

## A STUDY OF THE FACTORS ENHANCING SCIENCE EDUCATION LEARNING UPON BS STUDENTS IN DISTRICT PESHAWAR, PAKISTAN

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### ABSTRACT

*In this study I made a survey of all those factors which are liable for enhancement of Science Education learning. The nature of this study was descriptive. The data was collected in district Peshawar from the selected 100, BS students of different colleges randomly. The study were consisted of the following questions: what are the key factors which affects Science Education? Whether Science Education practices are applicable at BS level? For the improvement of science education what related contents, methods and themes are mentioned? What recommendation will be made for the improvement of Science Education learning? Results of the study showed that among all the key factors that had greatest effect on Science Education learning use were qualified instructors, experienced teachers, experiments, collectively study, mutual interaction and cooperation between student and teachers, audio- visual aid, motivation, class size, and constant practices, monthly test and exams, the use of effective and modern teaching strategies, family supports Babyee's model, and text book. From the results of the study it was suggested that, teachers' motivation, involvement, participation and encouragement to the students for adopting the most useful and effective Science education approaches would definitely effect on students' learning performance.*

**Keywords:** Science Education learning, Teachers, teaching methodology, BS Students.

### INTRODUCTION

The importance of Science education at higher education cannot be ignored. National Science Educational policy and programs should relate to the genius of people, consonant with history and culture, and at the same time meet the modern conditions and national developments. Academic education is considered very poor type of education therefore immediate and urgent need for training people in scientific and technical education at higher education is required to build up future economic life so that government of Pakistan proposed to set up a council to promote, planned, and supervise the scientific and industrial research and utilize the economic resources of the country up to maximum level. (Ministry of Interior, 1947).

It is not possible for a city or nation of Europe's to overcome the challenges of low production, less and insufficient progress, innovation and spreading of environmental and social threats. Also there are other challenges that is feeding of society, controlling disease, to produce sufficient amount of energy, supply of pure water, and the issues of global climate change which limits at the boundaries of Europe. So science education and innovation at higher education level are the most important factors that will help and guide Europe to move towards smart, healthy, sustainable and inclusive growth, the solution we take must explain these challenges and problems by finding sustainable universal solutions. European Commission (2013)

Science Education at higher education level promote vast contribution in knowledge-based progress which meets the highest ethical and moral standards and helps to ensure sustainable societies in future. European Commission (2013).

According to John Dewey science education improved and enhanced the ability of critical thinking and scientific attitude such as producing research oriented questions, real and logical thinking. John Dewey described the importance of science education with respect to society need according to him “ Science education as an appropriate intellectual study on the basis of which an individuals is capable to act independently in his life and his society and know the practical applications of life and its concentration on the real activities of life and also there is a basic link between science learning and social citizenship in democratic societies” (Dewey, 1916, p. 228 quoted in DeBoer, 2000, p. 583).

According to the experts of PISA science education is very important and significant for an individual’s acting and performing in everyday life, they stressed that science education affects the daily life issues of health, education, disease, climate, nutrition, sustainability development, global warming, and behavior on an individual. (OECD, 2000, p. 79).

Bybee link the goals of science education to society, social ideas, recognition of the socio-historical development, moral values, ethical aspects, cultural dimension, society development, social responsibility of science. A small group of individual and students had concentrated on science education in schools and colleges that is at lower level of education and higher level of education, these groups prepared students and individual future developing with science. (Bybee, 2002, p. 24).

Every society have a number of challenges that is feeding and accommodation the population, well and healthy living, protective and shielding the environment, producing sufficient energy, supplying of clean water, and climate change. It is easy to solve all these issue if all social workers understand the issues and their consequences and are practically involved and helped and identify and discussed society’s responses. By working together in participatory way we can better solve and obtained the goals and outcomes of science education at higher level of education and performed research with the values, needs and expectations of the society. Democratic societies have need an engaged and responsible community contributing at all levels of society across the world. European Union (2012).

It is the need and demands of the world that Science education must be compulsory from school beginning that is from kindergarten to higher education level .Science education enable and empower of all stage of students for providing a strong backgrounds and excellent talents also to motivate and produces the actively engaged in knowledge and scientific procedure. It should balance the requirements and need of breadth and depth so no one left from the approaches and access of it and everybody can use their full potential .Research shows that success is directly depends on performing meaningful efforts and hardworking and not on simply talent. ACOLA (2013)

Study of science education at higher education stage show that we are required to involve all stages of citizen in inquiry-oriented science learning such that to identify and frame the research issues and complexity. To discover the solution of innovation and for an everyday life so we involve all people of society which used more responsible and ethical approach to science education research and science innovation. For Responsible Research and Innovation (RRI) work in concern fields that is health education, global climate changes, and environmental education having many ways to empower all society and students. Jenkins, T.A. and M. Insenga (2013).

