



## Identification of Factors Undermining the Teaching-Learning Process in the Subject of Physics at Secondary Level in Pakistan

Vol. IV, No. III (Summer 2019) | Page: 425 – 435 | DOI: 10.31703/grr.2019(IV-III).47

p-ISSN: 2616-955X | e-ISSN: 2663-7030 | ISSN-L: 2616-955X

Kifayat Khan\*

Munir Khan†

Abdur Rashid‡

### Abstract

*The teaching of Physics involves theoretical as well as practical skills development of students at the secondary school level. The main aim of the study was to identify the factors that undermine the teaching-learning process in the subject of physics. All secondary school's science teachers were considered as the population of the study. Two hundred (200) science teachers (100 each male and female) were selected as the sample of the study through stratified random sampling techniques. Data was collected through a self-developed questionnaire of reliability coefficient 0.84 and were analyzed using statistical tools. The unavailability of physics: teacher, laboratory, classrooms, related books were concluded undermining factors. Lack of physics teachers and unfavorable working environment were found dominant in male teachers' school than female. The educational authorities with the collaboration of the community can play their role to overcome these undermining factors in the subject of Physics.*

**Key Words:** Teaching Physics, Undermining Factors, Teaching-Learning Process, Laboratory, Implement Etc.

### Introduction

Physics is considered to be the basic subject among the entire sciences disciplines (Wenham, Dorling, Snell & Taylor, 1984). This instills pupils with rational thinking and presents the theories required for grasping the method of exactly how things work. Technology is completely bound to physics because of its importance in addressing the facts including the interaction of matter and energy. This interaction according to Juceviciene and Karenauskaitė, (2004), Zhaoyao (2002) is needed for the scientific requirements of the altering society of the world

Physics is the study of matter, energy, and their mutual interactions. It deals with the observation and measurement which makes the individuals enable to comprehend the laws of nature and the world at large. In Pakistan, physics is taught as a linear subject beginning from secondary level to higher secondary level (grade 9-12). But the current study is limited to grade 9<sup>th</sup> physics at the secondary school level. At this level, science is separated into three (3) branches including Chemistry, Biology, and Physics. Also, each subject is divided into two (2) bodies of knowledge comprising: theoretical knowledge and practical knowledge.

### Literature Review

Secondary school education is important and challenging, being a change from general science to field-based programs. Right at this stage, the pupils begin physics, as a discipline, intending to follow their future professions in rudimentary sciences or pre-professional courses such as engineering and technology, and medicine at the upper level. Therefore, there is a dire need to offer the pupils with an adequate theoretical background of physics that would finally prepare them capable to meet the dares of pre-professional courses and academics after the secondary stage (National Curriculum for Physics IX-X, 2006; p. 1).

But pupil's interest in Physics at secondary school level may be affected by many factors. Also, pupils'

\* Assistant Professor, Department of Education, University of Haripur, Haripur, KP, Pakistan.

† Assistant Professor, Department of Education, University of Malakand, Malakand, KP, Pakistan.

Email: [drmunirkhan71@gmail.com](mailto:drmunirkhan71@gmail.com)

‡ Lecturer, Department of Education, Shaheed Benazir Bhutto University, Sheringal Dir Upper, KP, Pakistan.

interest and achievement are closely connected with the instructor and pupils' rapport in a particular subject (Igboke; 2004). According to Onah and Ugwu (2010), gender, instructor qualification, and laboratory amenities have very important impacts on pupils' performance in Physics at the secondary level.

Science practical is a necessary part of all science curricula (Physics, Chemistry, and biology) from grades 9-12 in Pakistan. It is a prerequisite for all pupils to perform practical work as an essential component of the physics 9th course. Practical work is evaluated by assessing bodies. Ten (10) marks are given to each pupil for practical examination contained in their respective transcript. In this context, pupils are instructed to keep records of all the laboratory work performed in a practical notebook including all their practicals, the experimental procedure, and arrangements exercised, all sort of observations made, the analysis of these observations, and findings. Although the physics teachers at the secondary school level in Pakistan do not perform practical work to the pupils during classroom instruction. According to Faize (2011), the teachers do not provide regular practical demos while teaching physics contents. Instead, practical work is carried out in the laboratory. Practical activities are always performed in a hurry with small impetus (Zaman, Bhatti & Ghias, 2012).

