

Role of Self-Assessment in Professional Development of Teachers in Science Subjects at Secondary Level: Gender and School Location

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Abstract

The study's primary goal was to look into the "The Role of Self-Assessment in Professional Development of Teachers in Science Subjects at Secondary Level." Our goals were to see how teachers evaluate themselves, how this evaluation helps them become better teachers, and how it affects their teaching methods. We also wanted to know if self-assessment helps teachers meet the needs of their students and how teachers feel about using it for their professional growth. The results of our study gave us a clear picture of how self-assessment plays a crucial role in helping science teachers improve and adapt to the changing demands of their profession at the secondary level. Simple stratified sampling was used for the collection of data. All the public, male and female secondary schools of DG Khan were selected as a population of study. Data was collected from 470 Male and 439 female teachers of all four tehsils of district DG Khan. The data was collected from rural and urban school teachers from district DG Khan and three tehsils. Researcher was adopted the questionnaire. The validation and amendment of questionnaire was based on expert opinion. The reliability of the questionnaire was assessed through Cronbach's alpha. One questionnaire selected for research the teachers. Research questionnaire was contained the two sections like first section described the demographic information of participant and the second section contained the 21 questions to analysis of teachers perception The Role of Self-Assessment in Professional Development of Teachers in Science Subjects at Secondary Level. There were 21 statements in teachers' questionnaire. SPSS was used to examine the data. The data were analyzed and interpreted using inferential statistics (one way ANOVA and independent t-test) and descriptive analysis (mean and percentage).

1. Introduction

Student self-assessment stands out in the present standards-based education environment in its ability to promote learning and student interest and motivation. When used properly, student self-assessment may foster more meaningful acquiring knowledge, internal control over effort, intrinsic drive, and a mastery goal orientation. Because of its

potent effect on how students perform on evaluations given in the classroom as well as large-scale accountability exams, pupils are better able to direct their own learning and internalize the standards for success (Jeong, & Frye, (2020). Evaluating oneself is essential to learning, regardless of whether one is a teacher or a pupil. In reality, when it comes to abilities, attitudes, pedagogy, and fresh information that is pertinent to the current educational framework, instructors also play the role of learners.

The aim of this research project is to investigate how self-assessment contributes to the professional growth of scientific instructors. The purpose of the study is to find out how science educator professional growth, topic knowledge, and teaching methods are affected by their own self-evaluations. This research highlights the value of self-evaluation and offers suggestions to science instructors on how to utilise it to further their professional growth (Herman et al., 2000). According to Duffy and Cunningham (1996), self-assessment is the process of analysing one's own learning and growth by accepting accountability for one's own advancement, determining one's strengths and shortcomings, and formulating an improvement plan. Self-assessment is a useful tool for improving topic knowledge and teaching techniques in scientific education. According to Avni and Lomsky-Feder (2015), instructors may improve their instructional quality by identifying their areas of growth and developing the necessary abilities through self-assessment.

Hadjerrouit's (2014) study brought attention to the effect that self-evaluation has on the professional growth of scientific instructors. According to the study, science instructors were able to discover their areas of weakness and pick up new techniques by using self-assessment. Instructors who self-assessed reported learning more about the science subjects, which enhanced their instruction. Additionally highlighting the benefits of self-assessment for teachers' professional growth are (Boud, & Molloy, 2013). According to the study, instructors who self-assess their practices are more introspective and have a development mentality (Goddard et al., 2004).

The term "change" is frequently used in scientific education research to refer to the necessity of enhancing practices, subject understanding, and attitudes. The National scientific Education Standards (National Research Council, 1996) published in 1996 provided a major boost to the movement for changes in scientific teaching practices. The National scientific Education Standards outlined the specific teaching strategies required to raise student academic progress and the calibre of scientific education. According to Crawford (2000), the National scientific Education Standards advocate for a culture of scientific teaching and learning that can only be achieved via inquiry-based, student-centered schools.

According to Darling-Hammond and McLaughlin (1995), professional development initiatives that call for teachers to alter their attitudes and methods as a means of growth are more likely to be successful if they are grounded in an awareness of how teachers learn and how education changes. We consulted a number of well-known international studies on teacher learning (Ball, & Cohen (1999) as well as studies on professional development programmes (Bubb & Earley, 2007) and changes in education (Fullan, 2001) when responding to the research brief. We start by providing a succinct overview of the important literature that has shaped our viewpoint for the investigation. This literature incorporates models and studies on "teacher learning" and "professional development."

