

# Perceptions and Practices of Students about Physics Learning Materials at Secondary Level: A Comparative Study of Government and Private Schools

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## Abstract

*This comparative case study is carried out to know the usage of physics learning materials in schools and also the impact of these materials on students' learning. The context of this comparative study is Government and private schools of Khairpur Mirs. This research study aims to know the usage and impact of physics learning materials. The methodology of this study is qualitative and comparative case study is done within it. A total number of research participants for this study was ten (10), all participants were students of both schools and five participants were selected from each school. Those participants were selected through a purposive sampling technique. After analysis of the data, it was found that physics learning materials were being used in Private school, while in other type of schools such sort of materials were not being used, even materials were not available in the laboratories of those schools. Research findings also show that students of Government school face more challenges as compared to the students of private school and there are many reasons for these issues or challenges faced by Government students. It is also found that Government school is deprived of well-equipped physics laboratory. Moreover, the usage of learning materials helps students learn topics easily and effectively. There is a need to conduct this research in a broader context such as province level or country level, as we have done this study in one of the cities of Sindh province. It is suggested that Government should provide well-equipped laboratories to Government Schools and also organize training programs for Physics teachers.*

**Keywords:** *Physics Learning Materials; Laboratories; Teaching Methodology; Government and Private Schools*

## INTRODUCTION

Science subject has been of great importance as compared to other subjects. If we turn the pages

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of history we would find the generally accepted truth that science paved the way for inventions in all ages and inventions help to be developed in all aspects. In nutshell, Science performs a pivotal role in sustainable and socio-economic development and it is also necessary for technological advancement (Olufunke, 2012). Learning about science and technology is considered as a pre-requisite thing or need of the time in all countries and it is required from people on a global level owing to a number of issues that they face continuously (Nchunga & Kira, 2016). If we further explore science, we would know that there are many broader categories within it, one of them being natural science. Natural science is further classified into many subjects such as Biology, Chemistry, Physics and Mathematics (Hartini et al, 2017). All Disciplines that come under the broader umbrella of natural science are important to know but one of them is very necessary and important to have under one's grip, and it means everyone must know the name of that discipline is physics. Physics is the heart of science and technology because most of the tools on which scientific and technological advancement depends are the direct product of Physics (Nchunga & Kira, 2016). Mostly all the inventions that have been done till now are due to physics subject and are the results of the hard work of experts in physics. If we put our glance at the role of physics in our life, we would find that it has added many comforts to our life. We are surrounded with the inventions of physics and now we have become dependent on such inventions. For instance, we have become dependent from the lamp in a room to the air-conditioner that makes our lives easier, as the former enables us to see things in darkness and the latter enables us to feel and enjoy the flavor of the winter season in the hot days of summer. It means we find its role in every aspect of our life (Prof: Aftab Ahmad, an essay from book titled as to the point, 2016).

Physics is considered the most interesting subject as compared to other subjects of natural science and it is interesting because of its practicality, as examples related to physics exist in our life, but there are also some abstract concepts whose examples do not exist in our practical life but we can teach them those concepts easily and effectively by using different tools such as technological tools, laboratory tools and low cost no cost teaching materials but in reality the case is reversed and opponent in our context (Aina et al, 2013). Our Physics teachers do not use relevant and appropriate materials related to the topics of physics that he/she teaches. They only use textbooks and notes and, in result, students do not learn the topic clearly and effectively and they just memorize those topics in order to pass the exams (Aina et al, 2013). According to Oladejo, Olosunde and Isola (cited in Aina et al, 2013), good grip on physics concepts cannot be achieved to the maximum level without using physics learning materials. Therefore, they put more emphasis on using such materials during teaching physics topics.

It is a fact that most of the schools in Pakistan, especially in Sindh, are deprived of all learning materials, but even whatever they do have; they do not utilize those materials. Here, materials do not only refer to laboratory tools; they also include technological tools and low-cost teaching aids or materials that teachers can arrange without spending a huge amount of money. Unfortunately, in our context, teachers consider the usage of physics learning materials less fruitful and time-consuming too; therefore, they do not use available materials, and they are of the view that if they made use of available laboratory tools, then probably these tools would be broken. That is one of the main reasons for not using available materials in the classroom, and those materials are kept in the cupboard as a showpiece in the laboratory (Dawn article, March 4, 2016 by Dr. A.H. Nayyar). Aina et al. (2013) found that lack of physics learning materials, insufficient utilization of present materials, and local materials that teachers use affect the teaching and learning process. Due to this, students find physics very difficult, perform poorly at all levels of education, and their achievement in Physics is low (Aina et al., 2013).

