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Science Teachers' Number Of Training Hours And Teaching Performance

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Abstract

The purpose of this study was to examine the profile of Science teachers including their training hours and their performance on the Classroom Observation Tool (COT). The study followed a sequential explanatory design. In the quantitative phase, a purposive sampling method was employed to gather responses from 107 Teachers I to III in the seven divisions of Region VII (Central Visayas) that offer STEM education. The second phase involved in-depth interviews with 15 key informants. Statistical analysis included percentage, mean, weighted mean ($w\bar{x}$), and linear regression analysis. The number of training hours had limited predictive power for teachers' performance. Nevertheless, the qualitative findings complemented the quantitative results, providing additional support. The in-depth interviews conducted during the study revealed that lesser access to trainings due to the pandemic in the 2021-2022 academic year was a significant factor within the study's scope.

Keywords: Classroom Observation Tool, Philippine Professional Standards for Teachers, Teaching Performance, Sequential Explanatory Design, In-depth Interview.

Introduction

The recent implementation of Senior High School (SHS) and the introduction of the Philippine Professional Standards for Teachers (PPST) address science education challenges in the country. The PPST incorporates the Classroom Observation Tool (COT), fostering lifelong competence among teachers with standardized criteria for evaluating performance and emphasizing student-centered instruction.

The adoption of the PPST, along with the mandatory COT implementation, demonstrates the Department of Education's dedication to elevate teaching standards, led by Secretary Leonor M. Briones. It reflects the system's commitment to providing quality education to all learners in the Philippines, promoting professional development, and fostering accountability for the benefit of students and the education system.

Studying the number of hours that science teachers spend on training and how it affects their teaching performance is important for a few clear reasons.

Ball et al. (2008) noted in their study that it is unlikely that teachers who lack a thorough understanding of the subject will have the knowledge necessary to pass on to their students. It might not be enough to simply know the material well to teach it. Teachers must gain more knowledge in order to help students understand the material, which includes choosing effective topic representation

strategies and helping content make sense of student work. Kim et al. (2018) acknowledged that bettering teachers' subject-matter expertise enhances both teaching and learning.

Additionally, Ngugi and Thinguri (2014) refer to Hammond, who emphasizes the importance of a teacher's understanding of teaching methods and subject matter in determining their effectiveness. According to this perspective, a teacher's proficiency in subject content is crucial for ensuring high-quality teaching and learning outcomes. When teachers have a comprehensive understanding of the subject matter, they are better equipped to design and deliver lessons that emphasize key concepts and address any misconceptions students may have. This level of subject mastery positively influences the learning process and contributes to overall teaching quality. It highlights the significance of subject expertise in effective teaching and emphasizes the role of teachers in facilitating meaningful learning experiences for their students.

Rahman's research in 2014 found that teachers' performance is positively influenced by their professional and pedagogical competence. In order to enhance this competence, the following activities should be undertaken: regular education and training, activation of teachers' forums, development of science textbooks, continuous education, improved supervision by principals, training in different science teaching methods, use of laboratory science equipment, IT-based media design education, and conducting action research. This study is highly relevant to the present study, particularly regarding the measurement of pedagogical competence in the COT and the significance of training in the research tool.

The existing body of research provides compelling evidence regarding the positive impact of teacher training on teaching performance and student achievement. Junejo, Sarwar, and Ahmed (2017) cite Naoreen, Aslam, Arshad, and Nausheen (2011), who emphasize that trained teachers, irrespective of their gender, exhibit superior performance compared to their untrained counterparts, thus playing a crucial role in promoting student success. This assertion aligns with the findings of Gibbs and Cofey (2004), who discovered that teacher training enhances teachers' ability to analyze and evaluate student learning, enabling them to make informed instructional decisions.

Furthermore, studies have consistently demonstrated that educational attainment and the number of training sessions attended have a significant influence on teaching performance. Teachers with higher educational qualifications and a greater number of relevant training experiences are more likely to demonstrate effective teaching practices in the classroom. These conclusions are further supported by the recent study conducted by Sumanga, Batuigas, Leyson, Fernandez, and Napil (2022), which emphasizes that attending training sessions contributes to the improvement of teaching quality performance.

