

Pedagogical Accountability of Teachers in Community Schools of Nepal: Lessons from a Case Study

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ABSTRACT

The teacher's instructional guideline provided by the National Curriculum Framework of Nepal for pedagogical accountability is insufficient to enhance the student's classroom performance. The main objective of this study is to assess science teachers' efficiency in enhancing students' learning with a focus on the basic pedagogical accountability in community schools of Tikapur Municipality. A qualitative study among two groups of stakeholders:, science teachers and principals of three different institutions, was conducted by including a three-phase conceptual model: the pre-active phase, the inter-active phase, and the post-active phase. Based on the interpretive philosophical research paradigm, information was gathered through in-depth semi-structured interviews and observation of science classroom activities. The operationalization of accountability assessment was further done by observing the methods of classroom teaching, goal management, and choice of teaching methodology by the teachers, and the use of different techniques by the teachers to motivate students and create an effective teaching environment. We found that intervention in all three phases of science teaching brought positive and effective changes among science teachers when they were committed to students and adopted innovative teaching with clear planning. The study also showed that teachers' accountability can be measured through teacher skills, techniques, and strategies reflecting innovation and inquisitiveness in and out of the classroom. Overall, especially in science subjects, practical sessions were found highly impactful on students' learning and understanding of basic knowledge of science particularly when they were associated with daily activities and were taught with necessary scaffolding.

Keywords: Pedagogical accountability, three-phases model, national curriculum framework, community school.

Introduction

Many factors such as pedagogical autonomy, teacher freedom, academic training and school environment are associated with the academic results of school students. Bedard (2015) highlights factors such as pedagogical autonomy and teachers' accountability toward teaching-learning activity. There are other factors as well such as tools and techniques of teaching, academic training for teachers, and school environment. The old chalk-and-talk technique of teaching methods for basic-level teachers cannot improve the students' average learning achievement; a lot more must go into teaching effectiveness. Yenipinar (2021) states that accountability is one of the features of current, democratic, institutional, and successful management. Accountability operates and indicates many other factors of effective teaching, as current scholarship has highlighted.

Accountability ensures basic educational quality as well as tries to address challenges like limited resources, training for teachers, and institutional environment. Researchers could study teaching effectiveness with a focus on accountability while educational challenges are persisting or rising. Observing the case study of Tikapur Municipality, Nepal, the School Improvement Plan (2022/23) shows that the students' average learning achievement is decreasing as the number of classes increases. Similarly, the National Assessment of Student Achievement (NASA) Report 2020 shows that the trend of learning in science in grade 8 has deteriorated by 30 average scale scores during three years from 2017 to 2020 (Khanal et al., 2022). This situation in the community schools prompted us to explore the causes behind the teaching and learning issues. As Dangal et al. (2016) state that awareness is necessary to make the teachers, including all the stakeholders, to be responsible for their profession. Interventions have been instigated to maintain school governance in community schools, such as the "Hamro Shikshya" project launched by National Campaign Educational Nepal in 2016. And, pedagogical accountability is one of the most important components to be addressed for school governance which is the major concern of this paper. In this respect, Bedard, (2015) states that the entire education system is centralized in various areas like content and educational materials for teaching learning activities.

The student's progress depends upon teachers' accountability and responsibility. Teachers should possess the necessary techniques and expertise to improve their hard and soft skills, knowledge, academic and nonacademic performance, and behavior. More importantly, teachers would have to focus on subjects like science which is not possible to learn without understanding the practical classes. Teachers' preparation and professional growth are required entities of pedagogical accountability (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2017). Moreover, accountability aims to develop teaching activities and

students' performance. Canadian Teachers' Federation 2004, claims that accountability not only measures the achievement of outcomes but also implies an obligation to find ways to improve the capacity and performance of those responsible.

The school teachers and principals are either rewarded or penalized based on the academic results of the students and their entire performance during the academic year. Therefore, they are also encouraged to adjust their pedagogical methods in order to bring some progress in students' academic achievement. O'Day (2002) supports Darling-Hammond and Snyder (2015) who insist that interaction with concerned authorities, extracurricular activities, and the personal growth of fellow teachers should be evaluated. The authors also focused on the assessments of tools and techniques for teaching, knowledge transformation, and activities conducted by the teachers with continuous evaluation of students' scores. The need that schools routinely evaluate students' achievement and modify instruction in accordance with the results is another crucial component of pedagogical accountability in Nepal. This involves measuring student learning and identifying areas for improvement using tools like standardized testing, teacher evaluations, and other assessment methods.

The Nepalese government has taken action in recent years to improve pedagogical accountability in the nation. The government has constructed a National Assessment Framework to raise the standard and consistency of student assessments and has established a Teacher Professional Development Program to offer ongoing training and support for instructors. For this, governmental organizations and educational institutions must continue to provide adequate training and skills to teachers (Dangal et al., 2016). The education sector needs to acknowledge the role of teachers in the classroom. The teachers come across different challenges like scarcity of resources, politics in academia, and instability in government. Focusing just on teachers' accountability will overlook the other factors responsible for students' learning phenomena. Further, a more innovative and comprehensive model is needed to address the upcoming challenges in the educational sector (Berg & Consult, 2023).