The principal purpose of physics is to discover the law that governs certain occurrences or to confirm a certain law that has been resulting from a theory. The demo of the experiment is essential for comprehending the doctrines of physics. Carrying out experiments personally is of ought most importance since it includes learning by doing. Consequently, an organized scientific-training and genuine laboratory work are of greater significance for fresh minds (Trivedi & Sharma, 2013).

The learning process without an adequate teaching method is unsuccessful. In Pakistan, the science teachers are mostly capable of lecture method and science teachers utilize this method most favorably in their physics classrooms (Chaudhry, 1993; Iqbal, 2004). Besides theoretical knowledge, the practical work occupies a minute place in the teaching. Likewise, according to Akhtar (2004), Iqbal (2004), Rehman (2004), Bibi (2005), the instructors are not capable of using active learning methods to teach science subjects. In Pakistan, according to Faiz & Dahar (2011) physics teachers are competent in using traditional teaching approaches like lecture and demonstration methods but are not proficient to utilize active learning approaches that are mostly required for teaching the subjects of science. Practical work is a fundamental segment of science as cookery is in the kitchenette, yet what worth is given to commonsense work in science instruction?

In revising the objectives and aims of or indeed causes and justifications concerning practical practice, Solomon (1980) normally summarize most teachers' main views. The aims of practicals, according to Shulman and Tamir (1973) are: to provoke and continue interest, satisfaction, broad-mindedness, attitude, and inquisitiveness in science; to improve problem-solving talent and innovative thinking; to arouse traits of logical thinking and scientific technique (e.g., constructing hypotheses and generating suppositions); to encourage theoretic understanding and academic competency; and to grow practical abilities (e.g., formation and execution inquiries, observations, documenting information, and evaluating and understanding outcomes).

Anderson (1976) has given the points of down to earthwork: to raise comprehension of the human undertaking of science to create understudy tasteful and scholarly understanding; to advance science examination abilities that can transmit to different zones of critical thinking; to help the student acknowledge and to some extent receive the job of the researcher, and to help the student create both in appreciation of the efficiency of deliberate information and in grasping the inconclusive idea of logical models and theories.

### **Previous Studies on Undermining Factors in Science Education**

The author Chisman (1984) underlined the below problems in Pakistani science education including absence of facilities in about ninety percent (90%) schools; shortage of the adequate amount of science instructors in high schools; the dearth of well- accomplished science instructors; instructors low enthusiasm for the teaching of science; old curriculum of science; poorly transcribed science course books of science; conventional instructional methods utilized by science teachers; lack of collaborations amongst different agencies and institutes like textbook boards, curriculum wing, examination boards, resource centers, etc.; weak inspection and monitoring; and shortage of good governance in science education.

In Pakistan, the studies conducted by the researchers (Rehman, 2003; Memon, 2007; Halai, 2008) on curriculum reform in science education have identified several problems that are considered as the main sources

of science backwardness containing: science teaching is a low salaried occupation and the instructors have a stumpy rank in the social setup, and these features stop the teachers, intellectuals and researchers to enter into this occupation; unavailability of appropriate number of science teachers; little spending on education; unavailability of science laboratories and science equipment; obsolete curricula of science; weak assessing system of the science education program; teacher's training quality in Pakistan is inferior; very low educational requirements for becoming a teacher; trainer teachers are not adequately trained, and hence they are not able to train the pupil teachers appropriately; inadequate and weak monitoring system of teachers training programme; and even the basis of the recruitment of teachers is difficult to justify. The teachers are recruited politically and sometimes even bribery is exercised; lack of science teachers and pedagogical knowledge.

Halai (2008) also comments that there are many teachers who at no time studied science in the institute, still teach science subjects due to lack of science instructors. Unavailability of a science teacher (Still in certain highly developed nations like Sweden, UK, Canada, and the USA) generates extra load for the instructors that compel them to demonstrate in many overcrowded classrooms; and due to this reason, they tend to concentrate on completing the course outline for the exams and cannot do justice with their teaching profession.

