Effect of Teaching Practices on Student Academic Achievement in Science Subjects at Secondary Level in Malakand Division Khyber Pakhtunkhwa

Aftab Ahmad	PhD Scholar, Department of Education Mohi-Ud-Din University, Islamabad.
Dr. Muhammad Javed Iqbal	Professor, Department of Education Mohi-ud-din University Islamabad, Pakistan.

ISSN: 3006-6549 (ISSN-L)
ISSN: 3006-6557 (Online)
ISSN: 3006-6549 (Print)

October-December
Vol. 2, **No.** 3 (2024)
Pages: 254-258

Keywords:
Teaching Practices, student academic achievement, Science subjects

Corresponding Author:
Aftab Ahmad
Email: aftabphd2016@gamil.com

Abstract: *This study was conducted to assess the effects of teaching practices on students' academic achievement in Science subjects at secondary level in Malakand division. The population of the study was all the secondary schools, science teachers, students and school heads of Malakand division KPK .Stratified random sampling technique was used Sample of the study was 200 secondary schools, 250 secondary school science 380 science students of class X and 20 school heads. Mixed method was used to triangulate the data. To assess the effects of teaching practices on students' academic achievement in Science subjects at secondary level, rating scales for teachers was used and the student academic achievement was measured through secondary school Board result in grades. Pearson correlation and regression tests were used to analyze the data. It was found that there is statistically moderate positive association between academic achievement and teaching practices.*

Introduction

A community's growth and collapse can be related to the rise and fall of science education, accordingly. A scientifically and technologically advanced country is more developed than one with a weak scientific base (Jan et al., 2024; Faize & Dahar, 2011). According to Carrillo (2015), science has contributed significantly to human existence, culture, and civilization. It is a foundation for personal and social development, and its outcome benefits human society and creates prosperity. Secondary school science subjects (biology, chemistry, and physics) are extremely important in the field of education. Students who take science classes improve their observation, experimentation, critical thinking, problem solving, and practical work skills. Students learn new theories that emphasize the ability to manipulate the physical world (Bean & Melzer, 2021). According to Falloon (2020), teaching is an art that requires teachers to have not only academic and professional skills, but also to practice teaching through various approaches throughout their lives. Science teachers' teaching methods are important in classroom practices if they follow appropriate teaching instructions based on the needs of science topics and students (Tufail et al., 2019). The appropriate use of interactive teaching methods facilitates the construction of scientific knowledge and increases learners' potential for critical thinking and problem solving (Burrows and Slater, 2015). Akhtar (2019). It has been discovered that science teachers are ineffective at teaching science; the most common teaching strategy is the chalk and talk method; laboratory work is neglected; and memorization is the most rewarding method of learning. In the same manner. Tebabal and Kahssay (2011) argue that traditional methods are teacher- centered with no

activity for the learners making them passive and therefore obtaining knowledge from the teacher without building their engagement level with the subject matter and this approach is least practical, more theoretical and memorizing.

Ahmed (2013) viewed that Lecture is teacher centered method of teaching is the one way communication where by the teacher delivers the materials orally while the learner listens or takes down notes. One of the traditional techniques of teaching involves primarily oral presentation of concepts, with the teacher doing the majority of the activities in the form of talking while the students are passive listeners or very slightly participating (Himmele and Himmele, 2017).

The lecture method is useful when introducing new subject matter or presenting over view summaries to student, it can be used for teaching group of any size and the teacher to cover a lot of content in short space of time (Hussain, Azeem & Shakoor, 2011). Osuyi and Anthony (2018) described the lecture method as a process in which the teacher or some other knowledgeable person supplies information to the students. Lecture teaching method does not encourage students' active participation in the class, it may lead to lack of interest on the part of the students. It encourages cramming of facts which students may not be able to recall correctly. However, lecture teaching method is not without some advantages. For example it is effective for managing large class size; it saves time and cheaper to use. Demonstration in science teaching method is a planned manipulation of scientific apparatus and materials so that learners observe first-hand scientific principles or laws. Scientific concepts are made easier to comprehend and connect to real-life experiences if explained alongside an observed demonstration (Basheer et al., 2017).

Demonstrations boost generalization by encouraging active participation from students and increasing their attention level (Awudi & Danso, 2023). Similarly, Johnson et al. (2014) believed that including components of cooperative learning into demonstration classes could help students better understand what they were taught. Ameh and Dantani (2012) found that demonstration approach as effective in enhancing chemistry achievement of secondary school students further argued that the approach allows active participation of students in the lesson. Hemantha kumar, Sultana, and Zarzari (2013) reported a similar finding where the achievement of biological science students has improved significantly by using the demonstration instructional approach.

