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AN OVERVIEW OF SCIENCE TEACHER EDUCATION IN PAKISTAN

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ABSTRACT

This article presents an analysis of some previous studies around education in Pakistan regarding Science Teacher education and aimed to explain the reality of the ST education situation in Pakistan. The study deemed view paper in different stages of education in Pakistan. The current study was processed by a qualitative method based on previous studies and researchers' reading as a historical study. Study outcomes were reported as follows: first, ST education practices by diploma stage better than others. Therefore, there is a lack of experience for preparing science teacher education, and other resources needed to teach science. Second, the Science Teacher education system in Pakistan is not enough and most studies indicate an exclusive involvement and need for supportive efforts by the Ministry of Education and improve it. Third, there are needed to encourage the researchers to examine other variables and attributions in ST education and how they can face the challenges in this field. Several aspects of ST education have been recommended.

Keywords: Teacher education; Pakistan; Science education; overview.

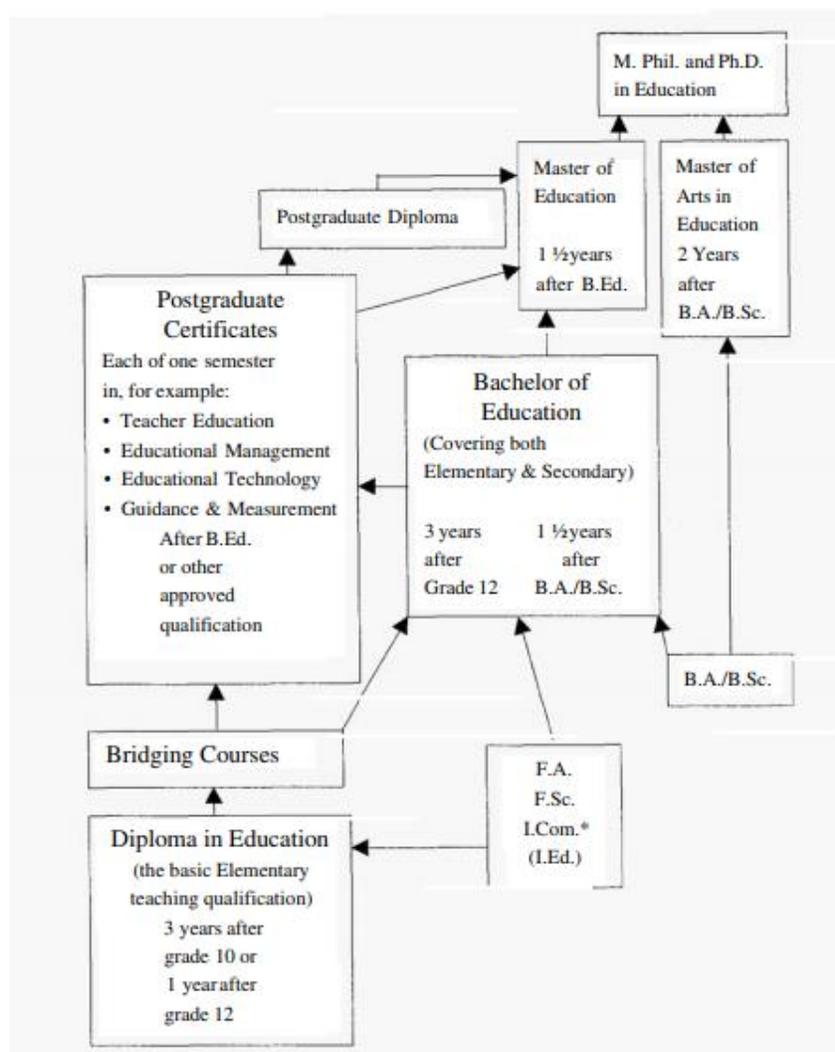
INTRODUCTION

The education of the teachers of a nation plays a defining role in the future of that nation and any amount of emphasis laid in this regard is not enough (Rakisheva et al., 2018). The prospects of the entire country and its success in various fields rely on how well-informed, literate, and educated, both qualitatively and quantitatively, the general population is, as great minds and future leaders are not going to fall from the sky rather emerge from these common people (Orhan and Altay, 2018). Education in the field of science, however, occupies an exceedingly crucial place in the prosperity as well as the survival of a nation. Consequently, facilitators of this discipline must have a clear understanding of the subject and must be equipped with the skills to successfully convey this information that is comprehensible for the students at that particular level of education (Al Rajhi, 2018). Both of these aspects along with pre-employment practical exposure are essentials that must be incorporated in science teacher education programs rather than focusing primarily on the provision of academic knowledge (Halai and Durrani, 2016; Hina, 2017). A fairly recent survey indicated that the present level of competency of science teachers was subpar despite the adequate certification renowned institutes (Saeed and Mahmood, 2002). This reflects poorly on the current state of policies and frameworks that have been introduced over the years in Pakistan to improve the status of teacher education.

Historical background

