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A Critical Study of Physics Curriculum as viewed by Teachers at Higher Secondary Level in Sindh

Abstract

Effective curriculum, maximum educational facilities, competent and trained teachers play main role during teaching learning process. The scientific knowledge and skills can be developed through a balanced curricula. A systematic and planned science education programme is essential to inculcate scientific knowledge. The existing Physics curricula are not fulfilling the needs of learners and teachers. The objective of the study was to analyze the Physics curriculum taught at higher secondary level. The Physics curriculum was analyzed to point out the strengths and weaknesses of the content. Survey research design was adopted. All Physics teachers working in the public sector institutes of Sindh were part of population. Data were collected through a carefully designed instrument. Data were analyzed statistically. It was found the present curricula are not matching with the current needs. Further the teachers are not well-versed with the subject besides not well skilled. In light of the findings concrete recommendations were made.

Keywords:

Physics Curriculum, Teachers

Introduction

Education is a process necessary for the creation of a sound mind in a sound body. Education is the process to change the behavior of the learners in desired direction. Static and outdated curriculum and instructional aids do not produce learners of higher thinking order.

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Curriculum development is a technical work. Detailed planning is required to select content, language, and organizational presentation. Science education is a creative activity.

Effective curriculum, maximum educational facilities, competent and trained teachers play main role during teaching learning process. The scientific knowledge and skills can be developed through a balanced curricula. A systematic and planned science education program is essential to inculcate scientific knowledge. The existing Physics curriculum is not fulfilling the needs of learners and teachers. The objective of the study was to analyze the Physics curriculum taught at intermediate level. The Physics curriculum was analyzed to point out the strengths and weaknesses of the content. The college teachers hesitate to adopt scientific method. The academic standards of our science students are poor. To critically review the subject matter of Physics to point out the strengths and weaknesses at intermediate level.

Teachers and learners are facing difficulties in explaining and understanding the basic concepts. The rationale behind the research is to analyze the curriculum of Physics at intermediate level in order to find out the deficiencies of curriculum. To elaborate the background further, the researcher interviewed some Physics teachers and students. Teachers stated that the existing curriculum of Physics has not been modified since long. The students were of the opinion that the content of the course is not updated and do not fulfill the needs. In Pakistan this can be only done when improved curriculum will be provided to the science teachers and students.

The scope of the study was limited to all teachers in the subject of Physics. The study would help in improving the existing curricula and it would help the authorities concerned to take appropriate actions in this regard.

Literature Review

The National Education Policy 1992-2002 emphasized the significance of curriculum. Curriculum plays a key role in the process of education. The development of curriculum is a systemic process which assumes its best shape if it is developed through professional inputs both in content and design.

The education sector reforms addressed quality assurance at all level (*The World Book Encyclopedia, 2010*),

- Revision of curricula at all levels including teachers training
- Introduction of multiple text books through deregulation of text books

Curriculum as being made up of six major components: (1) context, (2) general aims of the total Intermediate levels curriculum, (3) objectives of specific curricula or learning units, (4) curriculum materials, in which content, subject matter, and skills have been selected and placed in a particular sequence and may take various forms of documentation, including syllabi, teachers' guides, textbooks, workbooks, software, and other materials, (5) actual classroom practices, like (I) teachers deliver various aspects of contents and

subject matter (11) skills and values that students are expected to experience and secure (11) skills and values that are not intended but students are exposed to them in and outside the classroom and (6) outcomes through curricular materials, teachers, and students which may be intended or unintended (Jackson, 2007).

Das (2004) described the following criteria for selection of textbook:

- Contents should be appropriate for the age-level of the learners and in accordance to the syllabus prescribed for the specific grade level. It must focus on everyday life and experience of the learners.
- The subject matter should be organized in a sequence. The content presented in such a way as to make the subject meaningful to the learners.
- The language should be easy and within the comprehension level of the learners for whom the book is developed.

The presentation of book made attractive for learners. Print and paper should be of a good quality. The textbooks experts keep in view the needs of teachers and learners. From teachers point of view, the teacher should understand and comprehend the written text (Yadav, 1992). The activities included in the textbook are of practical nature. The textbooks can be covered in time. From learner's point of view, easy vocabulary helps to enhance comprehension level. The activities suggested in the textbooks are practical for learners to perform (Kiani, 2009).

According to the Education Policy (1998 – 2010): education is a process through which a nation generally develops its self. Education determines the destiny of a nation. It provides mental, physical, ideological and moral training to the individuals of the nation. The term applied science is sometimes used to refer the utility of scientific knowledge that concentrates on the development of technology.

UNESCO'S report stated that the following aspects of the content of "Science for all" may be considered as fundamental. It should:

- i. Be perceived by the learners as relevant to their actual needs or as having social worth due to its economic or community value i.e. it should lead to experiences and practical uses that are meaningful to the learners.
- ii. Improve the living conditions of the learners or increases their productivity and contribute to the well-being of the community and to national development goals.
- iii. Be based on daily life experiences of the learner needs, relate to the resources of their real world, and must have obvious applications in their work, leisure or homes.
- iv. Enable learners to acquire and master useful and employable skills and to use intelligently these skills.