Timperley et al. (2007) classified eighty-four design elements of professional development programmes, such as the program's content and methodology, the school environments in which teachers work, and the social milieu in which they operate. These lists of key operating components and design elements have drawn criticism, but they also aid in simplifying the wide range of intricate programmes. These lists have drawn criticism from two groups of reviewers: Sztajn et al. (2011) for drawing attention away from pertinent conceptual and theoretical frameworks, and Opfer & Pedder (2011) for being grounded in process-product logic, which defines programmes in terms of visible features or processes rather than the purposes for which these processes are used.

2. Current Study

Following were the research questions of the study.

1. What are the benefits of using self-assessment for enhancing the professional development of science teachers?
2. How does self-assessment contribute to the improvement of teaching strategies and methodologies of science teachers?
3. How can self-assessment be utilized to help science teachers address the learning needs of their students?
4. What are the prominent perceptions among secondary school teachers regarding the role of self-assessment in their professional development in science subjects?

3. Material and Method:

3.1 Research Design and Participants

This study was quantitative research in nature and used co-relational survey design because; it identified the relationship between self-assessment and its impact of teachers' professional development. In co-relational research design, researcher involves to observe two variables to establish statistical corresponding relationship between these variables (Creswell, 2012). This research design is also a non-experimental research design which is used to measure two variables. Co-relational research purpose is, to identify variables which have some kind of relationship in such sequence that, a change in one creates some change in the other. It allows researchers to investigate not just the depth of a topic in the qualitative phase but also the breadth of the subject in the quantitative phase. "The objective of this approach is to employ quantitative data and results to assist in the understanding of qualitative findings," as Tashakkori (2002) explains it.

Population in research study is normally represents very large collection of objects and individuals which has main focus on scientific query for data analysis. Population study is very important point for researcher. Due to large number of participants, researchers cannot check and test each participant from the population because this is too costly and time consuming factor. That's why; researchers often rely on sampling (Creswell, 2012). Secondary school teachers from four tehsils in District Dera Ghazi Khan participated in this study: Dera Ghazi Khan, Taunsa, Kot Chutta and Koh-e-Suleman. A printed questionnaire was given to these individuals to complete. To participate in this study, teachers were residents of District Dera Ghazi Kha. Teachers were selected from multiple schools and tehsils to provide trustworthy, dependable, and authentic findings.

The sample teachers included 470 male and 439 female teachers to get an even gender division among participants.

3.2 Instrumentation and Data Collection

The instructors' responses on a standardized questionnaire were gathered. There will be two sections to the questionnaire. Demographic details like gender, age, kind of school, and teaching experience will be included in the first part. Questions about the function of self-evaluation in secondary science teachers' professional development will be found in the second part. The questionnaire was created using a review of the literature, and a group of specialists will validate it.

Research tool was validated through expert opinion and pilot testing. The validity of research instrument was assessed through expert opinion. All experts were opinioned that 5-point Likert scale was very easy to understand and all the items were related to research topic. Experts also praised that all participants will feel easy to response so that they can response every question easily. As well as the questions for teachers were also easy to understand to reply. In pilot testing, research tool was conducted from 50 teachers of different secondary schools. The purpose of this procedure is to measure the feasibility, time, risk and performance of the research tool. Tool was completely understood and responds easily all items by the students and teachers. It was estimated that teachers take around 15 to 20 minutes to fill the questionnaire and return it to the respondents. Teachers were bound to answer the questionnaire in 5-point Likert scale. This Likert scale was ranging from 1- Strongly Disagree, 2- Disagree, 3- Neutral, 4- Agree, 5- Strongly Agree. Research tool was assessed valid through pilot test. The reliability of research tool defined as instrument is consistent in nature. It determined the degree from which a questionnaire is regularly measured what it attempted to measure. Researcher seeks the answers of this question that, does the tool consistently check what it designed to do? The reliability was measure from scale through SPSS and Cronbach's Alpha was found 0.32. The reliability value at 0.5 was considered appropriate. Overall scale reliability value of this study was calculated 0.95.

4. Data Analysis and Results

To administer the questionnaire, researcher had taken permission from CEO (DEA) D.G. Khan and as well as all the heads of public secondary schools male female for the questionnaire. It was assured by researcher to educational authority of district D.G.K and participants of study that all the information will remained confidential. All ethical concerns were practiced in the institutions during survey. Questionnaire were handed out and filled by the Teachers of secondary schools in the supervision of researcher in the classrooms during school time. Total 654 questionnaires were distributed among teachers .