Teachers in Nepal are generally required to hold a teaching license with an appropriate teaching qualification and relevant professional training. There are five categories of teachers in Nepalese community schools: permanent teachers (Teachers appointed by the Teachers Service Commission (TSC) to government teaching positions); Temporary teachers (Teachers appointed to government positions by the School Management Committee (SMC), but yet to sit or get through the TSC selection test); Relief teachers (Teachers hired by the SMC to fixed-term government positions to address workforce crisis in schools); Per Child

Funding(PCF) teachers(Teachers appointed on the PCF budget scheme); Local teachers(Teachers appointed by the SMC on local budgets (Khanal, 2011).

As mentioned, all teachers are not equally accountable for their duties and obligations even if they are recruited for teaching. Most of the available literature we have perused has stated the accountability of education, school governance, and teachers' accountability. However, there is very little literature that discusses global pedagogical accountability but not in the context of Nepal. Therefore, the major concern of the study is to increase teachers' efficiency in students' learning achievement by maintaining essential pedagogical accountability tools in community schools of Tikapur Municipality. This study also attempts to assess how pedagogical accountability influences science teachers' efficiency in a three-phase model. Finally, the entire study tries to identify the problems and challenges head teachers and science teachers face while adopting three phases of interventions in the classroom. This study aims to investigate how practical experience may work as a scaffold for science learning through PAR. Three research questions guide this study. 1)What types of pedagogical accountability have been practiced by science teachers in the community school? 2) What are the problems and challenges to make science teachers pedagogically accountable? 3) How does pedagogical accountability make teachers efficient? What changes are observed in students in science subjects after the intervention of creative tools developed by teachers and principals?

Theoretical Framework of the Study

The theory of action approach is a helpful tool for teachers who want to improve themselves using evidence and information. It is a way for teachers to solve problems by working together and learning from each other. They start by identifying problems, coming up with possible reasons for those problems, and then testing those reasons through action and thinking about what happened. This theory is useful for teachers because it helps them to think about their teaching, collect and study information, and make changes based on what they learn (Flood & Brown, 2018). Also, Andres and Nordengren (2022) in their theory of action-related articles focus on having a clear plan of action. They emphasize that the plan should include certain steps like goal setting, making decisions, and measuring success depending upon the requirements of the organization. This article stresses the importance of continually thinking about and adjusting the plan accordingly. It is not a one-time task, but an ongoing process that everyone in the organization should participate in to achieve success. This theory of action provides an understanding of pedagogical accountability among the teachers and stakeholders in government schools. But the theory provided by Jackson (1996) gives a clear

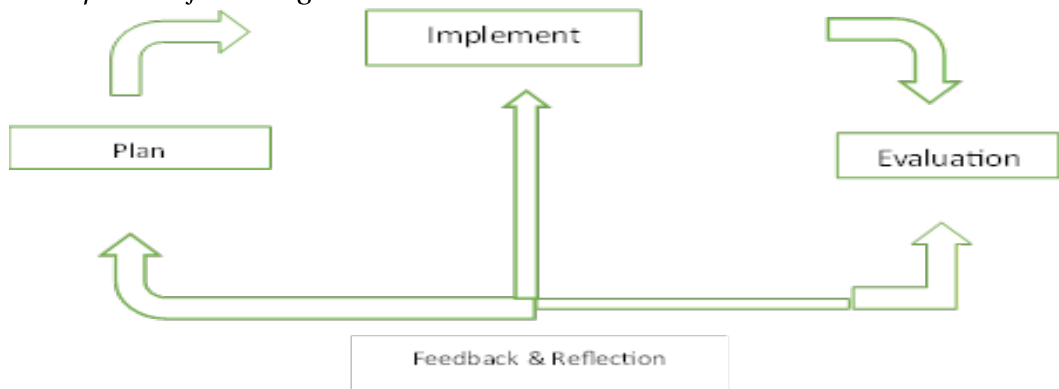
picture of pedagogical accountability used in this research. He provided a framework in three different teaching phases, which stated that

...the teacher hopes the involvement will result in beneficial student changes. Still, knowledge is, in this sense, a by-product or a secondary goal rather than the thing the teacher is most directly concerned with... (Jackson,1966).