Many researchers identified several problems that create hurdles in learning physics (Mehmood, 2007; Ishak & Mohamed, 2008; Kasanda, 2008; Rajib, 2013). These problems included: lack of subject matter knowledge is the chief cause of pupils' weak knowledge of physics content at the high school level; low education of science teachers flop to deliver active instruction to pupils and consequently produce science pupils with weak subject matter knowledge; encumbered syllabus; unnecessary stress on attainment in the exam without due concern to right comprehension; insufficient experience in learning Physics (as they have learned physics as a single subject from grade-XI) might be the possible reason; congested science schoolrooms; encumbered and lengthy science curriculum; and unavailability of resources. Moreover, according to Ibeh et al (2013), shortage of educated/trained physics teachers, insufficient teaching-learning resources, apparatus, instruction aids and tools, shortage of management/government intensive capital, lack of teachers and pupils motivation, and bumpy schoolrooms remained the difficulties/problems that create hurdles in the way to develop the outlook of secondary school pupils towards the subject of physics.

Education is directed towards the memorization of fundamental conceptions and their reproduction in the exams (Sadiq, 2003). According to Joe Cuseo (n, d), countries are comprising Pakistan facing problems in teaching Physics. These problems including unavailability of educated physics teachers in the institutes; outdated physics apparatus in the labs; no usage of computers; no structure for maintenance of apparatus; nonexistence of laboratory improvement policies and resources; and physics is taught mostly via lecture method.

Numerous investigators like Thair and Treagust (1999), Millar (2004), Halai (2008), Ranade (2008), Asikainen, and Hirvonen (2010), have realized some reasons of pupils weak performance in Physics subject matter knowledge. These reasons are inadequate teachers subject matter knowledge in Physics; insufficient pedagogic understanding, unreliable philosophies and understandings of teaching and learning physics; the lack of science teachers; overcrowded classes; no practical work; shortage of lab apparatus; poor quality of course books; an exam-dominated schooling structure; no activity-based method is exercised; insufficient teaching resources; and weak learning atmosphere.

According to Banu (2011), the teachers employed generally conventional teaching methods to help pupils to comprehend physics theories and conceptions. Despite the fact, there are specific and strong directives for the teachers to employ demos in the physics curriculum at the secondary level. Also, the teachers and pupils were restricted to carry out practical work. But, there are hurdles, while employing these restrictions comprising: a shortage of sufficient apparatus: teachers and pupils in the private schools confronted relatively more problems than those in public schools; low teacher-pupil ratios; no proper place for lab assistants; and teachers high workloads.

Unluckily, practical work does not acquire an appropriate position in science education in Pakistan. But, according to Woolnough (1991), the causes endorsed in favor of this carelessness of hands-on work comprising: overcrowded science schoolrooms; science instructors low practical capabilities; poor time-management abilities to carry on hands-on and experimental activities; the theory dominated exam system and offers a smaller amount of value to hands-on activities. As a result, the pupils in Pakistan got inadequate practical expertise. As an

alternative, the pupils appear in a paper substitute for the practical exam. The pupils without any pressure make preparation and appear in the paper by just remembering a few practical skills and methods.

### **The Rationale of the Study**

The use and impact of science have amplified complex in the present world. The financially devolved nations have their establishment on an amazing science instruction program. Pakistan as a creating nation is in critical need of a quality science training program, which might be built up from the essential level and afterward consistently reached out to a more elevated level. Remembering the importance of science training, the present investigation is undertaken.

### **Objectives of the Study**

The study was having the following objectives:

- 1) To identify the factors that undermine the teaching-learning process in the subject of physics at the secondary school level
- 2) To compare the male and female schools' teachers over the undermining factors.

### **Research Hypotheses**

To achieve the objectives the following research hypothesis were framed:

- 1) There are various factors for teachers that undermine the teaching-learning process in Physics subject of grade 9<sup>th</sup> at the secondary school level;
- 2) There is no significant difference between male and female teachers over undermining factors in the teaching-learning process for the subject of grade 9<sup>th</sup> physics at the secondary school level.

### **Research Methodology**

This was a survey research design in which data were collected through a questionnaire to identify the undermining factors.

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

All secondary school's science teachers of Haripur district were assumed as the target population of this study. It consisted of 257 secondary schools (EMIS, 2012-13; 2013).

The study sample comprised of 200 secondary school's science teachers. These teachers were selected through stratified random sampling techniques and divided into four strata in such a way that each stratum comprised of 100 science teachers (100 male and 100 female teachers; 100 public and 100 private teachers) at secondary school secondary level.

### **The Instrument of the Study**

To examine the undermining elements in the teaching-learning process in the physics subject of 9<sup>th</sup> grade, a self-constructed questionnaire was utilized to carry out this survey type research.

