferred rote learning rather than activity-based learning. So, they prefer traditional lecturing to innovative activity-based teaching. One of the participants shared:

> *Students do not understand even simple concepts but everyone needs more marks. Even management, guardians, and students focus on marks. So, we need to follow "Any how marks lyau" what type of method you follow or how you teach does not matter.*

Generally, lecture method and discussion methods are dominant, the demonstration is also used frequently and the practical method is rarely used in science teaching. Afterthe pandemic, power point presentations and audio-visual presentations are also used.

Perception of Teachers on Curriculum

AD EDUXIAN JOURNAL
(A Quarterly Multidisciplinary Blind Peer Reviewed & Refereed International Journal)
www.educarepublication.com
ISSN: 3048-7951
Volume-1, Issue-2, August-October 2024

When I asked about curriculum, one participant hadgood knowledge about curriculum while the other two had only surface knowledge. One of the participants revealed his perception and resentment:

> *The new curriculum is fully activity which is suitable for the present context but it is very vast so, it is difficult to complete the course. Teachers are not orientedon implementation of the curriculum or training on new pedagogy is not given which is mentioned in the new curriculum. The government frames the curriculum at the center, and even teachers like me who are in the capital city are not given orientation. I wondered how would teachers manage in distant areas.*

His resentment is genuine as the government has the responsibility to orient teachers before implementing the curriculum and monitoring after implementation.

Activities in the Classroom

When teachers shared their practices of activities and problems faced by them. They accepted that they involve the students in different activities like; project work, practical work, hands on activities, and model construction but not frequently. One of the participants shared:

> *My students are interested in activities but it is very difficult to manage time for activities. I often involved them in practical work, project work, herbarium collection, science speech competitions, and storytelling. Students enjoy the activities but parents think teaching book content is only teaching,conducting activitiesis not science teaching.*

Two of the participants said that their head teachers are science teachers so they provide all the required materials for activities but another participant said that his head teacher is froma non-science background and does not want to spend money on science materials. That participant expressed his experience;

> *Management is not positive toward providing science equipment and materials. Students and parents are focused on marks. So, I very rarely involved the students in activities.*

When I asked about field visits, they took only once a year.

From this study, I found that schools headed by science teachers have well-developed laboratories within the school, while other schools' laboratories are underdeveloped. Actual laboratory work performance is very low. Laboratories do not have enough materials to do real experiments. The most common activities performed in community schools are drawing, preparing models with story form and clay, pasting sheets, sketching and recognizing completed models and writing reports. Games are very rare in science classes in community schools.

Challenges in Activity-based Teaching

All the participants found it difficult to convince parents and administrators of action-oriented teaching as they believed that it is a waste of time to involve students in activities. For the parents, even today teaching textbook content is a priority but not learning through the activities. Therefore, uneducated parents and non-science background administrators do not encourage activity-based instruction at all.

All the participants complained about the unwillingness of school management to provide sufficient materials required for science activities even when head teachers themselves requested them. It is difficult to carry out activities without sufficient supplies. For urban areas, gathering locally available materials is also a challenge. Managing large numbers of students in a classroom for activities and reducing student absenteeism are different aspects.

From repeated talks with participants, I found that they were finding it very difficult to manage time to prepare materials for activities, and guide students in the preparation of models and perform project work. Scientific activities are time-consuming and it is very difficult to manage in a single classroom period. One of the participants shared his experience:

> *Sometimes while performing activities in the classroom it takes long time. I have to ask for time to other colleagues for their class. Sometimes they agree but sometimes do not. They are also not wrong as they also have responsibility to finish course.*

From this study I found that there is a challenge of completing the course too.Every participant experienced that preparing students to score high and performing activities continuously in classroom is extremely difficult. Parents, students and administration only focus on scoring marks that is very challenging to meet their expectation.

All the participants are not satisfied with teacher professional development training(TPD). They said that 30 days training are offered in two phases which are only theoretical, it is only a formality of completing TPD. One of the participants complained

> *I have never taken any activity-based training in my sixteen years of teaching profession although I am a teacher of one of the renowned schools of Kathmandu. How can I update myself in the changing trend of pedagogy without any such transformative training? Government provide TPD even when the trainer is not updated in activity-based pedagogy.*

This study shows that teachers are not satisfied with TPD training as this is not effective to incorporate the innovative pedagogy in teaching science.

Discussion

This study demonstrate that still there is domination of lecture method. According to Shattock, (2016),even though many forms of guidance are available lecture method continues and dominate undergraduate science teaching. My experiencee shows that only lecture method is not appropriate to give scientific concept, there should be hands on activity. Zulirfan et al.(2018) explained, hands on activity develops the scientific attitude in students. Science demands activity-based teaching but this study shows that there is less practice of activities in classroom. Action oriented teaching and learning build the foundation of students to understand nature, connect science with daily life(Wyner & Blatt, 2019), find the relation of science with kitchen(OBI & Amba, 2014) and engage students in creative activities (Hofstein & Mamlok-Naaman, 2007). Activity based teaching is guided by constructivism as it constructs knowledge by performing activities themselves. According to Bada & Olusegun (2015) in constructivist classroom, teachers are no longer to focus their knowledge on passive students waiting to fill the empty container. The constructivist model encourages students to

actively contribute to themselves in the learning process. Teachers act as facilitators (Jagtap, 2016) who facilitate, mediate, inspire, and support students to deepen their understanding and thereby evaluate their learning.