### ***Statement of the Problem***

It is observed that most of the teachers of physics are not habitual users of learning materials such as laboratory tools, technological tools, and low-cost, no-cost teaching materials; they only use text books as learning materials while teaching physics subject (Gok, 2011). Many studies have shown that mostly they (physics teachers) do not have awareness about the role that these materials play in the physics classroom in making teaching and learning more effective (Gunta, 2015). Most physics topics are being taught through the lecture method without using materials related to the subject. That is the main reason why students do not learn Physics topics effectively due to this strategy (the lecture method), and usually they have very poor performance in all levels of the Physics subject (Aina et al., 2013). Only students memorize the things they need to pass their exams because they do not have a conceptual understanding of Physics topics. Therefore, using physics learning materials will help to improve teaching and learning processes (Widayanti et al., 2019).

### **LITERATURE REVIEW**

The education system needs a plan that must be structured in terms of materials that are intended to be used in the teaching and learning process and such materials make the effective process of getting an education. Teaching material or subject material must be systematically arranged because it is the main component that supports the teaching and learning process (Widayanti et al, 2019). The study of Widayanti, Abdurrahman, and Suyatna (2019) explains that teaching materials are categorized into two classes: “intentionally designed materials for teaching” and “unintentionally designed materials for teaching”. The first type includes books, handouts, worksheets, modules, etc. that are explicit and known to all, while the other type includes films, advertisements, news, etc. Such materials are not known to all, but they can be used for teaching any topic. According to Aina and his colleague (2013), these learning (instructional) materials are classified into three types: audio, visual, and audio and visual. When physics teachers use such materials in the classroom, these materials attract the sense of sight and hearing of students. Such materials operate electronically and non-electronically; the former includes television, computers, radio, slide motion, etc., and the latter includes chalk, board charts, models, etc. If these tools are lacking in the physics classroom, then it will make the classroom uninteresting, effective learning of students will not occur, and this will lead to poor performance and low achievement of students in the physics subject.

Science education is an essential field as it enables students to understand their natural and real surroundings by enhancing a multi-perspective view of phenomena related to science (Fathman et al., cited in Khitab, 2015). Agommuoh (2014) founded that for making the process of teaching and learning physics effective, teachers should have to follow certain principles of effective teaching of physics, which deal with the existing ideas and concepts of students, advocate for students to apply new concepts or skills in different contexts, encouraging students’ participation in lessons, encourage students to inquire, and support cooperative learning among students.

### ***Role of Physics in Technology and Society***

Adeyemo (2010) states that physics is the heart of science and technology because both are dependent on physics, as the instruments on which the development and progress of these areas depend are the inventions of physics. Therefore, physics is the main branch in science and technology that examines and explores the natural phenomena and helps people understand the rapid changes

that occur in societies due to technology. In any society that aims to boost the mental skills of students in science subjects, laboratory plays a pivotal role in achieving or meeting this aim because laboratory plays a fundamental or basic role in the process of science learning (Miller et al., as cited in Nchunga & Kira, 2016). Physics, being a branch of natural science, performs a pivotal role in boosting personality and making students intellectually developed. The main objective of teaching science is to learn about things and events by developing connections with real life and the environment rather than to acquire knowledge, understanding, a positive attitude, and skills.