It is due to Science Education which shapes our modern culture and society also it change our individual and collective lives and also provides both theoretical visions and practical procedure to improve human life conditions. Thus, it is widely recognized that science education with the cultural and social settings also one of the basic and essential requirement of education in general (DeBoer, 1991).

## **LITERATURE REVIEW**

National Educational Policy (1970) stress on the need of science education and mention that Science education starts from the earliest stage of education for the purpose to solve problems of the society and nation and develop a scientific attitude due to encouraging, sustaining and rewarding the method and spirit of inquiry and scientific thinking, also it is most important and necessary to moderanise on continuous basis the curricula for science teaching and science education at higher level. At each level and stage of education departmental arrangement for the implementation of objectives of science education must be created.

The National Education Policy (1979) after analyzing the situation of science education at higher education level proposed to set up a National Centre for Science Education (NCSE) to improve science teaching and learning through research, innovation and to promote science and technology through science fairs, museums, films mover over this Centre also prepare the quality and supply of laboratory equipment's.

To promote the science education at university stage in rural population and organize training program for the in -service science teachers on the same spot a mobile science laboratory must be developed by the government. For the promotion and development of science education national seminars, meeting and working session and conferences would be organized. But due to lack of financial inputs and efforts some of the targeted proposals were implemented in that time and maximum of the given proposal delayed. Also in different area of science subjects scholarship programmes were announced and under the limitation of University Grant Commission science fairs were established. With the collaboration of foreign organization different developmental works occur that is Pakistan Science Foundation. (Ministry of Education, 1984).

To promote science education at schools, colleges and university level a great and successive step taken by Urdu Science Board to publish the science education materials in easy and comprehensive Urdu so to popularized science education among students and general public. So the main purpose is to make science more easier and understandable ,especially in case those students, for whom it is difficult to afford the foreign published books or those medium students which cannot developed clear understanding and idea of the books and material whose concepts is presented in English or in other language. For that purpose Urdu Science Board has published over 800 books to developed the quality of science education and for the understanding of common people in 25 different disciplines (Nadeem, 2009)

To obtain a higher quality of achievement in science education at higher classes both science teachers and students works collectively. Where total change in quality is depend on the support of parents, through collaborative works of teachers, students, science education researchers, leaders and other stakeholders, it is likely to be more energetic and useful in life and successful for everyone. Hargreaves, A. and M. Fullan (2012)

Science education is not in favor of to study science according to discrete scientific way rather than understanding science conceptually and experimentally and how to apply science learning to new situations and conditions at higher level of study. So learning conceptually science helps us to transform knowledge into usable and result oriented form and to produce

positive attitudes towards science .Concept and experimentally way of learning produces a skill of activeness and responsible citizenship. Dilling, L. and M.C. Lemos (2011)

A relation between formal, informal and non-formal provides many benefits that is to established research center, industries and increases the interest in science and science opportunities these all due to the science education and science education policy .Recent study explain the innovation in higher education to co-create knowledge and produce new methodology. Also the relation between teachers, students and stakeholders in science related fields solve the real life challenges with respect their ethical and social problems and it also providing problems solving skills. Steve Blank Influencer (2014).

All over the world for the latest researches and new technologies professionalism and initiative steps are important. A quality science education at university level provides us sharing of knowledge, lifelong learning, new inventions, and co-creation of better solution. New study also shows the values and importance of the collaboration among science teachers, parents, families, researchers, stakeholders, industries and civil society organization. Bell, M., P. Cordingley and L. Goodchild (2010)

The full consideration of Science education has centered that learning must be inside the context of science and mathematics at all. The Organization of Economic Cooperation and Development (OECD) makes a difference between two main concept that is knowledge of science and knowledge about science. “First Knowledge of science consist of to understand the fundamental scientific concepts and application of theories. Second knowledge about science means to understand the philosophy of science as a human power, interest and limitations of scientific knowledge” OECD (2009 p.128)

### **OBJECTIVES OF THE STUDY**

1. To know about the major factors affecting Science Education.
2. To suggest recommendations for the improvement of Science Education learning in Pakistan.
3. To study the access and equity inside Science Education.
4. To study the practices of Science Education at Higher Education.

