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RESEARCH ARTICLE

EXPLORATION OF CHALLENGES ASSOCIATED WITH SCIENCE EDUCATION AT TEACHER EDUCATION INSTITUTIONS

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ABSTRACT

The research paper strives to have an insight over the core issues and challenges surrounding the Science subjects teacher education provided at the teacher education institutes. It has been observed that there is an overall discomfort among the students and teachers regarding the curriculum introduced by HEC for the teachers education in General Science subject. The paper adopts a qualitative strategy to explore the issue. Ten in-depth interviews of teachers practicing at the teacher education institutes have been conducted coupled with ten interviews of the students of same colleges so that the perspectives could be collected both from the teachers and students side. The interviews are conducted face to face with the help of structured questionnaires. It has been unveiled from the study that the topics included in the course are largely mismatched with the syllabus being taught at the schools. Moreover, the students not having the science background are unable to understand the concepts included in the courses. The lab facilities are also not provided at the education colleges due to which the experiments could not be conducted. Consequently, both the students and teachers are viewing the curriculum inappropriate and ineffective. It has been recommended that General science education curriculum must be revised and restructured to meet the concerns of the teachers as well as students.

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INTRODUCTION

In the era of scientific revolution and advanced technology, the teaching of science subjects like biology, physics and chemistry has gained intense importance in preparing strong learning foundation and knowledge base of students as it plays vital role in enabling them to deal with these subjects at advanced level in their future lives (Abell, 2008). It is thus, widely agreed that science subjects must be taught at high standard that is necessary to meet the requirement of modern era. In order to keep the teaching standard of these subjects aligned with the requirement of contemporary science world, it is imperative that teachers must have complete command over the subject so that they can adopt an appropriate and systematic approach in teaching science subjects to their students (Davis *et al.,* 2007). The provision of adequate education to the science teachers is critically important from the perspective of the specialized teaching skills required for various subjects within science discipline. Cases where the teachers have not studied science subjects at advanced level, it became highly challenging for them to apprehend with the teaching requirements of the subjects that are outside their area of expertise. Teachers often encounter low level of self confidence in teaching science subjects whereas they usually face problems in preparation of lesson plans, selecting and planning devising activities, setting up the lab experiments and adequate application of various science concepts and principles in satisfying the students during answering their concerns and questions related with the subject matter (Sanders, Borko and Lockard, 1993). The SPDC Report (2003) has indicated that Pakistan has been facing massive shortage of science teachers. In rural areas the situation is worst whereas in urban areas also the teaching practice of science subjects could not be considered at satisfactory level according to international standards. In this context, the teachers' education institutions have taken very important responsibility to provide effective and up to the mark teachers education to the individuals headings to become science teachers because the quality of science teaching would heftily depending upon the quality of education provided to the teachers. In this regard, HEC has provided the teacher education institutes with a General Science curriculum for the B.Ed (Hons) classes to comprehend with the teachers' education requirements in General science field. However, both the teachers and students practicing this curriculum have reflected some discomfort regarding the practice due to which the actual significance of the curriculum becomes questionable. The teachers providing education to the pre-service teachers are having several issues in adjusting with the new curriculum introduced by HEC whereas the students have also reported difficulties due to lack of practicality of the curriculum. In this regard, the current research work strives to identify and analyze the core issues and challenges that

surround the General science curriculum introduced at the teacher educational institutions in Pakistan. The intention of the study is to point out the weaknesses of the curriculum and formulate some recommendations to make it more effective and significance in attaining the desired objective.

Research Question

The research study basically aims to find out the answer of following research questions:

1. What are the problems and difficulties faced by the teachers and students in the proper execution of General Science curriculum introduced by HEC for the B.Ed (Hons.) classes?
2. What are the changes required in the curriculum to make it practical and effective for the teachers and students to smoothly run the process of teacher education?

Research aims and objectives

The research study basically aims to explore the problem areas associated with the HEC introduced General Science curriculum for B.Ed. (Hons) in the teacher's education institutes of Pakistan. Hence, the core objectives of the research are as follow:

- To identify the weakness of the General Science curriculum introduced in the teachers education institutes
- To list out the main problems that are faced by the teachers in executing the curriculum
- To identify the difficulties that have been faced by the students in getting adjust with the implemented curriculum
- To establish the argument insisting the need of revising the curriculum
- To formulate some recommendations that can help in improving the curriculum by making some needed changes into it.