Objective of the Study

i. To assess the effects of teaching practices on students' academic achievement in Science subjects at secondary level.

Research Question

i. What are the effects of teaching practices on student academic achievement in science subjects at secondary level?

Methodology

In this study, a mixed mixed-method design was adopted. In mixed method design, Creswell (2011) perceives that using quantitative and qualitative methods conveys a comprehensive understanding of a research problem. Effects of teaching practices on students' academic achievement in Science subjects were found. Independent variable and its effect on dependent variables i.e teaching practices effect on student academic achievement were assessed.

Population of the Study

It was comprised of 394 Secondary Schools, 673 Secondary school science Teachers (SSTs) and 30948 science students' school heads of Malakand division.

Sample and Sampling

A stratified random sampling technique was adopted to select the sample from the population. / was 200 public secondary schools for boys, 250 science male teachers, 380 science students, 20 school heads were taken from 7 districts of Malakand division of KPK Pakistan.

Research Instruments

As per following detail four research instruments were designed after review of the related literature.

A five point Likert scale comprising 50 items for Secondary School science teachers was developed to collect the data about the teaching practices and its effect on student academic achievement. The student academic achievement was measured on the basis of board results.

Validation and Pilot Testing of Research Instruments

These research instruments were validated by the 12 experts of the field of education. In the light of their comments and input instruments, few items were dropped and remaining was improved. Instruments were pilot tested. Reliability alpha value for Rating Scale for secondary school science teachers 0.976, Rating scale for secondary school teachers 0.977, it determined significant Cronbach alpha value,

Data Collection

Data was collected personally by the researchers from approachable areas, whereas, data from distant areas were collected through emails. The response rate was 92 percent.

Data Analysis

In this study, data was collected through three Rating Scales, an interview schedule. Then it was tabulated and as well as decoded as per five point Likert scale i.e. strongly disagree, disagree, undecided, strongly agree ,agree To assess the effects of teaching practices on student academic achievement Pearson correlation test was used to find the relationship.

Table 4.57

Independent variable	Dependent variable	Coefficient correlation(r)
Teaching practices	Academic achievement	0.47

The table 4.21 show that There is a moderate positive correlation between teaching practices and academic achievement, $r = 0.47$ indicating that improved teaching practices are associated with higher levels of academic achievement.

Conclusion

This study was conducted to assess the effect of teaching practices on student academic achievement in science subjects at secondary-level schools in Khyber Pakhtunkhwa, Pakistan. The study found that science teachers adopt a dual approach to instruction, relying on traditional methods such as lectures and demonstrations while also recognizing the importance of modern, student-focused strategies. The finding of the study identified that Majority of teachers use the lecture method and teachers use demonstration method in their daily teaching practice for science subjects. This study shows that there is a moderate positive correlation between teaching practices and academic achievement.

References

Ahmed, A. K. (2013). Teacher-centered versus learner-centered teaching style. *Journal of Global Business Management*, *9 (1)*, 22.

Akhtar, A. (2019). *Effect of E-Learning as a Supplement to Traditional Method of Learning in Biology At Secondary School Level* (Doctoral dissertation, Sarhad University of Science and Information Technology, Peshawar.)

Ameh, P. O., & Dantani Y. S. (2012). Effect of lecture and demonstration methods on the achievement of students in chemistry in Nassarawa Local Government Area of Kano State. *International Journal of Modern Social Sciences, 1(1),* 29-37.

Aslam, M., & Kingdon, G. (2011). What can teachers do to raise pupil achievement?. *Economics of Education Review*, *30*(3), 559-57

Awudi, B., & Danso, S. (2023). Improving students' performance and conceptual understanding of heat transfer using demonstration method. *Journal of Mathematics and Science Teacher*, *3*(2).

Basheer, A., Hugerat, M., Kortam, N., & Hofstein, A. (2017). The effectiveness of teachers' use of demonstrations for enhancing students' understanding of and attitudes to learning the oxidation-reduction concept. *Eurasia Journal of Mathematics, Science and Technology Education, 13(3),* 555–570. https://doi.org/10.12973/eurasia.2017.00632a

Bean, J. C., & Melzer, D. (2021). *Engaging ideas: The professor's guide to integrating writing, critical thinking, and active learning in the classroom*. John Wiley & Sons

Bernard, R. M., Borokhovski, E., Mihov, B., & Schmid, R. F. (2021). A meta-analysis of teacher and student-centered practices and processes in undergraduate science education. *Journal of Higher Education Theory and Practice, 21(10)*.