The current education system followed in Pakistan dates back to the late 1800s as it was first established by the British government (Iqbal and Mahmood, 2000). However, basic education in the field of science was not part of the curriculum and its main focus was reading, writing, and arithmetic (Government of Pakistan, 1975). Soon after independence, in 1947, the First Education Conference was conducted in Karachi as a result of which a Committee on Scientific Research and Technical Education were established, the importance of science education was highlighted, and notable changes at all levels of the education system were instigated (Government of Pakistan, 1947). Later, in 1959, a commission, assigned solely with the responsibility of introducing measures of improving the education system of Pakistan, recommended that schooling should primarily focus on the subjects of mathematics and science. Furthermore, this commission made teaching these subjects compulsory from grades six to ten and called attention to the dire need for better teacher education programs. It also proposed an appropriate teacher education programs for those teaching at primary and secondary levels respectively (Government of Pakistan, 1959). However, this only promoted the study of nature at the primary level and the quality of science education, itself, remained decrepit as analyzed by Iqbal and Mahmood (2000). In 1979, a National Education Policy was established which addressed the issues regarding the development of science as a separate and essential subject at all levels of the education system in Pakistan in-general and the secondary-level in particular. It highlighted the value of knowledgeable teachers and introduced teacher preparation programs for all disciplines (Government of Pakistan, 1979). As a result of these efforts on the part of the government, according to the data collected in 1989, there were 4 Institutes of Education and Research, 5 Departments of Education, and 11 Colleges of Education responsible for the preparation of secondary school teachers (Government of Pakistan, 1989). Later, in 1992, another Education Policy was presented which, not only pointed out the gaps in teacher education but also made key recommendations to improve this situation focusing primarily on the quality enhancement of in-service educators (Government of Pakistan, 1992). Furthermore, following the data collected and the recommendations made over the years, a thorough framework for ensuring high standards of teacher education in Pakistan (Figure 1)





*I.Com. – Intermediate in Commerce; I.Ed. – Intermediate in Education.

Figure 1. The proposed model of teacher education in Pakistan (Government of Pakistan, 1996).

Current Status and Frameworks

Adequate provision of basic science education serves as a bedrock for the development and prosperity of any nation in this era of modernization and innovation. To make this possible, the educators and facilitators in this field, at all the different levels of education, should be equipped with the highest grade of knowledge to ensure the delivery of requisite information in the best manner possible (Kumar, 1997).

Taking into consideration a wider perspective of this situation, 15 different national systems of teacher education were studied in 1990, one of the said systems being Pakistan (UNESCO, 1990). However, a bit remote, this article is noteworthy due to its extensive, rigorous, and well-versed nature. It covers all aspects of teacher education in Pakistan along with the other 14 countries, including the literature review up to that time, the frameworks being and/or to be implemented, the drawbacks, and the recommendations for improvement in the future.