Literature Review

Kind (2009) explains that teaching science subjects to the students requires the teachers to have specialized knowledge as well as education to handle the subjects proficiently. the science teachers not only need to have adequate understanding of science concepts but they also need to have expertise over conducing various types of science experiments and activities outside the premises of classroom. Abell (2007) found that without background education of science, a teacher can never justify his teaching because without having technical knowledge he cannot develop the foundation of students that is mandatory for science studies. Magnusson et al. (1999) describe that science teaching as the transformation of several types of knowledge that could be simply acquired through basic level education or readings etc. but it needs specialized training and education. they explain that the knowledge areas that science teacher must have expertise consist of five components including 'orientation toward science teaching, knowledge and beliefs about the science curriculum and assessment in science, knowledge about students' understanding and misconceptions of specific science topics and knowledge about instructional strategies for teaching science or topic specific pedagogy'. Childs and McNicholl (2007) insists that teaching science requires subject specific knowledge because teaching science is different from other subjects. the teacher is not only required to have sound academic background in the respective science field but he also need to have the capability of understanding and applying various strategies that are applicable to teaching science subjects such as illustrations, formulation and explanation of models, understanding of analogies, conducting experiments and arranging different types of activities that are required when teaching particular topics within a science field. Iqbal and Mahmood (2000) explain that developing countries like Pakistan also need to build strong foundation in provision of science subjects education to assure that the coming generation of the country would be well versed in handling science related topics and processes. In order to assure the provision of quality science education, the presence of well trained and well educated teaching staff is necessary along with the provision of adequate library and laboratory resources. It has been revealed in a research study that there are some basic problems faced by the teacher education institutes in Pakistan during the provision of science subjects teaching education to the pre-service teachers. The main problem is the lack of adequate availability of resources imperative for science teachers education. Due to scarcity of resources five main types of problems evolved including 'a shortage of science teachers, poor education of science teachers, poor quality of textbooks, a system of examinations that encourages rote memorization, and a lack of laboratories, equipment, and other resources needed to teach science'.

METHODOLOGY

The research study is based upon a qualitative research approach. This is because of the nature of the research question that required deep understanding of the issue not possibly gained through quantitative means. The information has been collected with the help of 20 in-depth interviews; ten conducted from the teachers serving at the Teachers education colleges/institutions whereas ten interviews are conducted from the students perusing their teacher education from these colleges. The interviews have been carried out with the help of structured questionnaire. Two separate questionnaires were constructed to collect opinions of teachers and students regarding the issues related with the General Science curriculum. All the interviews were conducted face to face at the colleges after taking informed consent from the participants. The ethical requirements were considered in the process and the identity of teachers as well as the students would not be disclosed in the study results.

FINDINGS AND ANALYSIS

The interviews of ten teacher educators and ten perspective teachers provided detailed insight over the issues and help in the identification of the main problem area within the area under consideration. The interviews of the teacher educators highlighted the problems that are encountered during the process of execution of the General Science curriculum. First of all, it has been found that most of the educational institutions are not well equipped with the facilities that are necessary for the science subject education. At some places, the science labs are not established with availability of complete equipment whereas the other schools and institutes usually don't cooperate with the staff if they try to arrange the

General Science practical at some other place. Lack of availability of books is also an important issue for the teachers. They told that in Pakistan the locally produced contents on Science subjects is not update and advanced enough to cope with the requirement of this course and when they choose foreign books they face the issue of unavailability of the books and sometimes the foreign books are written with high level language and technicalities that it becomes difficult for the students to understand the contents and the teachers also find it difficult to teach the students using those books. The teachers also noticed that the General Science curriculum is not designed properly because there are some topics that are repeated in the course whereas some topics are totally missing from it. There is lack of balance in the subject areas within the curriculum and different disciplines like biology, chemistry and physics have not been given balanced place within the courses. The topics covered in the courses are also too many as compared with the time frame available to complete the courses due to which the teachers face problems in completing the syllabus on time. It is also revealed that there are many teachers serving at the teachers' education institutes that come from varied backgrounds other than science and they face problems in teaching the pre-service teachers this course because they don't have command over the subject. The teachers were provided with the training to better execute this curriculum however, that education was not adequate and effective enough to make the teachers well prepared to handle this advanced level curriculum. The teachers realize that without having science background they are not able to teach these courses so it is quite obvious that the students with no science education background will not be able to understand the topics and concepts included in the course. The teachers also informed that the faculty resources for the science subjects are not available due to which they cannot effectively teach the students science subjects and their main focus remain on theory rather creating balance between theory and practical exercises that is essential for science teaching practice.