Burrows, A., & Slater, T. (2015). A proposed integrated STEM framework for contemporary teacher preparation. *Teacher Education and Practice, 28(2–3),* 318– 330.

Carrillo, F. J. (2015). Knowledge-based development as a new economic culture. *Journal of Open Innovation: Technology, Market, and Complexity*, *1*(2), 1-17.

Euzent, P., Martin, T., Moskal, P., & Moskal, P. (2011). Assessing student performance and perceptions in lecture capture vs. face-to-face course delivery. *Journal of Information Technology Education, 10(1)*, 295–307.

Faize, F. A. & Dahar, M. A. (2011). Effect of Mother's Level of Education on Secondary Grade Science Students in Pakistan. *Research Journal of International Studies, 19,*13-19.

Falloon, G. (2020). From digital literacy to digital competence: the teacher digital competency (TDC) framework. *Educational Technology Research and Development*, *68*, 2449-2472.

Ford, M. B., Burns, C. E., Mitch, N., & Gomez, M. M. (2012). The effectiveness of classroom captures technology. *Active Learning in Higher Education, 13(3),* 191–201

Hemanthakumar, A. G., Sultana, Z., & Zarzari, H. (2013). A study of demonstration method as an activity based method of teaching biological science. *International Indexed & Refereed Research Journal, 4,* 47-48.

Himmele, P., & Himmele, W. (2017). Total participation techniques: Making every student an active learner. ASCD.

Hussain, A., Azeem, M., & Shakoor, A. (2011). Physics teaching methods: scientific inquiry vs traditional lecture. *International Journal of Humanities and Social Science*, *1 (19),* 269-276.

Jan, S.U.K., Alam, H., Khan, D, Ali, A., Anwar, M & Khan, A. (2024). Effects of Substance Use Disorder on the Students' Academic Performance in Khyber Pakhtunkhwa, Pakistan. *Remittances Review, 2024, 9 (2).*

Johnson, D. W., Johnson, R. T., & Smith, K. A. (2014). Cooperative learning: Improving university instruction by basing practice on validated theory. *Journal on Excellence in University Teaching*, *25*(4), 1-26.

Julies, A. (2020). An Exploratory Study on the Influence of Student-centered Teaching Methods on Student Motivation Towards Education (Doctoral dissertation, The IIE).

Kloser, M. (2014), "Identifying a core set of science teaching practices: A delphi expert panel approach: CORE SCIENCE TEACHING PRACTICES", *Journal of Research in Science Teaching*, Vol. 51(9), pp. 1185–1217, https://doi.org/10.1002/tea.21171

Naureen, D. J., Durrani, D. N., Brown, R., & Orr, D. D. (2013). Pedagogy, curriculum, teaching practices and teacher education in developing countries.

OSUYI, O., & ANTHONY, A. U. (2018). EFFECT OF DEMONSTRATION TEACHING MEHTOD ON STUDENTS'ACADEMIC PERFORMANCE IN BASIC ELECTRICITY IN TECHNICAL COLLEGES IN EDO STATE. *Journal of Education in Developing Areas*, *26*(2), 703-712.

Qaiser Suleman, H. D. (2011). EVALUATIVE STUDY OF THE EFFECTIVENESS OF TEACHING PERFORMANCE OF IN-SERVICE PROMOTED SECONDARY SCHOOL TEACHERS IN KHYBER PUKHTUNKHWA

(PAKISTAN). *International Journal of Humanities and Social Science.*

Tebabal, J., & Kahssay, E. 2011. The role of teacher's initiation in online pedagogy‟ Education Training Vol. 54 No. 6, 2012 pp. 456-471

Tufail, I., & Mahmood, M. K. (2020). Teaching methods preferred by school science teachers and students in their classroom. *PUPIL: International Journal of Teaching, Education and Learning*, *4*(2), 332-347.

Van-Dulmen, T. H., Visser, T. C., Pepin, B., & McKenney, S. (2023). Teacher and student engagement when using learning materials based on the context of cutting-edge chemistry research. *Research in science & technological education, 41(4)*, 1617-1638.