An explicit book *Science Teacher Education* presents a more generalized approach to the topic (Abell, 2000) while also gathering the status of this discipline of education, particularly in Pakistan in one of its chapters. It provides an in-depth knowledge of the history of teacher education in Pakistan while also giving a comprehensive account on the more recent scenario concerning skill development and eligibility of science teachers and their roles at various levels of education in the light of different government policies introduced over a period (Iqbal and Mahmood, 2000).

A research paper shares the experience of a young Pakistani female educator in teaching science and a reflection on her teaching education based on this exposure (Halai, 2002). Halai (2003) also sheds light on the importance of equipping science teachers with enough insight regarding the nature of science (NOS) to deem them capable of tutoring this subject.

United Nations Educational, Scientific and Cultural Organisation (UNESCO) taking the significance of teacher education under consideration, has taken an impressive initiative to develop a thorough system that focuses on the various aspects of this field to ensure delivery of the highest quality of education. It has introduced the concept of teacher professional development (TPD) in Pakistan and after thorough research has given recommendations to translate this distant dream into reality (UNESCO, 2006a). In the same year, UNESCO also issued a publication highlighting the province-wise status of teacher education in Pakistan while appreciating the strengths and assessing the weaknesses of this discipline in the country to offer measures for improvement (UNESCO, 2006b).

The topic under consideration is discussed comprehensively in a book by Khushbakht Hina, who explains the entire pre-STEP model of teacher education introduced by the USAID and underlines the benefits this framework has to offer while also mentioning the hurdles the Pakistani education system possesses with regards to the implementation of this model (Hina, 2017). Along with highlighting the earliest to the latest education policies implemented in Pakistan, she also regards 2009 as the 'Era of Change' in the education system of Pakistan. Furthermore, said policies and reforms are critically analyzed to make intelligent recommendations for the future. Hina primarily focuses on addressing the issues that are specific to the literary system of Pakistan. A dissertation highlights the long and tedious journey of the development of general teacher education in Pakistan dating from before its creation up to the current situation mentioning three noteworthy eras of progress in this field (Chang, 2014). A case study published in 2011 discusses a different and easier approach for the promotion of teacher education in Pakistan as it describes the opportunity for attaining this education from a university that does not require physical presence on-campus, namely, the Allama Iqbal Open University (Jumani et al., 2011).

A research article published in 2015 underlines the importance of quality teacher education in the literature as well as the economic development of a nation. The author draws attention to the numerous fallbacks in the establishment of this discipline in Pakistan, and how it affects the progression of the entire education system as a whole. He reflects on the guidelines and reforms provided by the government. After his thorough analysis of the situation, he concludes that the pre-STEP model provided by the United States can offer the solution that our teaching framework lacks (Khan, 2015).

A reflective paper published in 2013 also draws attention to this pre-STEP framework of teacher education given by the USAID, however, it also claims that certain 'pseudo evaluations' have also been conducted in Pakistan to provide benefits to certain groups of people and the data present



is not very reliable (Huma, 2013). Additionally, Huma gives unambiguous directions for the correct evaluation of teacher education programs and urges researchers to follow these in the future along with incorporating good practices that can be learned from those researches in the USA. However, the literature on science teacher education specifically in this regard and implementation of the pre-STEP model is lacking.

A paper published in 2010 gathers the indicators that can be used to test the quality of teacher education programs and has implemented these to assess different frameworks being followed in Pakistan (Dilshad, 2010). Unfortunately, these have been used rather generally and no such literature is present that employs these to analyze science teacher education specifically.