The students also share their problems in the interviews and informed that due to lack of having science background many of the students don't have basic understanding of various science concepts. The courses are widely comprised of the advanced level concepts that could not be understood by the students until and unless they have prior knowledge about the subject and have already studied the basic concepts at their schools and colleges. Since there are students from all disciplines in the B.Ed (Hons) classes it is obvious that many of them have never been through the science concepts and it is thus, not possible for them to grasp the advanced concept been taught at the institutions. It is also found that some of the students have very little or no interest in science subjects due to which they have not selected science at matric and intermediate level of education and at graduation level it becomes intensely difficult for them to develop their interest in science subjects specially when they don't even have the basic understanding of various science concepts. The students commonly believe that the science education is specialized area of study and a layman could not get into these subjects if they don't have proper background or the curriculum should have considered the face that the students without existing knowledge of science will also be going to study it, so it has to be designed accordingly. There is also discomfort among the students due to the reason that student with different backgrounds sit in the same class to study these subjects. The students with science background easily understand the topics and want to move towards the next quickly but the students without science background usually have slow learning process in this particular area and they find it difficult to cope with their classmates. As a result, the class divides into certain groups; students having science background find it easy to move on from one topic to another whereas students with no science background find it difficult to move on towards the next topic when they don't have proper understanding of the first one. Some students also believe that teaching these courses at this level is not significant because the students having no proper background of science education would not be considered as competent science teachers if they will apply for this particular position at schools because attending this course only is not enough for an individual to become a science teacher without having a proper science background. From this standpoint, only the students with science background are the actual beneficiaries of this course because their science background coupled with this teacher education will make them competent for teaching science at different levels but the other students have no practical importance for attending the General science subjects at this level. The interviews of the teachers and students show that there are some common problems faced by the teachers and students when they went for the General Science curriculum at the teacher education institution. The main and common problem is lack of prior science knowledge among teachers and students due to which they are not able to comprehend with the course. It is found from the interviews that these courses are not prepared by taking the teachers in confidence due to which they have several reservations related with these courses. Moreover, the students are not only uncomfortable in studying these courses but they also consider them insignificant because without science education at earlier stages they would not be able to seek the position of science teacher just on the base of attending this course. Lack of resources is also the main problem due to which the teachers and the students are losing their interest in these courses because unlike the requirement of the science subjects they are taking it as theory based study only due to the absence of laboratory resources.

Conclusion

The study concludes that the General science curriculum introduced at the education colleges by HEC is not appropriate enough to meet the requirement of the teacher education. It has been identified that the courses are not designed properly because due representation of each area like biology, chemistry and physics is not considered while designing the course. The level of information included in the course is advanced and fact is not considered that many of the teachers and pre-service teachers at these institutions have no prior science background due to which they would not be able to understand the concepts and information included in the course. In addition, there is lack of planning to assure the proper execution of the curriculum. The time frame is mismatched with the syllabus contents whereas the lab resources are not arranged before the introduction of the course to assure its proper execution. The teachers are not given proper education to handle these courses due to which many of them find themselves incapable to teaching these subjects to pre-service teachers. Based on the identification of these problem areas, there are some recommendations formulated with the intention of bringing some positive changes in the curriculum so that it could become effective in providing education to the pre-service teachers.

- The contents of the courses need to be revised to omit the repeated topics and include the missing ones
- The teacher education institutions must be provided with sound faculty resources including lab resources that are necessary for teaching science subjects
- The teacher educators should be provided with effective training to handle these subjects
- The level of technical knowledge in these courses must be kept aligned with the knowledge level generally acquired by the students till they reach the graduate level
- The students with no science background should be given consideration in these courses that could be possible by offering a basic science subjects for students with no existing educational background of science.
- There must be provision of adequate books and reading resources around the topics covered in the curriculum. The books must meet the level of education of the teachers and students and must not be too high or low.

REFERENCES

Abell, S. 2007. Research on science teacher knowledge. Mahwah NJ: Lawrence Erlbaum Associates.

Abell, S. K. 2008. Twenty Years Later: Does pedagogical content knowledge remain a useful idea? International Journal of Science Education, 30 (10), 1405-1416.

Childs, A. and McNicholl, J. 2007. Science teachers teaching outside of subject specialism: challenges, strategies adopted and implications for initial teacher education. *Teacher Development,* 11(1), 1-20.

Davis, E.A., Petish, D. and Smithey, J. 2007. Challenges new science teachers face. *Review of educational Research,* 76 (4), 607-651.

Iqbal, H.M. and Mahmood, N. 2000. Science teacher education in Pakistan. In S.K. Abell (Ed.), Science teacher education: An international perspective (pp. 75-92). Boston: Kluwer

Kind, V. 2009. A Conflict in your Head: An exploration of trainee science teachers' subject matter knowledge development and its impact on teacher self-confidence. *International Journal of Science Education,* 31 (11), 1529-1562.

Magnusson, S. K., Krajcik, J. J. and Borko, H. 1999. Nature, sources and development of pedagogical content knowledge for science teaching.In Gess-Newsome J. And Lederman, N. G. (eds). Examining pedagogical content knowledge: The construct and its implications for science education. p. 95 – 132. Dordrecht: Kluwer Academic Publishers.

Sanders, L. R., Borko, H. and Lockard, J. D. 1993. Secondary science teachers' knowledge base when teaching science courses in and out of their area of certification. *Journal of Research in Science Teaching,* 30(7), 723-736.

Social Policy and Development Centre.(2002-03). State of science education. Social development in Pakistan – Annual Review 2002–03.SPDC.

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