Jackson focused on phases of teaching in a cyclical form due to the byproduct of such an operation of teaching- the teacher's efficiency and the changes in the student's behaviour. It shows how teaching is systematic and helpful in achieving national and subject-wise educational aims and goals. The philosophy behind the three phases of teaching is an integration of the ideas behind the pedagogical accountability of teachers and awareness of the teaching-learning byproduct. In another way, if a teacher follows the planning, implementation, and evaluation activities, the consequences can be seen in the teachers' performance and students' learning behaviours. The conceptualization of teaching in three stages can be summarized in a diagram as follows:

Figure 1

Three phases of teaching



In Figure 1, the model is categorized into three phases; they are pre-active phase, inter-active phase, and post-active phase which indicate plan, implementation, and evaluation respectively. Feedback and reflection are accumulated in each phase and new planning starts with feedback (Jackson,1966).

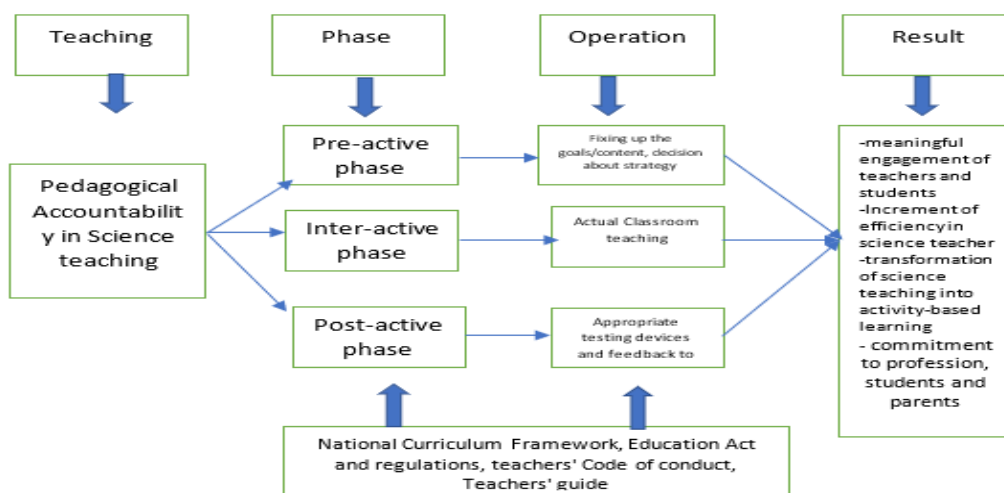
In terms of teaching effectiveness, the National Curriculum Framework 2076 presents insight into the world of being an accountable teacher (Curriculum Development Centre [CDC], 2019) while following the code of conduct given by Education Regulations 2002 of the Government of Nepal (Ministry of Education [MoE], 2002). Teachers remain in the central position to make the learning process easier and more feasible. Learning qualities depend upon the interaction between learners and teachers. As teachers play a pivotal role in the development of

curriculum and its implementation, teachers are to be well-trained to develop their skills and talents to impact the classroom and enhance the quality of students through different perspectives. Similarly, the Education Act of 1971 implemented the duties and responsibilities of the Headteacher for supporting directly or indirectly throughout the phenomenon of the accountability of the teacher in teaching-learning activities as mentioned in Education Rules 2002 (MoE, 2002).

Based on the above theoretical review, the study has been conducted accordingly and the conceptual framework is developed which is presented diagrammatically as shown below.

Figure 2

Conceptual Framework Used



Note: The study has followed three tiers of teaching phases and they are implemented in the classroom accordingly; pre-active phase, inter-active phase, and post-phase.

Methodology

Participatory action research (PAR) emphasizes participatory action. It focuses on group inquiry and experimentation that is based on experience. (Henderson et al., 2017) This PAR study was undertaken in the community schools of Tikapur Municipality, Kailali, Nepal. Based on three PAR cycles, the study was conducted with an initial field visit of selected community schools which is considered a pre-active phase. The second cycle was concerned with pedagogical instruction and activity-oriented curriculum. And, the third cycle was a post-active phase which was closely observed through practical-based interventions using the participation of science teachers in the classrooms. In the current study, PAR began with action-

oriented pedagogy and is connected to the third cycle. In February 2023, we posed those interventions and requested teachers to follow lesson plans, teachers' guidelines, national curriculum framework, etc.

A total of three school Principals and three science teachers participated in this PAR study. This study is a qualitative inquiry and uses PAR research design. As a part of scientific methodology, the case study is a powerful method to reflect on human experiences and advocate for the appropriate measures to address the issues (Stake, 2005). Interviews were carried out among school principals and science teachers. They were asked about the activities they conducted during the pre-active phase and inter-active phase. Furthermore, key selected principals instructed their science teachers to follow the guidelines provided for them. And, the teachers also applied the practical activities along with theoretical parts in the classroom. Action-based pedagogy (Lier, 2007) was applied in the classrooms for 30 days regularly.

The three stages used for this study were pre-active phase, inter-active phase, and post-phase. The first phase of teaching was a pre-active phase of teaching. This phase included the planning and preparation of activities that a teacher performs before entering the classroom. As the planning of a lesson consists of a number of entities and to be seen in broader terms, it includes details of the lesson, learning outcomes, required resources and materials, the strategies and methods adopted by teachers and many others. As it is the planning phase of the instructional act, the foundation of this phase was set through the establishment of certain objectives.