Collectively, these studies underline the importance of equipping teachers with appropriate training, knowledge, and skills to enhance their instructional effectiveness and positively impact student outcomes. The findings highlight the significance of investing in comprehensive and continuous professional development programs that empower teachers to continually improve their teaching practices and meet the evolving needs of diverse

To negate the various established studies connecting the trainings, level of understanding of the appraisal indicators, teaching performance, and students' performance, the following studies view other factors affecting the above-mentioned variables.

Popova et al. (2016) conducted research revealing that many teachers in resource-poor settings lack the necessary knowledge, skills, and motivation to provide quality education. However, several impact evaluations have demonstrated the effectiveness of interventions aimed at improving teaching quality.

Contrarily, Tehseen and Ul Hadi (2015) argue that teacher training alone is insufficient to determine teacher performance. They highlight various intrinsic motivational factors, including personal fulfillment, recognition, passion for teaching, career advancement, the challenging nature of teaching, personal goals, and influence over others. Additionally, extrinsic incentives such as salaries, housing, educational benefits, meals, financial support, leave, and healthcare also play a role. Therefore, assessing teachers' performance should consider these motivational factors in conjunction with training.

In line with this, Kanya, Fathoni, and Ramdani (2021) found a significant impact of school principal leadership variables, organizational culture, and teacher competence on teacher performance. Akram (2010) also emphasized four crucial factors for enhancing teachers' job performance: attitude toward students, subject mastery, teaching methodology, and personal characteristics.

Moreover, it is important to develop professional development projects that enhance school officials' understanding of teacher motivation and effective performance management. By utilizing performance management as a developmental tool, teachers' motivation can be optimized, leading to improved performance outcomes.

Supporting the influence of external factors on teacher performance, Kagema and Irungu (2018) observed that teachers perceived government regulations as unfavorable in terms of career advancement and policy implementation. This suggests that external factors and regulations imposed on teachers can significantly impact their motivation and performance.

In conclusion, the related studies discussed above significantly contribute to the current study and provide valuable insights into the areas being examined. These studies shed light on various aspects of teaching performance, professional development, student achievement, and instructional strategies. The findings highlight the importance of factors such as teacher training, educational attainment, scaffolding techniques, and adapting instruction to meet diverse learning needs.

This study aimed to determine if the number of training hours of Science teachers related to the domains covered by the Classroom Observation Tool (COT) significantly predicts their teaching performance

Specifically, the study sought to answer the following questions:

1. What is the profile of the STEM Science teachers in terms of the no. of hours of training relevant to the following domains?

1.1. Content Knowledge & Pedagogy;

1.2. Learning Environment;

1.3. Diversity of Learners;

1.4. Curriculum and Planning; and
1.5. Assessment and Reporting?
2. What is the teaching performance of the STEM Science teachers in terms of the S.Y. 2021-2022 Classroom Observation Tool (COT)?
3. To what extent does STEM Science teachers' profile predict/influence teachers' COT performance?

Methodology

The study used an explanatory sequential design, consisting of two phases. First phase involved a quantitative study to collect data on Science teachers' profile (training hours) and teaching performance (COT ratings). Quantitative data analysis explored patterns and predictive ability of the independent variables to the dependent ones. In the second phase, qualitative data was collected through interviews with selected key informants, providing additional insights and explanations to complement the quantitative findings.

By employing this design, the study aimed to integrate quantitative and qualitative data, triangulating the results for a comprehensive analysis. The quantitative phase offered statistical evidence, while the qualitative phase provided nuanced insights, enhancing understanding of the factors influencing teacher performance and student outcomes.

Through the colloquium, the work was reviewed and polished by a panel of experts. The finalization of the manuscript was done immediately after that. The pandemic, however, caused a delay in the questionnaire distribution. The permission letters were sought from the offices of the superintendents of the schools in Bohol, Tagbilaran City, Dumaguete City, Tanjay City, Bais City, Siquijor, and Negros Oriental. The principals of the identified SHSs that provide STEM programs were given signed and authorized requests. The involvement of the respondents was entirely voluntary, and they were free to opt-out at any point with no repercussions.

