

Performance Assessment in Science: Issues and Challenges in Implementation

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Abstract

The National Education Policy 2020 has incorporated different methods of authentic assessment in both school education and teacher training programs. This research investigates the performance assessment strategies employed by prospective science teachers during their school internships and the factors influencing the adoption and implementation of these strategies in elementary school science classrooms. Semi-structured interviews and classroom observations were conducted to gather information from prospective science teachers using a descriptive qualitative method. Twenty-eight science students in 7th semester B.Sc. B.Ed. Integrated program from the Central University of South Bihar were selected through a purposive sampling technique. The collected information on the challenges and issues faced while implementing performance assessment strategies in the science classroom during the internship was analyzed using thematic analysis. The research shows that prospective science teachers need support in designing assessments that gauge students' conceptual understanding, managing time, getting necessary resources for their science classrooms, and establishing criteria for evaluation. Besides these, there were also other concerns discovered regarding lesson plans and school administration. The findings of the study will be helpful for the teachers, students and administrators in facilitating the use of performance assessment in science classrooms.

Keywords: Performance Assessment, Issues and Challenges, Internship, Science, Elementary school level.

Introduction

In the Teacher education program, there is an emphasis on boosting theoretical and practical aspects of teaching. The theoretical aspects involve the knowledge and understanding of teaching and learning, whereas the practical aspects involve the application of skills and those theoretical concepts in their internship in schools. In internships, teachers assist prospective teachers to teach efficiently by applying their skills. It is an important phase for every teacher in teacher education to become an efficient and full-fledged teacher (Michos et al., 2022; Rogayan & Reusia, 2021; Ugalingan et al., 2021). To become an efficient and full-fledged

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teacher, it is necessary that prospective teachers should use appropriate teaching and assessment skills according to the needs of the learners and situations in their practicum or internship. During their internships, prospective teachers engage extensively in teaching and assessment processes within the classroom. Nowadays, assessment is used as an instructional strategy that is interlinked with instruction. The goal of assessment is to continuously evaluate and provide feedback to teachers, allowing them to improve and adjust their practices as needed. The assessment skills and practical application of a prospective teacher significantly influence students' learning and well-being (Arter 2003; Coutts, Gilleard, & Baglin 2011; Gibbs & Simpson 2005; Veldhuis & van den Heuvel-panhuizen 2013) which is shaped during the teacher education program and their internship (Smith et al. 2014; Xu and He 2019).

Science is a subject where practical experience is necessary to understand the concepts and their phenomena. So, science teachers need to teach and assess students in a manner that evaluates their skills and understanding of concepts, leading them on the right path. Since prospective teachers learn and improve their teaching skills through microteaching. And during internships, they practice those skills in their classrooms. But what about the assessment skills of teachers? How do they assess students in their classroom? While internship, prospective teachers know and use a variety of assessment skills, which are authentic, like performance assessment, peer assessment, self-assessment, project assessment, etc (Indriyani, Artini & Surya Adyani, 2021). Therefore, to develop competencies and skills in science, it is necessary to use assessment forms that focus on process and product. Performance assessment is one of the important forms of assessment that is used by prospective teachers to improve their teaching and learning skills. According to Davey et al., (2015) “performance assessment” refers to a variety of tasks and test designs used to represent real-world activity, including simulations, projects, essays, demonstrations, reflective questions, portfolios, artwork, and work products, etc. When peer assessment and self-assessment are used in performance assessment, it provides students the opportunity to reflect objectively on their accomplishments and learning (Sadeghi & Khonbi, 2015). It helps to engage students and make the classroom more meaningful and interactive so that learners learn to take part in different activities and tasks. However, an increase in assessment knowledge does not mean a change in assessment concepts and practice.

Rationale of the Study

At present, after the emergence of NEP 2020, assessment took an importance place in the education system in India at all levels. Since in previous days, assessment was only used to pass the examination by marking or grading them. But now it takes turn and integrated teaching learning and assessment is used. Since NEP also talked about the transforming assessment, 360 degree, formative and holistic assessment of students either in school education or teacher education. Performance assessment not only assesses students, but also integrates their teaching and learning, which is important for future perspectives. As NEP 2020 states, teacher should not require only subject knowledge but also diverse skills must require, which is the need of 21st century. Since, prospective teachers are the backbone of teacher education institutions, that impart their skills and knowledge to their school students during their internships and wherever they go. So, they need to have an understanding and ability to use

diverse forms of assessment in their classrooms. Knowing about the issues and challenges will help prospective teachers to accommodate and overcome those challenges while implementing performance assessments in the future.