This questionnaire was planned on a simple "Yes/No" response, encompassing 25 items divided into four (4) factors: physics teacher, physics classroom, physics laboratory work, and working environment. These factors comprised of 7, 5, 5, and 8 items respectively. To make it refined, experts (physics) and researchers' views were found. The questionnaire was revised in the light of the suggestions given by researchers and experts. The reliability coefficient (Cronbach's Alpha) was 0.84.

### **Data Collection and Data Analysis**

The scholar individually paid a visit to the concerned institutes and collected data from the physics instructors. The data was analyzed by utilizing mean scores, percentages, standard deviations, and t-tests employed through

the statistical package for social science.

### Results and Discussion

The data are tabulated, analyzed, and interpreted in light of the study objectives. Conclusions and recommendations were obtained on the bases of research outcomes. The whole process is explained as under:

**Table 1.** Percentage Responses of Science Teachers about Physics Teacher

S. No.	Statement	Yes	No
1	The physics teacher is not available.	45.0	55.0
2	The physics teacher has no proper qualifications.	50.0	50.0
3	The physics teacher does not use A.V. Aids during instructions.	60.0	40.0
4	The physics teacher is overloaded in terms of work.	65.0	35.0
5	The physics teacher is with inadequate experience.	65.0	35.0
6	The Physics teacher has little understanding of the Physics course.	65.0	35.0
7	The Physics Teacher mostly uses chalk and talk method of teaching.	60.0	40.0
Mean		58.57	41.43

About 45% of teachers responded that physics teacher is not available, while 55% responded that teachers are available. Almost 50% of teachers were in favor of the statement “Physics teacher has no proper qualifications” while 50% were against it. The majority (60%) of the teachers were of the views that they utilize A.V. Aids in their classrooms, while 40% were against the statement “Physics teacher does not use A.V. Aids during instructions.” The majority (65%) of the teachers responded in favor of the statement “Physics teacher is overloaded in terms of work” while 35% were against the statement. The majority (65%) of the teachers responded that most teachers were inexperienced, while 35% said that the teachers were having more experience. Sixty-five (65%) percent of teachers responded that most teachers do not understand the physics courses, while fewer (35%) responded that they understand the subject matter. About 60% of teachers utilized chalk and talk methods of teaching, while 40% were against the statement.

**Table 2.** Percentage Responses of Science Teachers about the Physics Classroom

S. No.	Statement	Yes	No
8	The physics classroom is overcrowded.	55.0	45.0
9	The physics classroom is not suitable for the teaching-learning process.	30.0	70.0
10	The Physics classroom is not properly arranged.	45.0	55.0
11	There is the unavailability of Physics classrooms in the school.	60.0	40.0
12	There is no proper writing board in the Physics classroom.	30.0	70.0
Mean		44	56

The table shows the percentage of views of the teachers’ responses to the physics classroom. Mostly (55%) teachers responded that the physics classroom is overcrowded, while 45% responded against it. The majority of teachers responded that the physics classroom is suitable for learning, while fewer (30%) responded against it. The majority (55%) of teachers responded that the physics classroom is properly arranged, while fewer numbers (45%) against it. About (60%) teachers were of the views that the physics classroom is not available in the school, while 40% of teachers were against it. About 70% of teachers responded that the writing board is available in the physics classroom, while 30% of teachers were against it.

**Table 3.** Percentage Responses of Science Teachers about Physics Laboratory

S. No.	Statement	Yes	No
--------	-----------	-----	----

13	There is no independent Physics laboratory.	70	30
14	The physics laboratory lacks basic facilities.	40	60
15	The equipment in the Physics laboratory is mostly outdated and rusted.	40	60
16	The Physics equipment is not enough for more than a single student's group.	60	40
17	Laboratory attendant is not available	50	50
Mean		52	48

Table 3, indicates the responses of the science teachers relating physics laboratory. About 70% of teachers were of the views that there is no independent physics laboratory, while 30% of the teachers were against it. About 60% of teachers say that physics lab fully equipped with basic facilities, while 40% were against it. Few teachers say that the laboratory is full of outdated and rusted equipment, while majorities (60%) of the teachers were against it. About 60% of teachers say that lab pieces of equipment are enough for a single group of students, while 40% of teachers say that the lab is full of all types of equipment in greater numbers. However, 50% of the teachers responded that lab attendant is available, while 50% of teachers were of the opinions that lab attended is not available in the school.