The second phase included the execution of the first phase plan in which learning experiences were provided to students through suitable teaching methods and methodologies. As the implementation part is always challenging. The learners in this phase were provided with a special learning environment to achieve desirable changes and learning outcomes. Adopted teaching methods and methodology by the teachers might be in the classroom, laboratory, outdoors, or anywhere else, which could motivate students to interact openly in the particular environment. The variety of experiences that students accumulated through different means and different personalities like teachers, friends, and among themselves provide the best learning opportunities. This phase is best for the teachers in terms of sizing up the class. Similarly, the students could also feel the personality of the teachers while teachers should appear as an efficient and impressive personality. This situation created a conducive environment for teachers to know their learners. Teachers perceived, diagnosed and responded in this phase.

And the final phase of this study is the post-active phase. One of the main objectives of this study is to increase the average learning achievement of students by maintaining pedagogical accountability (PA). It is the phase that concerns the impact of teachers' activities on students. While the teaching tasks sum up, the

teacher measures the achievements of students through different means including tests, quizzes, observation, comments, and many other situations.

The study applied a qualitative research approach consisting of observation followed by six key informant interviews (KII). The entire research process has been conducted physically as there was no obstruction to collecting data from concerned stakeholders. The respondents for the study were purposely selected representing different age groups, classes, castes, and societies to see the multiple perspectives. And, the venue for the study was convenient to us. Likewise, the purpose of selecting science teachers from government schools was to conspicuously observe three phases of teaching in science classes where practical classes are a must for students. Since we researchers were limited to blackboard drawings for science classes, the study wanted to examine if the situation remains the same or has progressed to some extent.

The interview was focused on semi-structured mode to collect new data and explore participants' thoughts and beliefs about the research issue. As the respondents were selected purposively from a specific geography, we researchers aimed to accumulate more information from them for what the questions were open-ended.

Science teachers used practical classes regularly for thirty days as part of intervention activities. These exercises were used to access students' theoretical and practical knowledge that they could apply to their daily lives. Science teachers supported students both within and outside the classroom trying to link the theoretical concept with practical activities. The school managed all the required materials for practical purposes during the intervention. Through group discussion, the teachers and students both learned to interlink the practical activities to the science curriculum and textbooks. As a result, the data were thematically examined and directly coded to provide descriptions of the study.

Regarding ethical considerations, confidentiality is the most important part, especially in qualitative research. It can be ensured by using good data collection and storage practices. Before conducting the interviews for this research, we shared with the respondents the research objectives, the applied methods, and the purpose of the information. In addition to this, we also took prior approval from the respondents. To maintain confidentiality during the research, we kept the respondents confidential, protected personally identifiable information, and maintained confidentiality beyond the focus group. The education issue is not as sensitive as gender-based violence and many others, so it is not important to consider in this research. To maintain confidentiality, we did not ask such questions to the respondents, which created conflict in social cohesion. Therefore, pseudo names, symbols, or alphabets are for collecting information or data. All of

the researchers in this study are from teaching backgrounds. Also, the researcher is a resident of this study area and is well acquainted with the context of the study. The role of the researcher was as an insider while observing the intervention strategies adopted by the science teacher. And also, as an outsider during interviews with the teacher to minimize biases in the research. Thus, a balanced role was played by the researchers in the research area. After the data were collected from the field, the information gathered was transcribed and shared among the respondents for validation from the respondents by visiting them in the study area.

Results and Discussion

Headteachers and Science teachers from three different schools in Kailali districts were asked about the three phases of teaching pedagogy and they were; pre-phase, inter-active phase, and post-phase (Jackson,1966). Teachers involved in this study provided understanding about the execution of science learning and theoretical knowledge. It shows the fruitful participation of teachers and students in practical activities, efficiency in science teaching, transformation of theory to practical, and commitment to their profession. Therefore, the findings are derived from thematic analysis and so interpreted under the three themes: the interventions made by researchers. Also, the problems and challenges science teachers have faced while implementing them as classroom interventions through participatory action research are explored.

Pedagogical Accountability (PA) Mechanism: Before actions

Based on school observations and information gathered from principals from sampled schools (Table 1), there were no written and strict strategies for maintaining the accountability of the science teachers. Even though having well-equipped infrastructures for teaching-learning environments, two schools out of three selected for the purpose of this study were established in 2018 and 2045 BS., were applying conventional teaching methods. And, the young teachers were found more innovative and technically sound in teaching compared to old aged teachers (Qi Z, 2022), however, there were no hard and fast rules set for ensuring pedagogical accountability within the school.