Many studies have been conducted to examine assessment practices used by teachers and prospective teachers (Al-Malki, 2016, Sulaiman et al., 2020, Nyagi & Rajendaran, 2019 and Hussain, Idris & Akhtar, 2021). Also, few studies have been found related to internship and lesson plan (Achmad et. al., 2023, Kasli & Ilban, 2013, Tsuruyya, Tandyonomanu & Miftakhul Huda, 2021, Shaketange, Kanyimba & Brown, 2017, Panda & Nath Nayak, 2014) in mathematics, English and science in different countries like Indonesia, South Africa, Namibia and India. However, there are only a few studies that researchers have found on the challenges of a particular assessment form in science for prospective teachers. Therefore, this study explores the strategies or techniques used by prospective teachers in science for the assessment of students in the classroom.

Research Questions-

1. What techniques of assessment do the prospective science teachers use in their class during internship?
2. What issues and challenges do the prospective science teachers face while using performance assessment in the classroom?

Objectives-

1. To study the status of the classroom assessment practices of the prospective science teachers.
2. To study the challenges faced by the Prospective Science teacher while using performance assessment in their classrooms?
3. To provide suggestions for implementation of performance assessment in the classroom.

Method-

The present study followed a descriptive method of qualitative type to know the performance assessment strategies used by prospective science teachers in the classrooms and the issues and challenge faced during its implementation.

Participants and Sampling Techniques of the study-

B.Sc. B.Ed students of 7th semester of Central University of South Bihar were taken as the population of the study. Purposive sampling technique was used to select the 28-science prospective teachers as a sample from the population. All the 28th participants were represented as T1, T2, T3, T4to T28.

Tools used in the study-

Semi-structured interviews and classroom observation were used to know the present status of the assessment practices and the challenges faced by science teachers during implementation of Performance Assessment. The collected information on challenges was interpreted under

different themes.

Data Analysis and Discussion-

Study of the status of the assessment practices of the prospective science teachers

From classroom observation and interaction with students, it was found that prospective science teachers first focused on the traditional form of assessment such as closed tests either short, long answer type questions, multiple choice focusing on the level of knowledge, fill-in-the-blank, true or false, etc. Additionally, they showed scientific experiments to students but did not involve them. Although they use many performance assessment activities during instruction, but they cannot implement them effectively for assessment purposes.

Study of the issues and challenges in using performance assessment by prospective science teachers

The responses of prospective science teachers related to limitations or challenges faced during the implementation of the above-mentioned performance assessment strategies in the classroom were analyzed under five categories preparation of task, crowded class, time constraint, subjectivity in assessment, inefficient resources

Challenges faced while preparation of tasks

As a result of interview and observation of the class of prospective science teachers, it was seen that few are much better in the preparation of performance tasks for what they are going to teach in the class. Some of them, like T2, T5, T7, mentioned that “prepare some performance assessment tasks in science for specific content but not able to apply in class”. T3, T9, T10 & T17 stated that “it is very difficult for us to prepare or add the task according to the content demand, sometimes we prepare the task but after teaching of particular concepts prepared task do not fit for the assessment of students”. Again, the prospective teachers like T11, T 19, T15, T24 stated that “not able to design the simple experimentation and project that students can do” On the basis of the opinions of the prospective teachers, it can be concluded that the prospective teacher are not able to prepare the task in science due to the lack of understanding about the performance assessment and also due to lack of training. The problems faced by prospective science teachers related to the preparation of tasks in science subject according to the curriculum is also tandem with the study of Metin and Özmen (2010b) Metin (2013). So, the given study is supported by the above result of the study.

The issue is that there is a lack of awareness about performance assessment and the strategies used for it, which affects the way tasks are prepared and processed in the classroom. They also do not know how to prepare for content-specific activity.

Challenges faced due to Crowded class

The number of students more than the capacity is one of the biggest issues in the Indian classroom. The student-teacher ratio is not up to the mark, as mentioned in the different policies. Most of the prospective teachers mentioned that “mentor teachers told us to implement performance tasks in the classroom and assess the performance of the students but it was very difficult for us to implement in the class due to the large number of students in the

class” (T1, T4, T15, T19, T20, T25 etc.). In addition to this T3, T14, T15, and T23 stated that “while performing activity individually it was very annoying to keep watching all the students at the same time in the class of 60 to 65 students”. Few of the prospective teachers like T6, T8, T11, T26, stated that “strength of students in 6,7 and 8th grade is up to 68, 55 and 62 respectively in many schools but there are no sections which create burden”. The result is much more replicable with the previous study of (Hurix, 2023; Attia, Nyatiskor and Amoako, 2023). It is very difficult for teachers to control and manage the students in the classroom while using performance assessment strategies in the classroom (Chingos, 2013; Batchford & Russell, 2020). According to the Right to Education Act 2009(RTE), the pupil-teacher ratio at the upper primary level is 35:1, but the scenario is very much different from what is mentioned in the policies.

Observation revealed that there is a lack of accountability among the school administrators regarding the upliftment of the school and children. Since the same building housed classes for both primary and upper primary schools. From 3rd grade to 8th grade, many schools have only 4 classes. In many schools, there are always two combined classes in two rooms. Therefore, schools need to develop their own infrastructure to classify classes and sections as per RTE 2009.