**Table 4.** Percentage Responses of Physics Teachers about Working Environment

S. No.	Statement	Yes	No
18	Student absenteeism is a common issue in school.	45	55
19	Lack of will to acquire science related resources on the part of administration is found.	45	55
20	The working environment is not favorable for teaching physics.	50	50
21	Principals do not cooperate in conducting Physics experiments and practical work.	25	75
22	The medium of instruction is a hurdle in the subject of physics.	50	50
23	There is no alternate to overcome load shedding (cut off power).	50	50
24	Furniture available is not sufficient for the flexible seating arrangement of the students.	60	40
25	Physics-related books and literature are not available in the library.	65	35
Mean		48.75	51.25

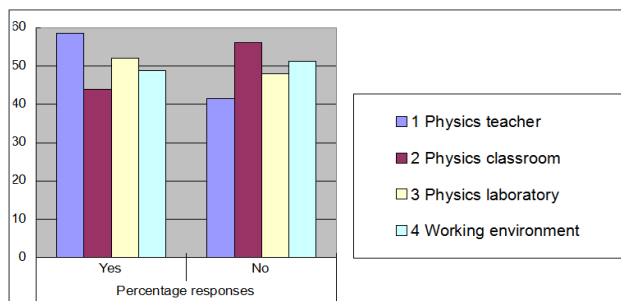
Table 4, shows the percentage responses of the teachers about the working environment for the subject physics. Mostly (55%) teachers say that "student absenteeism is the common issue in the school" while 45% were against the statement. About 45% of the teachers were in favor of the statement "lack of will to acquire science related resources on the part of administration is found" while 55% were against it. The majority (75%) of the teachers were against the statement "working environment is not favorable for teaching physics" while 25% of the teachers were in favor of it. Almost equal opinions of the teachers were found in favor and against the statement "Medium of instruction is a hurdle in the subject of physics." Similarly, equal responses of opinions were found in favor and against the statement: there is no substitute to control over load-shedding or power failure. Further, the majority (60%) teachers responded in favor of the statement "furniture available is not adequate for the flexible seating arrangement of the learners" while 40% responded against it. Lastly, about 65% of teachers believed that Physics-related books and literature are not available in the library, while 35% of the teachers responded in favor of the availability of these things.

**Table 5.** Mean Percentages of Undermining Factors

Factors	Percentage responses	
	Yes	No
Physics teacher	59	41
Physics classroom	44	56
Physics laboratory	52	48

Working environment	49	51
Mean	51	49

From table 5 the percentage mean values concerning physics teacher, physics classroom, physics laboratory, and working environment revealed that majority (59%) of the science teachers were of the opinions that physics teacher-related matters generate an undermining factor, while less number (41%) of teachers responded that physics teacher-related matters do not create hurdle in the teaching-learning process. Further, the majority (56%) of the science teachers responded that physics classroom-related matters do not create problems in teaching, while fewer numbers (44%) of the respondents consider it a big constraint. Moreover, the majority (52%) of teachers responded that matters relating to physics laboratory is a big hurdle, while (48%) teachers responded against the view. Furthermore, the majority (51%) of teachers responded that there is a good working environment in school to promote teaching, while 49% of the respondents were of the view that it is a problem in the teaching-learning process. The overall situation about all the four undermining factors is depicted in the below figure:



**Table 6.** Gender Differences Over the Undermining Factors in the Subject of Physics

Undermining factors	Gender	N	M	SD	SEM	t	P
							Sig. (2-tailed)
Physics Teacher	Male	100	4.40	1.287	0.128	2.256	0.025
	Female	100	3.80	2.326	0.232		
Physics Class	Male	100	1.60	1.206	0.120	-6.675	0.000
	Female	100	2.80	1.333	0.133		
Physics Lab	Male	100	2.40	1.864	0.186	-1.856	0.065
	Female	100	2.80	1.082	0.108		
Working Environment	Male	100	4.50	1.696	0.169	5.416	0.000
	Female	100	3.30	1.424	0.142		

Table 6 shows the comparison of male and female school teachers over undermining factors. The mean values of male and female schools physics teachers over undermining factors (Physics Teacher, Physics Class, Physics Laboratory, and working Environment) are ( $M_m=4.40$ ,  $M_f= 3.80$  and  $P<0.05$ ), ( $M_m=1.60$ ,  $M_f= 2.80$  and  $P<0.05$ ), ( $M_m=2.40$ ,  $M_f= 2.80$  and  $P>0.05$ ), and ( $M_m=4.50$ ,  $M_f= 3.30$  and  $P<0.05$ ) correspondingly. The entire table reveals that there is a statistically substantial difference for all factors except the Physics laboratory. So, hypothesis No 2 is partially rejected. The male school teachers have faced greater hurdles in terms of physics teachers, and working environment. However, they have fewer problems than female school teachers for the factor of physics class. Further, physics laboratory-related hurdles are the same for both male and female school physics teachers. Hypothesis No. 2 is, therefore, accepted.