Table 1*Pedagogical practices in community schools*

Stages of Teaching	The practice of PA Mechanism Observed	Principals' perspective towards PA
Pre-active Phase	Whiteboard for absentee teachers, Anushashan Ainaa, textbooks and guidelines, annual plan and time schedule for teaching.	Providing textbooks, teachers guidelines (e-copy), and some materials of teaching, followed annual work plans except in some cases, No compulsion of lesson plan.
Inter-active Phase	Chalk and Talk method using a microphone device, focus on course completion, Attendance, and records of teachers, Provision of class Monitor, Support for teachers.	Provision of "sujhav petika" for feedback, asking staff about courses and problems at terminal exams in groups. Nominal monitoring and supervision of educational authorities, lack of discussion among subject teachers on pedagogical issues, rare parent teachers meeting.
Post-active Phase	The conventional method of performance evaluation, Staff Meeting, Discussion & feedback sharing in groups.	Preparation of portfolio in totality, flexibility of implementation of code of conduct for teachers, No provision of feedback and reward for accountable teachers.

Note: Field note, 2023

Pedagogical accountability as a science teaching arena: action and reflection

Throughout the study, the science teachers of three schools and principals noted that the conventional techniques of instruction could be changed with the positive perception of being pedagogically accountable. Regarding this, the information was gathered and analyzed thematically as follows:

Creation and reflection on the pre-active phase of teaching

Teachers were asked to prepare contextual lesson plans, written or verbal preparations, teaching guidelines, follow curriculum, instructional guidelines or materials, complete the lessons, different strategies and techniques, and evaluation tools, and follow the national curriculum framework before going to classrooms in the pre-phase. Teachers could increase their confidence, feel easy about delivering lectures and build time management skills if they followed them properly. Likewise, teachers could also draw students' attention, and learning was meaningful and clear about the activities they were doing in the classroom. In the meantime, they also got immediate responses from students. These were the interventions posed by the researchers to science teachers. In this respect, head teacher B from the same school revealed his perception

"During the school time, I observed that the teachers who were prepared for the class, they could solve students' problems immediately without wasting time and draw

students' attention to the classroom. The Confidence of these teachers is higher than the others. Likewise, I found cultural knowledge of the teachers is very beneficial and productive in the classroom as a part of practical learning” (Translated version of researchers).

This opinion shows that teachers should be prepared prior to going to the classroom as stated in educational rules 2002 and the Code of Conduct of Teachers as mentioned in educational directives 2002 (MoE, 2002). Adopting a code of conduct and following educational rules can strengthen the caliber of teachers and create a conducive environment for student-oriented learning. Headteacher 'A' claimed that the whiteboard system is an intervention idea. An administrator closely watches the timetable and responsibilities, making teachers more accountable.

According to Acar (2014), Educational accountability provides the system's stakeholders with the reasons behind choices and educational initiatives. Ali M. et. al. (2018), states that the system is responsible for increasing the quality of human capital. Having used the optimum resources and utilizing knowledge, teaching, and learning processes can create greater educational responsibility.

Reflection of science teachers on pedagogical accountability: Inter-active phase

The influence of the lecture method on learners' academic performance is found very low (Williams et al, 2018). We tried to connect the practical and theoretical knowledge by posing some interventions to the teachers' pedagogy. The studies by different researchers claim that the contribution of teachers in the study of science proved to be productive and effective when carried out in the classroom (Acharya et al, 2019; Alburaidi and Ambusaidi 2019; Crawford 2012).

Teachers found the first phase really effective after blending both theoretical and practical techniques and tools for teaching. Science teacher A argued that

“I have students from various cultures, classes, castes, and ethnicities like Tharu, Dalits and Pahari, (people from the hills mostly khas). Generally, I use simple materials and tools and also use the local language to explain complex phenomena which makes my students understand basic science clearly and practically” (Translated version of the researchers).

In our intervention, we observed that the method of vaporization and evaporation for preparing *Dhikri*, a local food of the Tharu people, is one of the best examples to make Tharu students understand practical science. Such local examples enhance the knowledge of local community people, which is very powerful and makes students happy, brings them closer to the teachers and helps for fruitful learning. This demonstrates how different thinking exercises investigate innovative ideas

from practical learning and connect themes with learning in science by which knowledge is modified among students through vaporization and evaporation. In this regard, Gronberg and Jansen (2006) stated how cultural restraints can be incorporated into teaching for effective learning. We observed that during the interactive phase, teachers also applied their own strategies, techniques, and resource materials despite several challenges and problems. Furthermore, the students also had active participation and got a clear understanding of the performed activities. Xu (2016) highlights that in classroom activities the instructor's action influences the achievement of students and schools together.

The interventions that we had posed in the course of the pre-active phase were implemented in an interactive phase. This portrays how teachers' activities serve as ideal scaffolding for pupils to learn accurate and first-hand scientific information. Another science teacher (A3) expressed his view: "Often, the use of local words makes students fresh and energetic in the classroom, and their performance satisfies teachers in their teaching methods". In addition to this, they also bring changes in the participation of students, and learning becomes meaningful. Furthermore, teachers got self-satisfaction with their teaching methods while students posed immediate responses and got inspired by the teaching techniques adopted by teachers. This environment also made teachers comfortable delivering lessons and developed their confidence level to improve the understanding level of students. As per the teachers' directives, teachers should follow the code of conduct, which enables teachers to be accountable as the code of conduct makes a reflection mirror (*anusashan aina*, The Self-guide to self-discipline).