Challenges face due to time constraint

Students are given a 40-minute class period to work on their lesson plans and assessments within a specified time frame for all students. T2, T7, T11, T16 stated that “while task is in group and pair like any experimentation, project or assignments it is sometimes easy for us to manage the time and assess every student through the activity but when the task is individually, it gets very difficult for us to give time to each and every individual” while most of science students mentioned that “it is difficult for us to instruct and assess each teaching point of the lesson plan to students due to restricted time limit and assess the 56 to 60 students within 35 to 40 minutes” T9, T12, T1, T17, T21 etc. whereas few of them state that “they are not implementing performance task much more effectively in the classroom” (T4, T8, T15, and T23). The finding also confirms the early study of Algan (2008), Karakuş and Kösa (2009), Metin and Demiryürek (2009).

It is difficult for science teachers to implement performance assessment due to time constraints. The main problem is lack of training on using different assessment strategies in the classroom. The institute should enhance its micro pedagogy and use various assessment strategies along with the teaching-learning process to instruct the class better.

Challenges faced due to Subjectivity in Assessment

T4, T7, T8, T13, T14, T18 and others stated that “After the debate, model preparation, task and experimentation on any science content, we do not understand how to rate students because it varies individual to individual”. In line with the statement, some mentioned that “when we give any open-ended question to students, we give them either high mark or low marks” (T12, T15, T20, T19). Almost all the prospective science teachers mentioned that they are not able to assess the students objectively after the activity or task and are not able to create the assessment criteria tool for the assessment of students. This finding of the study is in

conformity of the study of Mertin (2013). Frederiksen and Collins (1989) and Stiggin (1991) mentioned that subjectivity in scoring is the hallmark of the Performance assessment, but Sebrechts, Bennett, and Rock (1991) opposed that the performance assessment task can be made objective. Assessment criteria tool for the performance assessment task is formulated by the teachers to assess students objectively, either students performed group activity or individual activity through rubrics, self-assessment or peer assessment.

Lack of proper training, lack of awareness and lack of proper monitoring by the authority are the issues for the prospective teachers for not using performance assessment and not preparing the assessment criteria tool for the students.

Challenges faced due to Inefficient Resources

For the fruitful and interactive learning, it is important to have useful and necessary resources in the schools according to the need of the subject areas not only even in science but also in other subjects. Most of the teachers stated that in schools where they are practicing, there are inefficient resources available that interrupt their instruction and assessment task as well. T28, T 27, T19, T17 and others stated that ‘tasks could not be performed effectively because of the unavailability of necessary science equipment in the schools’. It was also found in the observation of the class by the researchers. The result is supported by the previous research of Acat and Demir (2007), Sindhu, Rajeshwari, and Kavitha (2023). The prospective teachers mentioned that they are not aware of various forms of assessments and the use of resources effectively. It appears that they are not using any equipment and other necessary resources in the classroom, not only for teaching the students but also for the involvement of students in the assessment.

The school administration failed to make proper arrangements of resources for learning and assessment in the classroom, which is an issue behind it.

Suggestions for better implementation of performance assessment strategies in the science classrooms

Prospective science teachers need to be prepared for the 21st century skills during their internship program. After discussion with prospective science teachers, the following suggestions were given which are as follows- prospective science teachers need-

- To be aware of the various strategies of performance assessment that can be used in science to make teaching and learning more joyful and burdenless.
- To give proper training towards the preparation of different assessment strategies and criteria tools like Rubrics, self-assessment, and peer assessment and how to use them in any task for objective assessment of students.
- To give regular and proper monitoring of the prospective science teachers' classroom teaching during the internship and give proper feedback so that they overcome their challenges.

Result of the Study-

The prospective science teacher used the traditional method of assessment. Despite using many

performance assessments, they struggle to implement them properly due to crowded classrooms, limited time, lack of evaluation criteria tools like rubrics, and inefficient resources in the school. The Issues behind challenges include ignorance or lack of awareness, inadequate training and inadequate monitoring in performance assessment. The school administration either did not provide adequate resources or negligence toward students learning and assessment.

Conclusion

Performance assessment in science is very important for students to build their higher order thinking skills. It engages students in activity that gives students exposure to develop their knowledge and build their own concepts by involving in the process to think critically. The prospective science teachers need to develop knowledge about what is performance assessment and how the task of the performance assessment be prepared. They must have to generate and be more competent in developing assessment criteria tool (rubrics) to assess the students' understanding. By the observation, it seems that the task is used for the assessment of students, but it is also for the prospective teachers to know its competency of teaching. Lack of time and overcrowded classrooms is the prime problem for the prospective science teachers to implement the performance task in the classroom. Since time can be managed by the competency of preparation of the task according to the need of students and content but the crowded class is one of the biggest issues in Indian classroom.

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