- v. Consider cultural and social traditions and seek to complement these and not clash with them unnecessarily.
- vi. Make the learner recognize and appreciate the importance of science and technology in national development.
- vii. Include natural phenomena which will arouse one's curiosity and desire to investigate and produce excitement in the learners.
- viii. Enable the learner to utilize wisely the resources in their environments and to live harmoniously with nature and society (APPIED, 1989).

Taba (1962) gave the most comprehensive definition of the curriculum, "a curriculum usually contains a statement of aims and specific objectives. It indicates some selection and organization of content. Curriculum is the construction of knowledge and experience systematically developed under the auspices of the school to enable the learner to increase his, her control of knowledge and experience (Aggarwal, 2011). Wilson (2005) described curriculum as, "anything and everything that teaches a lesson, planned or otherwise". Zais (2011) stated objectives content and methodology as important elements of curriculum programme. Ali and Rana (2005) stated the state of affairs prevailing at intermediate level.

Content may be regarded as valid when it is authentic and accurate. Thus the use of validity criterion is particularly important for practicing teachers who implement syllabuses developed by those externals to the school such as state educational authorities (Print, 1993).

According to Balsara (2010) content should be made interesting to the learners for effective learning through activities and experiments. The subject matter must satisfy the needs of learners. The content should be according to the cognitive level of the learners. The concepts should be logically ordered, from simple to complex (*Gordon, 2006*). According to Print (1993) and *Malik, (2000)* content is presented to learners over a period of time in varying arrangements or order. The order in which those parts are presented to learner is called sequencing. Evaluation is the process of determining what the actual educational outcomes are and of comparing them with the expected outcomes. It also involves judgments about the nature and desirability of any demonstrated changes. Evaluation is the systematic process of collection and analyzing data in order to make decisions (*Gay, 2011*).

Methodology

The overall strategy of was survey. The population of the study consisted of all the Physics teachers working in the public sector higher secondary institutes of Sindh. The population was large and heterogeneous. It was not possible to carry out a census. Consequently, a stratified random sampling design was adopted.

The principle of classification related to the gender and district-wise location of the colleges. Total sample size was 60 teachers. A questionnaire comprised of thirty items was developed. The data were analyzed statistically.

Null Hypothesis

There will be no significant difference in the views of male and female teachers regarding the effectiveness of Physics curriculum at higher secondary level.

Application of t test for testing the Null Hypothesis

$$\begin{array}{llll}
 \sum X_1 & = & 3031 & \sum X_2 & = & 2058 \\
 N_1 & = & 36 & N_2 & = & 24 \\
 \sum X_1^2 & = & 257937 & \sum X_2^2 & = & 177520 \\
 \text{Computed "t"} & = & 0.776 & & &
 \end{array}$$

Tabulated value of "t" = 1.96 with df = 58 at $\alpha = 0.05$

Conclusion

Referring to the table "t" we found that the tabulated value of "t" = 1.96 with df = 58 at $\alpha = 0.05$ is greater than the computed value of t = 0.776. Therefore the null hypothesis is upheld and it is concluded that there is no significant difference between the views of male and female teachers regarding the effectiveness of Physics curriculum at higher secondary level in Sindh.

- 1- Majority of Physics teachers were not trained according to the changing world of knowledge, so In-Service training should be arranged
- 2- Most of teachers were agreed to develop the activity based curriculum of Physics because the students are least interested in the existing curriculum.
- 3- Examination system is not focusing on the aspect of learning and comprehension.
- 4- Teachers are totally ignored during curriculum development process.
- 5- The quality of printing and illustrations are not appropriate.
- 6- Most of teachers are of the opinion due to few solved examples content is not easy to understood.
- 7- The content helped in understanding the basic concepts of Physics but its effectiveness for developing critical thinking was not ensured.

- The academically expert and professionally competent science teachers (specifically in Physics) may be appointed.
- In-service teachers training must be arranged according to the future needs.
- Experienced and competent teachers may be involved in the curriculum development process.
- Loaded curriculum may be avoided.
- Sufficient audio-visual aids may be provided to teachers in order to enhance the effectiveness of the process.
- Teacher manual may be provided at the time of the introduction of new book.
- The selection of content for may be based upon the interest, needs and development of scientific skills.
- Monitoring and evaluation is based upon scientific principles.
- Evaluation of the teaching process may be introduced.
- The teacher should give preference to practical work.

- The teacher should use audio-visual aids in the teaching learning process.

Activity-based curriculum should be developed. The curriculum should develop the practical approach in the students. Loaded curriculum should be avoided. Teachers would be effectively trained before implementation of curriculum.

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