The implementation part is always challenging, but teachers' planning changed the students. Culturally responsive pedagogy makes teaching effective and could improve the learning environment for weak students, and positively impact students' achievement. Additionally, it was noted that utilizing accessible resources transformed traditional chalk-and-talk methods into activity-based-learning tools, and techniques as a living laboratory. As per educational rules 2002, function duties and powers of the head teacher also play an important role in making teachers accountable. Headteacher A stated that there is always moral and physical support from the administration to ease the classroom environment. The headteacher had two important roles. First, they had to make sure they managed the school resources well, worked with teachers, encouraged everyone to share their ideas, and understood what parents wanted. But at the same time, they had another responsibility that was not easy. They used power secretly to maintain control and keep things unfair (Khanal, 2019).

Through the interventions made in the inter-active phase, teachers realized that activity-oriented pedagogy could engage students in the field and encourage them

to address problems by exploring their ideas and concepts. PAR study in students-oriented pedagogy showed positive transformation to a greater extent. PAR activities connected, interconnected, and correlated theoretical and practical pedagogy, which also played a pivotal role in progressing their academic performance.

In this connection, teacher C argued that practical-based or student-focused learning activities in science, participation, and active engagement improved the academic achievement of students in the final term compared to the previous terminal exams. This clearly illustrates that practical learning is the intervention school's most demanding sources for science learning. According to the respondents, engaging students in hands-on practices induced teamwork through collaboration, cooperation, and interaction in a practical field rather than only concentrating on the prescribed syllabus.

Evaluation phase as a key basis for improving pedagogical accountability: post-active phase

It is the actual phase of assessing students and teachers for the self-evaluation of their responsibility and accountability for making the classroom student-oriented. Teachers admitted and realized that there is improvement in their teaching quality if planned properly prior to going to the classroom. For teachers, the creation of different assessment tools, and designing assessment activities appear unavoidable (inter-active et al, 2018). The science teachers had prepared various activities and applied them in pre-active and inter- active phases respectively to make them innovative and inquisitive. They utmost used the available resources in addition to their creativity. And, they used their own strategies, techniques, and creation in the scarcity of resources, materials, and tools (Mupa & Chinooneka, 2015). During the post-active phase, teachers reinforced students by rewarding them with different forms of awards. Copp (2019) also argues that rules, regulations, evaluations, rewards, and sanctions are the main driving forces for the accountability focus. Our observation showed that the science teacher used various techniques to appreciate students - verbal praise, cash prize, and appreciation in the form of a certificate. Correspondingly, Khanal et al. (2022) claimed that the students who regularly received comments on their assignments had shown better performance compared to others.

According to Science Teacher B, applying culture-friendly evaluation tactics- verbal questioning, practical observation, use of local language, portfolio etc.- after the completion of the chapter and entire course brought drastic changes in the theoretical and practical understanding of the students in the classroom.

Along with this, the regular and accountable teachers were honored by the head teachers during staff meetings which helped them to boost their confidence and motivated them to be accountable. In this context, the head teacher B stated that

“Although there is the provision of reward and punishment in government rules and regulations, we have our own way of rewarding teachers in our school. There are very potential teachers in our school but due to financial constraints, we can only give them encouragement and appreciation in the staff meetings but cannot provide any financial support” (translated version of the researchers).

The aforesaid opinion was noticed in the action of sampled science teachers awarded. The science teacher with proper recognition by the school administration made him more committed to the teaching profession and sensitized him in carrying out work with more responsibilities.

After the completion of cycles of interventions, it was observed that the participation of students and science teachers in practical classes transferred the classroom into an exact learning area from where they could connect science with their daily activities. The prior preparation of teachers reflects in the outcome of students' performances because of its effective implementation. As Khanal et al. (2022) stated that “Teachers who were dedicating all their time to the classroom were successful in improving students' achievement.” Thus, accountability in the pedagogy of science teachers can scaffold the learning of the students and transform the capacity of the teachers in teaching.