### Discussions

The mean percentage of teacher’s responses is 51% (table 5) concerning the undermining elements. The below elements are confirmed as emasculating aspects since these elements acquired mean percentage greater than

equivalent to fifty-one percent (51%): physics instructors do not utilize audio-visual aids while teaching; the physics instructor is overloaded; physics instructor having insufficient experience; the physics instructor has a smaller amount of comprehension about the course; the instructor frequently utilizes chalk and talk method of teaching; physics classrooms are overloaded; unavailability of physics separate lab; inadequate physics instruments only support a sole group of pupils; lack of proper physics schoolrooms; the existing furniture is not enough to support pupils flexible seats arrangement, and the school library is not equipped with physics-related books and works of literature. These outcomes corroborate completely with the results of the researchers including Thair and Treagust, (1999), Millar (2004), Halai (2008), Ranade (2008), Asikainen, and Hirvonen (2010), Nivalainen et al (2010), Banu (2011). Further, these researches moderately support hypothesis No. 01. Likewise, CLEAPSS (2006-13) discussed nearly a few of these outcomes. Moreover, these outcomes also concordat with the results of the researches (Chisman,1984; Woolnough, 1991; Rehman, 2003; Sadiq, 2003; Memon, 2007; Mehmood, 2007; Ishak & Mohamed, 2008; Kasanda, 2008; Rajib, 2013; Ibeh et al., 2013; Cuseo, n,d). The male school teachers have faced greater hurdles in terms of physics teachers, and working environment. These may be due to the reasons that female students are more peaceful because they are more restriction on them from home and family sides as compared to male students. Further, female science teachers' availability in the school may be due to the reason that they are always employed at their nearest school station and not frequently transfer to the remote area.

## **Conclusions**

The non-utilization of A.V. Aids during instruction; physics teachers heavy workload; physics teachers' inadequate experience; physics teachers less understanding of physics course; utilization of chalk and talk teaching method during instruction, lack of physics classrooms, overcrowded physics classrooms, unavailability of independent physics labs, insufficient physics apparatuses, insufficient furniture for pupil flexible seat management, and unavailability of Physics-related works of literature and books in the library were decided as the undermining factors that create hurdles during the instructional process in the physics course of 9<sup>th</sup> grade at the secondary school stage. Male science instructors face great hurdles as compared to female instructors in terms of physics teachers and working environment. Conversely, they have fewer problems than female school teachers for the factor of physics class.

## **Recommendations**

The following recommendations were made in the light of the conclusions to overcome these undermining factors. Firstly, the teacher might utilize audio-visual aids or teaching aids in their daily instruction to make the teaching-learning process more exciting. To observe its daily utilization, the principals and educational authorities may visit the class regularly. To overcome the shortage of teaching aids/material, the school science instructors with the collaboration of school establishments and pupils can develop these aids and spare a multipurpose resource room where a store of such aids can be maintained, and it may be modernized and updated according to the demand of the science/physics subject over time. Secondly, additional science teachers might be employed to overcome and decrease the workload problems of science teachers and to have complete focus and devotion to their subjects. If possible, zero funds may be utilized to employ fresh science graduates as a science teacher. Thirdly, the department of education in the universities might prepare the basic science subjects (chemistry, biology, and physics) as the compulsory component of their pre-service training program to equip the teachers to have adequate understanding to join the new teaching career. Fourthly, the taxonomy of instructional strategies may be embedded in all courses of the specialized degree programs of teachers including B.Ed (1.5), B.ED (2 years), BED (Hons), and M.Ed to weaken the conventional teaching systems of instructions. Fifthly, the educational authorities, local Administration, and PTA/PTC can participate to build additional schoolrooms to control the overloaded physics classroom problems and supply enough furniture so that every pupil might have enough space for sitting, seating, and moment management in the class. Sixthly, a separate Physics lab is the requirement of the subject and pupils as well. Therefore, the management/ leaders of the schools are needed to build labs specific for Physics subject where all materials regarding Physics subject might exist. Besides, the lab must accomplish the requirements of each pupil along with the groups of pupils to have an equivalent chance to