The data collection process used a mixed approach. Some respondents decided to respond using a Google form, while others completed hard copies of the surveys that were retained in a brown envelope to protect the secrecy of the information provided. Along with the main objective, instructions were correctly supplied for the responses. When the respondents wanted clarification, the researcher made sure to be reachable through text, phone, email, and/or online. After the respondents in each school had finished their responses, the questionnaires were recovered. In order to further secure the respondents' anonymity, all of the surveys were kept in a locked box after being retrieved. The collected information was handled, examined, and interpreted.

Furthermore, because the nation has not yet been deemed COVID free, the minimum health standard was followed throughout the whole data collection process.

Results and Discussion

After a thorough analysis of the study, the researcher came up with the following findings:

1. Profile of the STEM Teachers

1.1 Number of hours of training

1.1.1 In terms of content knowledge and pedagogy, 66 out of 107 respondents, or 61.68 percent, received training ranging between 1 and 24 hours.

1.1.2 Regarding the learning environment, a majority of the respondents (64.49%), or 69 out of 107 individuals, underwent training for a duration of 1-24 hours.

1.1.3 In terms of learner diversity, 68 out of 107 respondents, or 63.55 percent, completed the training in a range of 1 to 24 hours.

1.1.4 Regarding curriculum and planning, a majority of the respondents (68.22%), or 73 out of 107 individuals, underwent training for a duration of 1-24 hours.

1.1.5 In terms of assessment and reporting, 69 out of 107 or 64.49% of the total respondents took the training in a range of 1-24 hours.

The in-depth interview complemented the above-stated findings because 80% of the key informants reported that science teachers typically received trainings ranging from 3 to 14 hours.

2. Teaching performance of STEM Science Teachers in COT

While "consolidating" received the highest frequency in both semesters with a frequency of 40 out of 107 or 37.38% of the total respondents for the first semester and 44 out of 107 or 41.12% of the total respondents for the second semester, "organizing" received the lowest frequency with a frequency of 0 out of 107 or 0% of the total respondents in both semesters. This indicates that the teachers consistently align the indicator's pedagogical components with student growth in a way that supports students' success as learners.

Based on the interviews conducted, it was found that out of 14 respondents, 10 of them expressed that the Classroom Observation Tool (COT) was implemented without the presence of students. This finding indicates that teachers perceive the existing assessment process as insufficient in capturing the actual impact of their teaching on student learning outcomes. While two (2) respondents provided the significance and purpose of Classroom Observation Tool (COT) in the context of teaching STEM.

3. Science Teachers' Training Hours Related related to COT Domains and their Teaching Performance

3.1 Content Knowledge and Pedagogy Training Hours versus COT Performance

The COT Performance of teachers can be predicted by Content Knowledge & Pedagogy with 0.46% certainty.

3.2 Environment Training Hours versus COT Performance

The COT Performance of teachers can be predicted by Learning Environment Training Hours with 0.006% certainty.

3.3 Diversity of Learners Training Hours versus COT Performance

The COT Performance of teachers can be predicted by Diversity of Learners Training Hours with 4.53% certainty.

3.4 Curriculum & Planning Training Hours versus COT Performance

The COT Performance of teachers can be predicted by Curriculum & Planning Training Hours with 0.34% certainty.

3.5 Assessment & Reporting Training Hours versus COT Performance

The COT Performance of teachers can be predicted by Assessment & Reporting Training Hours with 0.38% certainty.

The study findings indicate that training hours across all COT domains have very low predictive power in relation to teachers' COT performance. The qualitative component of the study aligns with these results, as 60% of the respondents expressed that the number of teacher training alone does not determine COT performance. Instead, it depends on how effectively teachers apply the acquired knowledge. Conversely, 40% acknowledged that training can offer valuable assistance in specific areas.

Conclusion

Based on the findings provided, the following general conclusions can be made:

The findings revealed that a significant portion of teachers received training ranging from 1 to 24 hours in various aspects such as content knowledge, pedagogy, learning environment, learner diversity, curriculum, and assessment. The findings also indicate that the number of training hours has limited predictive power for teacher performance. The qualitative findings align with these quantitative results and emphasize the impact of reduced class interaction during the pandemic.

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