Problems and challenges while ensuring pedagogical accountability

Headteacher C argued that ‘Teachers’ preparation is quite important to be inquisitive and innovative to bring life and science together for which they need adequate homework as science is connected with life, virtue, language and knowledge’. It means that despite several odds, challenges, and problems, teachers should always be responsible and accountable for classroom management and pedagogy enhancement (Darling-Hammond et al., 2020). However, they face a number of challenges while following contextual lesson plans, academic calendar guidelines, curriculum, and updating and upgrading teaching soft skills. The large number of students from various backgrounds itself is a great challenge for teachers. Parents teachers meeting is one of the important components to make the teaching-learning environment friendly. Nonetheless, the busy schedules of parents do not let it happen. While parents are from various occupations and should leave for work early in the morning, they are compelled to leave their children very early in school and cannot manage time to take part in the meeting and for their studies. In addition to this, teachers themselves have the challenge to

manage time for morning shifts and day shifts. A study on community school accountability, workplace culture, and teachers' morale came to the conclusion that accountability pressures hinder efforts to enhance performance in community schools. It is noticed that there is dissatisfaction and unhappiness among teachers. This leads to impeding student achievement in school (Erichen & Reynolds, 2020). And, it is observed that they make a number of excuses (tire puncture, bank visits, visits to hospitals, and many others) to be safe from the punishment set by the school. Such challenges create obstruction and require additional classes to complete the course on time.

Likewise, teachers have challenges and problems in the pre-phase for not having adequate teaching materials and tools for practical teaching. Due to the large number of students in classrooms, the available instructional materials are insufficient for the entire classroom. One of the science teachers argued that the utilization of different strategies and tools in the science instruction class is transformed into a practical or activity-based classroom.

In addition to these, we researchers also observed the classes. As planned, the expectation could not meet due to various hurdles and pitfalls in the field. The code of conduct followed by the teachers for being on time regularly to and from the school also makes teachers accountable, but this is another biggest challenge for themselves (Matete, 2021).

Conclusion

Pedagogical variations of science teachers based on phases of teaching enable and empower them to act in the best interests of their students. Being pedagogically accountable in teaching science, the teachers felt more comfortable in delivering the contents instead of conventional/theoretical and lecture-based classes. These findings support the view of Khanal et al. (2022) that the devotion of teachers all of the time in the classroom was successful in improving the students' learning. The three phases of pedagogy interventions, pre-phase, inter-active phase, and post-phase, posed to the teachers and brought drastic changes in their learning process. These interventions were transformed from passive pedagogy to activity-based learning. Regardless of several challenges and obstacles, teachers manage various forms of resources and time to improve the learning environment of students, which offers them more accountability in their professions. Student-centered classrooms, innovative ideas of science teachers, and the use of available resources have created a conducive environment for learners and set the best example for practical-based learning instead of the excessive use of theory-based lectures. This indicates that it is quite important to connect theoretical knowledge with practical knowledge, which enables students to carry on their day-to-day life smoothly. Also, concerned authorities should be aware and take the initiative to apply three phases

of teaching methods to make classrooms meaningful, effective, and practical, for collaboration and intensive interaction, among head teachers, subject teachers, and students. As the study was delimited to three community schools of Kailali districts in Nepal, the study process was also limited to certain numbers of science teachers and principals. However, this study can be the direction for similar studies in the coming days. And the study should not be limited to social science researchers and teachers; rather, social workers, policymakers, educators, administrators, and many other members of society could conduct a large-scale research study.

The present study concludes that the pedagogical accountability of the teachers plays a significant role in the progress of the teacher's efficiency and finally students' participation in teaching learning phenomena. It sensitizes the teachers for better performance through developing and implementing the innovative, supportive, equity pedagogy plan in the classroom. This study is helpful in respect of policy formulation and policy implementation. It is necessary to have coordination among active stakeholders like head teachers, other staff, School Management Committee members, Parents, and Officials of local governance to make every teacher pedagogically accountable.

Declarations

Ethical Consent and Consent to Participate

We declare that this research was conducted ethically and take sole responsibility for any plagiarism or misconduct.

References

- Ali, M., Egbetokun, A., & Memon, M. H. (2018). *Human Capital, Social Capabilities and Economic Growth. Economies*, 6(1). <https://doi.org/10.3390/economies6010002>
- Andres, A. J., & Nordengren, C. (2022). Theory of action: The care and feeding of your mission. *Phi Delta Kappan*, 104 (3), 42-47 <https://doi.org/10.1177/00317217221136598>
- Acharya, K. P., Rajbhandary, R., & Acharya, M. (2019). (Im) Possibility of Learning Science Through Livelihood Activities at Community Schools in Nepal. *Asian Social Science*, 15(6), 1-88.
- Alburaidi, A., & Ambusaidi, A. (2019). The Impact of Using Activities Based on the Montessori Approach in Science in the Academic Achievement of Fourth Grade Students. *International Journal of Instruction*, 12(2), 695-708.