The finding of my study shows that to some extent teachers are trying to practice activity-based teaching by including hands-on activities, involving students in practical work, model construction, and project work that enables constructing knowledge in students by experimenting (Stofflett, 1994) but they are facing challenges in the management of materials and time. All the above-mentioned activities are activity-based teaching pedagogy designed to enhance scientific attitudes in students(Suryawati & Osman, 2017). My experience as a science teacher enriched me that without inculcating such activities, science teaching-learning is incomplete like a curry without salt. Teachers and students are enjoying activity-based learning. Insufficiency of materials and apathy of the administration to motivate teachers to spend extra time in teaching is a very common problem of community schools in Nepal. We can make students participate in designing activities and encourage the use of low-cost and no-cost materials that are locally available.

My study revealed that teachers frequently involve students in project-based learning which is very impressive but they are complaining about the difficulty of time management as they have to provide extra time to guide their students in project and model construction. Bell, (2010) claimed Project-Based Learning (PBL) is an innovative learning approach that teaches a range of strategies essential for 21st century success**.** According to Kokotsaki et al. (2016), project-based learning (PBL) is an active, student-centric form of instruction that features student autonomy, constructive research, goal-setting, collaboration, communication, and reflection in real-world practice. With my experience of teaching science, I too attest to the bitter experience of participants but I feel if teachers work smartly such challenges could be overcome. Training smart students in advance and making them guide the weaker students by forming groups in the classroom is a good practice for managing time.

During the interview, teachers agreed that field visits of students are very rare, just once a year. Field visit is associated with the learning theory of behaviorism. According to the learning theory of behaviorism(Clark, 2018), students behave based on their interaction with

their environment. So, as much as students interact with nature, they construct their learning permanently. My experience taught me that when a student directly observes nature, he constructs his perception about nature which is permanent and different from classroom teaching. It is very essential to include frequent field trips in annual calendar of school and follow it strictly to enhance the interaction of students with nature. According to Nadelson & Jordan, (2012) students had a positive attitude towards the field trips and most often recalled the hands-on orienteering activities.

This study shows that learning is compared with scoring in examinations. Learning cannot be compared with scoring. Science learning must focus on developing a scientific attitude(Olasehinde & Olatoye, 2014) and positive attitude(Mohanty, 2009). Teachers are not able to change the traditional mindset of guardians and the management to apply activity-based teaching in the classroom. According to John Dewey school is a miniature society. Short (1992) describes a classroom as the collaboration of diverse groups where every student has diverse learning abilities. Each and every person has his/her own mindset, and it is very difficult to change it but a teacher has to understand the ability and interests of students and design the activities according to student's interests so that science teaching-leaning will be more contextual. Koul & Dana (1997) described a contextualized school curriculum that offered a more productive approach to learning and exploring scientific concepts, processes, and scientific and technological issues.

The science curriculum covers theoretical and practical courses but this study shows that practical classes are very less due to the unavailability of materials and difficulty in managing time to complete the course content. In the national curriculum framework 2076, there is an internal evaluation of 50% at the basic level and 25% at the secondary level which is fully based on activities performed in the classroom. It is very necessary to engage the students in activities to achieve the goal of the national curriculum.

Teachers are not trained in activity-based teaching pedagogy. Patil et al.(2016) described activity-based teaching-learning as an effort to overcome the limitations of traditional methods of delivering courses. My experience shows that if teachers are trained in activity-based teaching, they can design contextual activities and collaborate with the theoretical and

practical class through activities in the classroom which enhance persistent learning in the minimum time frame that helps to finish the course in time and make the students score high. Lack of sufficient training in activity-based teaching for teachers makes it very difficult to implement some of the activities included in the new curriculum.

Conclusion

Activity-based teaching is the best way of teaching science. Due to the vast course load and lack of training and inadequate training for teachers in activity-based teaching, it is very hard to practice and overcome the challenges of changing the traditional mindset of guardians and management, scoring high in examinations, demanding activity-based pedagogy of teaching from teachers without providing sufficient materials in the context of community schools of Nepal. The government should train science teachers in activity-based teaching from time to time. Management should provide sufficient materials in the science lab and the ratio of teachers and students should be balanced. This study reveals the practices and challenges of science teachers in activity-based teaching in schools. It additionally paves the manner for similar studies on how activity-primarily based totally coaching may be used to contextualize technology schooling via way of means of overcoming demanding situations confronted via way of means of teachers.