### **RESEARCH QUESTIONS**

1. What are the factors affecting Science Education?
2. What recommendations will be made for the improvement of Science Education learning?
3. What competences and attitudes with concern to supporting and facilitating students in becoming scientifically educated?
4. Is science Education practically applicable at Higher Education?
5. For the improvement of science education what related contents, methods and themes are mentioned?

### **METHODOLOGY**

The research was a descriptive type research. Through questionnaire data was collected from sampled BS students.

#### **Population and Sample of the Study**

The population of the study was all colleges of District Peshawar. The sample was randomly selected which compromised 100 BS students enrolled in BS programme in different colleges of District Peshawar.

**Research Tools**

The research tool of the study factors enhancing Science Education learning was a questionnaire for the students designed with five points Likert Scale. And the analysis was done by using likert scale mean score values to study the significance of differences among the Science Education learners.

**DATA ANALYSIS**

**Table 1. Students Responses**

S.No	Statement	SA	A	UD	DA	SDA	Mean score
1	I can improve my science education through Bybee’s model of science education learning	65	30	1	1	3	<b>4.53</b>
		325	120	3	2	3	
2	I can improve Science education through Listening Science activity Programmes on the TV	50	30	5	10	5	<b>4.1</b>
		250	120	15	20	5	
3	My Science education improve through Activity base learning	60	35	5	0	0	<b>4.55</b>
		300	140	15	0	0	
4	My Science education improve due to lecture method Of teaching	20	20	10	10	40	<b>2.70</b>
		100	80	30	20	40	
5	My Science education learning improve due to Presentation Method in the class room	30	30	15	15	10	<b>3.55</b>
		150	120	45	30	10	
6	My Science education learning improve due to expert qualified, well fluent and experienced teachers	60	30	5	5	0	<b>4.45</b>
		300	120	15	10	0	
7	My Science education improve due to audio visual aid, Science museum, films, diagrams, structures	70	20	5	2	3	<b>4.52</b>
		350	80	15	4	3	
8	I can improve Science education learning through I can improve Science education learning through	45	45	5	3	2	<b>4.28</b>
		225	180	15	6	2	
9	My Science education improve due to participation and discussion with my classmates	30	40	10	10	10	<b>3.7</b>
		150	160	30	20	10	
10	My Science education learning improve due to regular monthly test and exams	55	40	0	1	4	<b>4.41</b>
		275	160	0	2	4	
11	I can improve my Science education learning through Practical work	60	30	5	3	2	<b>4.43</b>
		300	120	15	6	2	
12	I can improve my science education learning due to motivation of my teacher	70	20	0	6	4	<b>4.46</b>
		350	80	0	12	4	
13	My parents can improve my Science education learning	55	35	6	2	2	<b>4.39</b>
		275	140	18	4	2	
14	I can improve my Science education learning due to My Science teachers	40	40	10	0	10	<b>4.0</b>
		200	160	30	0	10	
15	I can improve my Science education learning through Experiments in the classroom	70	28	0	20	0	<b>4.66</b>
		350	112	0	40	0	

## **DISCUSSION**

Data Analysis Based on the Likert five point scale type questionnaire, the students' responses to the items were scored as follows: strongly agree-SA, agree-A, undecided-UD, disagree-DA, strongly disagree-SDA, for positive items and reversed for negative ones. The analysis of the data was done into Mean Score values and the means scores values are 4.5,4.1,4.5 ,2.7,3.5 ,4.4 ,4.5 ,4.2 ,3.7,4.4 ,4.4 ,4.4 ,4.3, 4.0,4.6, for the statements in above table.

From the above table most of the students uses Bybyee's model of learning of science education and improved their science education as the mean score is 4.5 which also shows that majority of the students strongly agreed with this statement. As from mean score 4.1 indicate that students is in the favor of uses of science programmes on T.V to improved their science education. Majority of the respondent supporting the statement that due to activity base teaching and learning science education improved as the mean score is 4.5. Some of the respondents also agreed that lecture method of teaching improved our science education learning as from table the score is less as compared to others that is 2.7. Most of the students agreed with presentation method of teaching for enhancement of science education because the score is 3.5 from the table. Respondents strongly agreed without any doubt that science education improved due to experts, qualified and experienced teachers because the mean score is 4.4. Also majority of the students agreed with the statement that science education enhanced due to audio-visual aids, from table the means score values is 4.5. Respondents also agreed with fact that science education learning improved due to reading context books regularly because from table its mean score is 4.2. From table the mean score is 3.7 which indicate that students participation and combine discussion on science education improved its learning. Due to regularly monthly test and exams science education improved and because most of the students strongly agreed the statement that is its score is 4.4. From table the score is 4.4 which shows that most of the students is in favor of the motivation due to teachers in the fields of science education. Educated parents also improved the science education learning because most of the students strongly agreed this statement its score is 4.3. Most of the respondents replied that they improved the science education learning due to experiments in class room and laboratories, because the means score vales is 4.6 that is students strongly agreed with this statement.