The Education Policy in effect was presented in 2017 and will stay applicable until the end of 2025. It highlighted the shortfalls in the existing system of teacher education (Government of Pakistan, 2017). To address these shortcomings, the policy put forward the following:

- The teachers need to have B.Ed. (Hons) or BA/ BSc along with B.Ed. qualification to be able to teach elementary or secondary classes. Moreover, leeway is allowed for underqualified teachers provided that they are teaching in less developed regions where teachers are scarce.
- All programs should have the same content as five years B.Ed. Secondary to ensure that it is equivalent to masters (4 years BS with B.Ed. Secondary).
- The policy also requires yearly projections to be made to gauge the number of teachers needed. These projections will then be used in providing specialized teacher education programs in vocational as well as technical education. And, the educational institutions will collaborate to plan programs and the teacher admissions to prepare teachers accordingly.
- There needs to be uniformity amongst teachers in qualification and their designations throughout Pakistan. For this purpose, a performance-based reward system will be established to encourage teachers and provide opportunities for continuous professional development (CPD). CPD will be made available for all teachers every three years.
- The policy requires that the teacher education programs' curriculum be linked to National Professional Standard for teachers. Initial teacher education programs will be offered via face-to-face incorporating practical learning opportunities for teachers. Distance and virtual learning for teachers will also be provided to ensure that they are competent in using technology. However, these programs will not be entirely virtual as a significant portion will also include face-to-face learning to ensure the quality of teachers.
- Underqualified teachers will be provided face-to-face or distance learning opportunities. The face-to-face model will have programs over summers, weekends, or in the evening.
- Universities, as well as general post-graduate colleges, will be provided support to enable them in offering content courses in the relevant departments and programs of various pedagogical and cognitive sciences for the candidates.
- Programs requiring long term commitment shall have teachers with titles of two degrees like BS. and B. Ed. To attract a better quality of teachers.



- To ensure the quality of teachers, a standard-based teacher certification examination will be conducted by the government. The promotion of teachers will also be dependent on the performance of the teachers.

Fallbacks and Challenges

Multiple factors hinder the establishment and implementation of a system of teacher education in general and science teacher education in particular. Some of these are global challenges and issues while others are specific to developing countries like Pakistan. Numerous researches, after thorough evaluation, have identified the causes of poor science teacher education in Pakistan. Of these the most troublesome yet common one is the astonishing discrepancy between lucrative education policies on paper and their poor execution (Hina, 2017; Iqbal and Mahmood, 2000). Furthermore, the training institutions offering purely teaching courses are scarce, the duration of study is shorter than that recommended by international standards, older programs are being followed without the implementation of most recent updates, the theoretical learning rather than practical exposure is considered the main focus at universities offering teacher education courses, and in-service training, although promoted, is lacking in reality. The absence of a continuous system for the check and balance of the standard of education provided by these teachers and frameworks aiming towards the achievement of unrealistic goals only adds to these challenges (Baig, 1996). Another research conducted in 2016 identifies the lack of practical knowledge as a major factor causing poor teaching which reflects on substandard teacher education (Halai and Durrani, 2016). The researchers strongly recommend incorporating exposure to the real-life teaching experience during education rather than first-time workplace encounters.

Questionnaire-Based research conducted in 2004 assessed the understanding of science amongst Pakistani science teachers (Halai and McNicholl, 2004). It concluded that, although the ethnic backgrounds did not significantly affect their outlooks, most of these teachers incorporated religion while delivering purely scientific concepts which reflected poorly on their comprehension of the discipline.

CONCLUSION

A nation must be adequately equipped with an understanding and ability to implement science to survive in this era of modernization. Some basic scientific knowledge is essential for all individuals if they hope to live a successful and fruitful life. The father of the nation, Quaid-e-Azam, appreciated the significance of this discipline and tried his best to incorporate it in all levels of Pakistan's education system (Government of Pakistan, 1947). This is only possible if our science teachers have complete command over the subject and are skilled enough to convey this knowledge in a manner that is understandable for all students at that particular level of education. The government of Pakistan understands the significance of teacher education and since independence, many reforms, frameworks, and policies have been introduced, however, poor implementation and deficient monitoring systems have hindered the improvement that the education system of Pakistan was capable of achieving. The most recent literature analysis conducted on teacher education in Pakistan suggests that only blindly following international standards of teacher education without taking into consideration the problems that are specific



to our country is not the solution and that these frameworks, to be most widely accepted and implemented, must be contextualized rather than standardized (Rizvi & Khamis, 2019).

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