- Bedard, M. (2015). *Pedagogical Autonomy and Accountability: A Recipe for Improving Academic Results*. Montreal Economic Institute.
- Berg, S. & Consult, V. (2023). *The status of Teacher Education Development in Nepal*. britishcouncil.org.np/sites/default/files/the_status_of_teacher_education_and_development.pdf
- Copp, D. (2019). Accountability Testing in Canada: Aligning Provincial Policy Objectives with Teacher Practices. *Canadian Journal of Educational Administration and Policy*, 188, 15-35.
- Crawford, B. A. (2012). Moving the essence of inquiry into the classroom: Engaging teachers and students in authentic science. *Issues and challenges in science education research: Moving forward*, 25-42.
- Curriculum Development Centre [Nepal]. (2019). *The National Curriculum Framework of School Education 2076*.
- Dangal, M., Dhakal, R., Khanal, K., Munakarmi, R. (2016). Hamro Sikshya Project. *National Campaign for Education Nepal*.
- Darling-Hammond, L., Flook, L., Harvey Cook C., Barron Brigid., & Osher David (2020). Implications for educational practice of the science of learning and development. *Applied Developmental Science*, 24:2, 97-140, DOI: [10.1080/10888691.2018.1537791](https://doi.org/10.1080/10888691.2018.1537791)
- Darling-Hammond, L., & Snyder, J. (2015). Professional capacity and accountability: An introduction. *Education Policy Analysis Archives*, 23(14).
- Erichsen, K., & Reynolds, J. (2020). community school accountability, workplace culture, and teacher morale. *Social science research*, 85, 102347. <https://doi.org/10.1016/j.ssresearch.2019.102347>
- Flood, J. D., & Brown, C. (2018). Does a theory of action approach help teachers engage in evidence-informed self-improvement? *Research for All*. Vol. 2(2):347-358. DOI: 10.18546/RFA.02.2.12
- Gronberg, T. J., & Jansen, D. W. (Eds.). (2006). *Improving school accountability check-ups or choice*. Emerald Group Publishing.
- Henderson, M., Selwyn, N., & Aston, R. (2017). What works and why? Student perceptions of 'useful digital technology in university teaching and learning. *Studies in higher education*, 42(8), 1567-1579.
- Jackson, P.W. (1966) *'The way teaching is'*. National Education Association, Center for the Study of Instruction
- Khanal, P. (2011). Teacher management in a decentralized school context in Nepal: Fueling tension and dissent?. *Compare: A Journal of Comparative and International Education*, 41(6), 769-784.
- Khanal, K. P. (2019). Managing Resources in Community Schools: An Accountability Practice in Paradox. *Dhaulagiri Journal of Sociology and Anthropology*, 13, 20-30. <https://doi.org/10.3126/dsaj.v13i0.21889>

- Khanal, B., Bishwakarma, A., Acharya, S.P., Acharya, D. & Bhatta, L.D. (2022). *National Assessment of Student Achievement 2020: Report on National Assessment of Student Achievement in Mathematics, Science, Nepali and English for Grade 8*. Education Review Office.
- Khatiwada, S.P., Acharya, B.R., Limbu, K.B. (2018). *An Analysis of Student Assessment Practices in Nepal*. Education Review Office
- Lier, L. van. (2007). *Action-based Teaching, Autonomy and Identity. Innovation in Language Learning and Teaching*, 1(1), 46-65. <https://doi.org/10.2167/illt42.0>
- Matete R. E. (2021). *Teaching profession and educational accountability in Tanzania. Heliyon*, 7(7), e07611. <https://doi.org/10.1016/j.heliyon.2021.e07611>
- Ministry of Education [Nepal]. (2002). *Education Act 1971* (7th amendment).
- Ministry of Education [Nepal]. (2002). *Education Rules, 2002*.
- Ministry of Education [Nepal]. (2002). *Education directives, 2002*.
- Mupa, P., & Chinooneka, T.I. (2015). Factors Contributing to Ineffective Teaching and Learning in Primary Schools: Why Are Schools in Decadence?. *Journal of Education and Practice*, 6, 125-132.
- O'Day, J. A. (2002). *Complexity, accountability, and school improvement*. Harvard Educational Review, 72(3), 293-329.
- Qi Z. (2022). On the Professional Development Environment of Young Teachers in the Series of Quality Education in Colleges and Universities. *Journal of environmental and community health*, 2022, 5370757. <https://doi.org/10.1155/2022/5370757>
- Stake, R. E. (2005). Qualitative case studies. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage Handbook of qualitative research* (pp. 443–466). Sage.
- United Nations Educational, Scientific and Cultural Organization. (2017). *Accountability in education: Meeting our commitments (Global Education Monitoring Report 2017/8)*. <https://gem-report-2017.unesco.org/en/current-report/>
- Williams, D. R., Brule, H., Kelley, S. S., & Skinner, E. A. (2018). Science in the Learning Gardens (SciLG): A study of students' motivation, achievement, and science identity in low-income middle schools. *International journal of STEM education*, 5(1), 1-14.
- Xu, Y. (2016). The Relationship Between Teachers' Attitude Towards Professional Development and Schools' Accountability Performance. *Research in the Schools*, 23(2), 51-60.
- Yenipinar, Ş. (2021). Instructional accountability in the Turkish context: A qualitative descriptive analysis. *Eurasian Journal of Educational Research* 91 DOI: 10.14689/ejer.2021.91.12