use the equipment with thorough attention. Likewise, low cost but standard resources might be created on the indigenous level or school level to control over the lack of the equipment in the labs specific for physics subject. Seventhly, the government and N.G. O might play their part in the up-gradation of the school library by offering modern Physics-related literature, magazines, and books relevant to the intellectual level of the pupils. Lastly, the establishments may fill the gender gaps by providing equal opportunities to the secondary schools in terms of the availability of science/physics instructors, conducive working atmosphere, and building additional physics schoolrooms.

## References

- Akhtar, M. (2004). *Analysis of Curriculum Process and Development of a Model for Secondary Level in Pakistan* (Unpublished Ph.D. Thesis), University Institute of Education and Research, University of Arid Agriculture Rawalpindi, Pakistan.
- Anderson, R. O. (1976). *The experience of science: A new perspective for laboratory teaching*. New York: Teachers College Press, Columbia University.
- Asikainen, M. A., & Hirvonen, P. E. (2010). Finnish cooperating physics teachers' conceptions of physics teachers' teacher knowledge. *Journal of Science Teacher Education*, 21 (4), 431-450.
- Banu, S. (September, 2011). *The role of practical work in teaching and learning Physics at secondary level in Bangladesh* (doctoral thesis). The College of Education, University of Canterbury, New Zealand.
- Bibi, S. (2005). *Evaluation Study of Competencies of Secondary School Teachers in Punjab* (PhD Thesis). University Institute of Education and Research, University of Arid Agriculture Rawalpindi, Pakistan.
- Chaudhry, A.G. (1993). *A Study of the Practices of Teaching Physics in Secondary Schools of the Punjab* (Ph.D. Thesis). University of Punjab, Lahore.
- Chisman, D.G. (1984). *Science Education*. Report. Government of the Islamic Republic of Pakistan. UNESCO, Paris.
- Cuseo, J. (n,d). *Active learning: definition, justification, and facilitation*. (pp.1-28) Retrieved on 6/23/2014, from [uw.edu/.../active\\_learning-definition\\_justification\\_and\\_facilitation](http://uw.edu/.../active_learning-definition_justification_and_facilitation).
- Education Management Information System. (2012-13). *Annual statistics report of Government schools*. Government of Khyber Pakhtunkhwa, Pakistan: Elementary & Secondary Education Department.
- Education Management Information System. (2013). *Annual statistics report of Non-Government schools*. Government of Khyber Pakhtunkhwa, Pakistan: Elementary & Secondary Education Department.
- Faiz.F.A., & Dahar, M.A. (2011). Physics Teachers Teaching Competency in Pakistan Perception of 'O' Level Students. *American Journal of Scientific Research* ISSN 1450- 223X Issue 16, 15-19 EuroJournals Publishing, Inc. <http://www.eurojournals.com/ajsr.htm>
- Faize, F.A. (2011). *Problems and Prospects of Science Education at Secondary Level in Pakistan*, 1-249. Ph.D Thesis International Islamic University, Islamabad.
- Halai, N. (2008). Curriculum reform in science education in Pakistan. In R. K. Coll & N. Taylor (Eds), *Science Education in Context: An International Examination of the Influence of Context on Science Curricula Development and implementation* (pp. 115-129). Rotterdam: Sense Publishers.
- Ibeh, G.F., Onah, D.U.1., Umahi, A.E.1., Ugwuonah, F.C.1., Nnachi, N.O., & Ekpe, J.E. (2013). Strategies to Improve Attitude of Secondary School Students towards Physics for Sustainable Technological Development Abakaliki L.G.A, Ebonyi-Nigeria. *Journal of Sustainable Development Studies* ISSN 2201-4268, 3, 127-135.
- Igboke G. (2004). Comparative Analysis of SSCE and NECO Results in Ohaukwu L.G.A of Ebonyi State (Thesis ESUT); Ohaukwu L.G.A of Ebonyi State.
- Iqbal, A. (2004). *Problems and Prospects of Higher Education in Pakistan* (PhD Thesis). University Institute of Education and Research, University of Arid Agriculture Rawalpindi, Pakistan.
- Ishak, M. Z. & Mohamed, Z. (2008). Teacher training of secondary school physics teachers in Malaysia: Critical issues and a new direction. In R. K. Coll & N. (eds), *Science Education in Context: An International Examination of the Influence of Context on Science Curricula Development and implementation* (pp. 301-312). Rotterdam: Sense Publishers.
- Juceviciene, P., & Karenauskaitė, V. (2004). Learning environment in physics: the context of double paradigm shift, Paper presented at the European Conference on Educational Research, University of Crete, (Pp22-25).
- Kasanda, C. D. (2008). Improving science and mathematics teachers' subject knowledge in Namibia. In R. K. Coll & N. Taylor (eds), *Science Education in Context: An International Examination of the Influence of Context on Science Curricula Development and implementation* (pp. 199-209). Rotterdam: Sense Publishers.
- Mahmood, N. (2007). Elementary School Science Teachers' Belief about Science and Science Teaching in Constructivist Landscape. *Bulletin of Education & Research*, 29(2), 59-72.