Table 1: Independent sample t-test of role of self-assessment and professional development of teachers on the basis of school location

| Variable | School location | N | Mean | SD | df | t-value | p-value |
|--|-----------------|-----|-------|------|-----|---------|---------|
| Enhancing teaching effectiveness through SA | Urban | 276 | 17.17 | 3.30 | 435 | 10.39 | .000 |
| | Rural | 161 | 20.54 | 2.73 | | | |
| Meeting learning needs through SA | Urban | 276 | 21.39 | 4.59 | 435 | 9.89 | .000 |
| | Rural | 161 | 25.48 | 3.32 | | | |
| Shaping teaching strategies through SA | Urban | 276 | 14.14 | 3.10 | 435 | 11.55 | .000 |
| | Rural | 161 | 17.47 | 2.50 | | | |
| Teachers' perspectives on Self - Assessment in their PD. | Urban | 276 | 21.55 | 4.77 | 435 | 10.22 | .000 |
| | Rural | 161 | 26.18 | 4.18 | | | |

Table 1 shows an independent sample t-test that was applied to Enhancing teaching effectiveness through SA, Meeting learning needs through SA, Shaping teaching strategies through SA and Teachers' perspectives on Self -Assessment in their PD on the basis of school location scores. With respect to school location, statistically there was a significant difference in results for Enhancing teaching effectiveness through SA of urban school (Mean=17.17, SD=3.30) and rural schools (Mean=20.54, SD=2.73), $t=10.39$, $p=.000$ (two-tailed). There was also a significant difference in results for Meeting learning needs through SA of urban school (Mean=21.39, SD=4.59) and rural schools (Mean=25.48, SD=3.32), $t=9.89$, $p=.000$ (two-tailed). There was also a significant difference in results for Shaping teaching strategies through SA of urban school (Mean=14.14, SD=3.10) and rural schools (Mean=17.47, SD=2.50), $t=11.55$, $p=.000$ (two-tailed). There was also a significant difference in results for Teachers' perspectives on Self -Assessment in their PD of urban school (Mean=21.55, SD=4.77) and rural schools (Mean=26.18, SD=4.18), $t=10.22$, $p=.000$ (two-tailed).

Table 2: Independent sample t-test of role of self-assessment and professional development of teachers on the basis of gender

| Variable | Gender | N | Mean | SD | df | t-value | p-value |
|--|--------|-----|-------|------|-----|---------|---------|
| Enhancing teaching effectiveness through SA | Male | 229 | 18.41 | 2.99 | 435 | .017 | .986 |
| | Female | 208 | 18.41 | 4.00 | | | |
| Meeting learning needs through SA | Male | 229 | 23.19 | 3.98 | 435 | 1.40 | .161 |
| | Female | 208 | 22.57 | 5.20 | | | |
| Shaping teaching strategies through SA | Male | 229 | 14.96 | 2.81 | 435 | 2.75 | .006 |
| | Female | 208 | 15.82 | 3.74 | | | |
| Teachers' perspectives on Self - Assessment in their professional development. | Male | 229 | 23.17 | 4.33 | 435 | .40 | .689 |
| | Female | 208 | 23.36 | 5.80 | | | |

Table 2 shows an independent sample t-test that was applied to Enhancing teaching effectiveness through SA, Meeting learning needs through SA, Shaping teaching

strategies through SA and Teachers' perspectives on Self -Assessment in their PD on the basis of gender for male and female. Statistically there was a significant difference in results for Enhancing teaching effectiveness through SA of male (Mean=18.41, SD=2.99) and female (Mean=18.41, SD=4.00): $t=.017$, $p=.986$ (two tailed). There was also a significant difference in results for Meeting learning needs through SA of male (Mean=23.19, SD=3.98) and female (Mean=22.57, SD=5.20): $t=1.40$, $p=.161$ (two tailed). There was also a significant difference in results for Shaping teaching strategies through SA of male (Mean=14.96, SD=2.81) and female (Mean=15.82, SD=3.74): $t=2.75$, $p=.006$ (two tailed). There was also a significant difference in results for Teachers' perspectives on Self -Assessment in their PD of male (Mean=23.17, SD=4.33) and female (Mean=23,36, SD=5.80): $t=.40$, $p=.689$ (two tailed).