## **CONCLUSION**

The analysis of the data showed that Bybee's method of teaching, well experts and qualified teachers, audio-visual aids, reading context books, experiment with related topic, monthly test and several other factors have an important and positive effect on the enhancement of science education learning. It will be discussed as follow: From the study it was concluded that for the enhancement of science education learning most colleges used Bybee's 5E's model of learning of science education so due to that conceptual method of teaching students enhanced their science education at BS level in colleges. So it is concluded that due to Bybee's model science education improved. Also the main role of science education learning at BS level as that of the motivation and cooperation of well qualified and well experienced science teachers. Due to skillful faculty science education improved so the qualification of faculty is important in delivering science education and is the most important factor for the enhancement of science education. Apart from these the important role is that of audio-visual aids in the field of science education it spread up the science education activity and shoe the clear model and graphs of the phenomenon related with science education so it is also the important factor in learning science education. From the study it was concluded that the study with experiment and activity base learning is very important for students to learn science

education, this factor is most important in all colleges and higher level teaching. Thus maximum students improved science education due to experiments and activity base learning.

According to Whitehurst (2000) the difference in teachers did not matter, but the main thing is the quality of a teacher which is a single factor for the enhancement of science education, and due to that quality students can improve their science education skill. Housner and Griffey (1985) noted that the planning and instruction of all experts teachers and instructors are same for a class in the purpose of science teaching, but experts teachers and instructors first needed to know about the level of ability of students, their experience, and their background they were to teach, and they also know about the facility given to class in which they would be teaching science education.

According to National Research Council (1996), ABL (Activity Base Learning) is a process of inquiry that requires asking questions, its reasoning, testing, observing, data exploration its analysis, and also manipulation of data. The activity base learning actually uses for the generalization and application of scientific knowledge. For this purpose students and learners must be engaged in different science education activities. Engagement in learning activities in science develops and enhanced conceptual understanding and motivates science students to seek further information about science knowledge (Brophy, 1995).

In the early 1960's, Robert Karplus proposed a new model of teaching and learning to explain and generalized the science education materials and knowledge. The new 5 E's model proposed by Bybee can be conveniently implemented in science classroom for the improvement and enhancement of scientific knowledge. This new model was developed under the project of Biological Science Curriculum Study (BSCS). The 5 'Es' used for Engage, Explore, Explain, Elaborate and Evaluate and each E represent a phase of learning.

## **RECOMMENDATIONS**

1. There may be properly trained, qualified and experienced teachers for teaching Science education at college level.
2. The parents may cooperate their children's and guide them about the learning difficulties of science education. A linkages may be established between science students and vocational training centres.
3. There may be continuous feedback and evaluation mechanism to check the science education in classroom so that a continuous improvement process is institutionalised.
4. There may be a regulated system of publishing of text books and learning materials for science students at college level.
5. There may be standardized students-teacher ratio in the class room at college level.
6. For the improvement of science education there may be a positive use of media and modern technology.
7. There may be a career guidance and counselling at college level which provide information to college students about the nature of work requirements.
8. For the delivery of high quality distance science education additional television channels may be dedicated.
9. The use of Modern information and communications technologies (ICT) may be used to enhance the efficiency of science education at higher education level.
10. Encourage and motivate the students about the research work and science education.
11. There may be a well-equipped laboratory for science students which consists of modern apparatus for experiments.

12. To improve the quality of science education in colleges and universities that is at higher education level the curricula may be revised according to modern need and requirements, improving physical facilities, and performing more effective the teaching-learning process at all stages of education.
13. The training of science teachers may be compulsory which include comprehensive understanding and knowledge about the new concepts and phenomenon in science education.
14. There may be a counseling programmes for students to help select them in selecting the science subject which is more appropriate according to their aptitude.



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