- Memon, G. R. (2007). Education in Pakistan: The key issues, problems and the new challenges. *Journal of Management and Social Sciences*, 3(1), 47-55.
- Millar, R. H. (2004). *The role of practical work in the teaching and learning of science, High School Science Laboratories: Role and Vision*. National Academy of Science, Washington, DC.
- National Curriculum for Physics (2006). Grades IX-X, Government of Pakistan, Ministry of Education Islamabad.
- Onah, D.U & Ugwu, E.I. (2010). Factors which predict performance in secondary school physics in Ebonyi north educational zone of Ebonyi State, Nigeria. Pelagia Research Library. *Advances in Applied Science Research*, 1 (3), 255-258. Available online at [www.pelagiaresearchlibrary.com](http://www.pelagiaresearchlibrary.com)
- Rahman, T. (2003). Impediments in the Development of S&T: Cultural and Social Structure. In Dr. Inayatullah (Ed.), *Towards Understanding the State of Science in Pakistan* (pp. 78-85). Karachi, Pakistan: Muizz Process.
- Rehman, F. (2004). Analysis of national science curriculum (chemistry) at secondary level in Pakistan (Unpublished doctoral dissertation), University Institute of Education and Research, University of Arid Agriculture Rawalpindi, Pakistan.
- Rajib, M. (2013). Whether aptitude in physics, scientific attitude, and deep approach to study explain achievement in physics significantly—an investigation. *International Journal of Humanities and Social Science Invention*. [www.ijhssi.org](http://www.ijhssi.org); 2(1), 57-63.
- Ranade, M. (2008). Science education in India. In R. K. Coll & N. Taylor (eds), *Science Education in Context: An International Examination of the Influence of Context on Science Curricula Development and implementation* (pp. 99-114). Rotterdam: Sense Publishers.
- Sadiq, A. (2003). Evaluation of Scientific Enterprise in Pakistan. In Dr. Inayatullah (ed.), *Towards Understanding the State of Science in Pakistan*. Karachi, Muizz Process.
- Shulman, L. S., & Tamir, P. (1973). Research on teaching in the natural sciences. In R. M. Travers (Ed.), *Second handbook of research on teaching: A project of the American educational research association* (pp. 1098-1148). Chicago: Rand McNally and Company.
- Solomon, J. (1980). *Teaching Children in the Laboratory*. London: Taylor and Francis.
- Thair, M. & Treagust, D. F. (1999). Teacher training reforms in Indonesian secondary science: The importance of practical work in physics. *Journal of Research in Science Teaching*, 36(3), 357-371.
- Trivedi, R. & Sharma, M.P. (2013). A Study of Students' Attitude towards Physics Practical at Senior Secondary Level. *International Journal of Scientific and Research Publications*, 3(8), 2250-3153, 1 ISSN 2250-3153, [www.ijsrp.org](http://www.ijsrp.org)
- Wenham E.J., Dorling G., Snell J.A.M., & Taylor B., (1984). *Physics: Concepts and Models*, Addison-Wesley, pp. 92, DOI: 10.1080/00107518508210742
- Woolnough, B.E. (1991). *Practical Science*. Philadelphia, USA: Open University Press.
- Zaman, T. U., Bhatti R.U., & Ghias, F. (March, 2012). Effectiveness of pre-labs at secondary school level chemistry lab. *Pakistan Journal of Science*, 64(1), 16-19.
- Zhaoyao, M. (2002). Physics education for the 21st century: *Avoiding a crisis*. *Physics Education*, 37(1), 18-24.