5. Discussion

This study aimed to investigate five main areas: the role of teachers' self-assessment in secondary continuing education; the effectiveness of educators every self-assessment in enhancing their professional development; the influence of teachers' self-assessment on their science instructional approaches and methodologies; the role of teachers' self-examination in addressing their requirements for learning and aligning them with the demands of the profession; and teachers' opinions concerning the role of teachers' self-evaluate in secondary professional development. Thus, the significance of self-assessment in professional growth for educators was discovered by this research.

Concerning the question of "Whether self-assessment can be a strategy to enhance teachers' professional development," the results of the current study demonstrate that SA may be a useful tactic for improving science instructors' professional development. Numerous research backed up Dhillon and Kaur's (2021) assertion that self-reflection and SA are necessary to guarantee instructors' quality. In order to increase instructors' consciousness of their performance quality and competency, the instructors' SA is essential. It helps aspiring teachers learn and develop progressively, and it helps seasoned educators advance their career prospects (Akram & Zepeda, 2015). One of the most effective instruments for teachers' improvement is teachers' SA (Akram & Zepeda, 2015, 2013). According to Akram, Munir, and Bilal (2021), self-assessment (SA) is a useful and affordable method for instructors to evaluate themselves and develop a drive for self-improvement. As per Sharma and Pandher (2018), Bakhmat (2017), Borgmeier, Loman & Hara (2016), it forces educators to assess their own work.

Subsequent research revealed that instructors tend to overestimate their own effectiveness when self-evaluating, which might hinder their professional development. Because one cannot strengthen their shortcomings unless and until they are aware of them. Regarding this, Borg and Edmett (2019) agree that there are questions regarding the validity of instructors' self-assessments since they might be biased to give themselves an excessively high rating. Borg (2018) proposed a solution to this issue by combining instructors' SA with other metrics or indicators such teachers' portfolios, peer observations, and classroom observations. SA encourages TSE by bolstering teachers' confidence in their capacity to improve students' learning. These findings concur with those of Bruce and Ross (2007). In a similar vein, SA has some beneficial effects on teacher self-efficacy and success levels (Harlen, 2007). Additionally, Coronado-Aliegro

(2007) asserted a strong correlation between SA and teacher self-efficacy. Similar findings were shown by Zhou, Zheng, and Tai (2020), who asserted that TSE is a crucial variable for professional development for teachers since it may predict both the attitudes of instructors and the academic performance of their pupils (Guskey, 2002).

6. Conclusions and Recommendations

It is concluding that there is significant difference in enhancing teaching effectiveness through SA on the basis of school location. It is concluding that there is significant difference in Meeting learning needs through SA on the basis of school location. It is concluding that there is significant difference in Shaping teaching strategies through SA on the basis of school location. It is concluding that there is significant difference in Teachers' perspectives on Self -Assessment in their PD on the basis of school location. It is concluding that there is significant difference in enhancing teaching effectiveness through SA on the basis of gender. It is concluding that there is significant difference in meeting learning needs through SA on the basis of gender. It is concluding that there is significant difference in Shaping teaching strategies through SA on the basis of gender. It is concluding that there is significant difference in Teachers' perspectives on Self -Assessment in their PD on the basis of gender. Based on the findings of this study, the following recommendations are proposed: Educational authorities should develop and implement professional development programs that emphasize the importance of self-assessment. These programs should include workshops, seminars, and workshops that will provide teachers with the information and tools they need to effectively self-evaluate. It is recognized that there are significant differences in self-assessment by gender and school environment and that support should be tailored to this difference. Professional development measures should be implemented to meet the specific needs of male and female teachers, as well as teachers in urban and rural areas.

Schools should create a culture that supports teachers to evaluate themselves regularly. This can be done by integrating self-assessment into the daily assessment process and giving teachers the opportunity to reflect on their practice and share their experiences with peers. Online portfolios, self-assessment software and mobile applications can provide teachers with a simple and effective way to measure their performance and track their progress.- Create a training program where experienced trainers can train and support colleagues with less experience in self-assessment. Peer support groups can be created to encourage collaborative learning and collaboration. Such a policy would ensure that self-assessment is an integral part of the professional development process. Research focusing on different disciplines and educational levels will provide a better understanding of the benefits and challenges of self-assessment. and better learning outcomes for students. Promoting self-evaluation as a key element of teacher development will help create better and more effective teaching.

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