References

1. Bada, S. O., & Olusegun, S. (2015). Constructivism learning theory: A paradigm for teaching and learning. *Journal of Research & Method in Education, 5*(6), 66-70.
2. Barak, M. (2017). Science teacher education in the twenty-first century: A pedagogical framework for technology-integrated social constructivism. *Research in Science Education, 47*(2), 283-303. https://doi.org/10.1007/s11165-015-9501-y
3. Bell, S. (2010). Project-based learning for the 21st century: Skills for the future. *The clearing house, 83*(2), 39-43.https://doi.org/10.1080/00098650903505415

4. Clandinin, D. J., & Connelly, F. M. (2004). *Narrative inquiry: Experience and story in qualitative research*. John Wiley & Sons.
5. Eggins, S., & Slade, D. (2004). *Analysing casual conversation*. Equinox Publishing Ltd.
6. Hayat, M., Hasan, R., Ali, S. I., & Kaleem, M. (2017). Active learning and student engagement using Activity Based Learning. 2017 International Conference on Infocom Technologies and Unmanned Systems (Trends and Future Directions)(ICTUS), https://doi.org/10.1109/ICTUS.2017.8286005
7. Hofstein, A., & Mamlok-Naaman, R. (2007). The laboratory in science education: the state of the art. *Chemistry education research and practice, 8*(2), 105-107. https://doi.org/10.1039/B7RP90003A
8. Kokotsaki, D., Menzies, V., & Wiggins, A. (2016). Project-based learning: A review of the literature. *Improving schools, 19*(3), 267-277.https://doi.org/10.1177/1365480216659733
9. Koul, R., & Dana, T. M. (1997). Contextualized science for teaching science and technology. Interchange, 28(2), 121-144. https://doi.org/10.1023/A:1007348821292
10. Lindemann, H.-J. (2002). The principle of action-oriented learning. GIZ (Hrsg.), Linking German TVET with Anglo-Saxon CBET, International Workshop. Weimar ua: GTZ,
11. Mohanty, M. S. (2009). Effects of positive attitude on happiness and wage: Evidence from the US data. *Journal of Economic Psychology, 30*(6), 884-897. https://doi.org/10.1016/j.joep.2009.08.010

12. Nadelson, L. S., & Jordan, J. R. (2012). Student attitudes toward and recall of outside day: An environmental science field trip. *The Journal of Educational Research, 105*(3), 220-231. https://doi.org/10.1080/00220671.2011.576715

13. OBI, N. C., & Amba, N. H. (2014). Correlation between Students Academic Performance and Entrepreneurial Ability When Taught Saponification Reaction Using Kitchen Resources. *Journal of Asian Scientific Research, 4*(7), 408-412.

14. Olasehinde, K. J., & Olatoye, R. A. (2014). Scientific attitude, attitude to science and science achievement of senior secondary school students in Katsina State, Nigeria. *Journal of Educational and Social Research, 4*(1), 445-445. https://doi.org/10.5901/jesr.2014.v4n1p445

15. Patil, U., Budihal, S. V., Siddamal, S. V., & Mudenagudi, U. K. (2016). Activity based teaching learning: An experience. *Journal of Engineering Education Transformations, 10*. https://doi.org/10.16920/jeet/2016/v0i0/85433

16. Sayidova, S. N., & Mirzayeva, M. R. (2020). Types of pedagogicaltechnologies and their development methods in pedagogy.*Theoretical & Applied Science*(4), 976-980. https://doi.org/10.15863/TAS.2020.04.84.179

17. Shattock, M. (2016). The 'world class' university and international ranking systems: what are the policy implications for governments and institutions? *Policy Reviews in Higher Education, 1*(1), 4-21. https://doi.org/10.1080/23322969.2016.1236669

18. Short, K. G. (1992). Researching intertextuality within collaborative classroom learning environments. *Linguistics and Education, 4*(3-4), 313-333.https://doi.org/10.1016/0898-5898(92)90006-I

19. Stofflett, R. T. (1994). The accommodation of science pedagogical knowledge: The application of conceptual change constructs to teacher education. *Journal of Research in Science Teaching, 31*(8), 787-810. https://doi.org/10.1002/tea.3660310804

20. Suryawati, E., & Osman, K. (2017). Contextual learning: Innovative approach towards the development of students' scientific attitude and natural science performance. *Eurasia Journal of mathematics, science and technology education, 14*(1), 61-76. https://doi.org/10.12973/ejmste/79329

21. Tuli, F. (2010). The basis of distinction between qualitative and quantitative research in social science: Reflection on ontological, epistemological and methodological perspectives. *Ethiopian Journal of Education and Sciences, 6*(1). https://doi.org/10.4314/ejesc.v6i1.65384

22. Vianna, E., & STETSENkO, A. (2006). Embracing history through transforming it: Contrasting Piagetian versus Vygotskian (activity) theories of learning and development to expand constructivism within a dialectical view of history. *Theory & psychology, 16*(1), 81-108. https://doi.org/10.1177/0959354306060108

23. Wyner, Y., & Blatt, E. (2019). Connecting ecology to daily life: how students and teachers relate food webs to the food they eat. *Journal of Biological Education, 53*(2), 128-149. https://doi.org/10.1080/00219266.2018.1447005

24. Zulirfan, I., Osman, K., & Salehudin, S. N. M. (2018). Take-home-experiment: Enhancing students' scientific attitude. *Journal of Baltic Science Education, 17*(5), 828. https://doi.org/10.33225/jbse/18.17.828