### ***Importance of Physics Learning Materials***

Using physics learning materials in the classroom is very essential because students forget very soon what they hear, but they cannot forget easily what they see, which remains in their minds for a long time. Abimbola (cited in Aina et al., 2013) also contributed to the value of using physics learning materials in the physics classroom; he explained that physics learning materials aim to make learning more effective and advocated it too. Bellen (2017) explains that the requirement of science education is that schools have proper laboratory materials in order to support learning in an effective way. Students can easily understand a real system, process, or phenomenon when there is an interaction between laboratory learning and instructional simulations. Besides this, laboratories are the places where experimental work is being done in order to promote scientific concepts and theories. This is the main source for promoting formal reasoning skills, students understanding, and enhancing desired learning for students. Bellen further states that the laboratory is not the foundation or base for learning, but it supports students in visualizing and understanding physics concepts and theories easily. The progress of laboratory instruments (materials) is useful and beneficial for students as it paves the way for new discoveries and inventions, but for this, a proper guideline, set of instructions, and support are needed (Bellen, 2017). Physics education helps students and also provides a platform for developing their skills, such as decision-making and problem solving skills, and these skills lead them to be critical thinkers (Nchunga & Kira, 2016).

### ***Challenges and some suggested pedagogical strategies***

Aina and Akintunde (2013) found that physics is the most difficult subject for students, and due to this, students do not have high achievements in this discipline. Moreover, it was also found that in physics subject, students have poor performance at all levels, and other researchers also advocated these results. The main reason of lack for the interest of students in physics is that teaching physics is not encouraged in schools because of its abstract nature; therefore, there is a dire need to use instructional or learning materials in order to facilitate students' learning of physics and also to develop their interest in this subject. Many researchers have identified that students understood the physics concepts poorly through the conventional (traditional) method. Moreover, findings reveal that traditionally taught courses were not capable of getting a student better understanding of the basic concepts, and students were not able to solve the work problems of physics topics. Moreover, it was also reported that in physics lectures in which students have to interact with each other and with teachers and mentors about the topics under discussion, they learn more and are more actively engaged with the materials they are learning (Mazur, cited in Gok, 2011). Oladejo, Olosunde, Ojebisi, and Isola (cited in Aina et al., 2013) also emphasized that students cannot achieve full mastery over all the concepts of physics without using the learning materials.

Lab work is the base of all sorts of experimental work that is being done in the laboratory, which includes demonstrations and computer simulations, as well as hands-on experimental

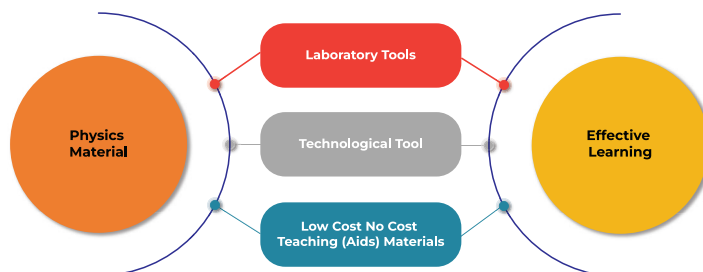
work. The objective of a laboratory is to provide structured practical activities which help in the development of conceptual understanding rather than connect pre-existing theory to practice. There is a widespread belief that lab work is necessary for students to acquire conceptual understanding of the scientific disciplines and to enhance a wide range of practical skills, as there is no universal guide for introductory practical lab work (Deacon & Hajek, 2010).

The few important components for the understanding of physics concepts are demonstrations and laboratory experiences. Visualization can help students understand physics concepts because it not only allows students to see the behavior of the things but also provides them with visual associations or connections. There are many ways or techniques of visualization, such as demonstrations, simulations, models, real-time graphs, videos, etc. Laboratory experiences enable students to have the experience of meeting nature as it is, rather than in idealized form, and also provide an opportunity to boost their skills in scientific investigation and inquiry.

The resources for teaching physics and, generally, teaching science are not enough. Therefore, researchers try to find an alternative or substitution of physics materials for the teaching of physics by taking the economic or financial conditions of the country into consideration. Therefore, some efforts were taken to find out the effectiveness and benefits of low-cost, no-cost materials in the teaching of physics as materials that have less cost, are available, and are beneficial in countries such as Pakistan where schools are deprived of resources, especially in secondary education. In science education, low-cost, no-cost materials have proven useful in backward and developing countries such as Pakistan, India, Sri Lanka, Nigeria, and Bangladesh. Savikumar (2014) states that low-cost teaching materials are designed from local materials that have very little cost to engage teachers and students. When the act of planning and creating the learning materials is done by teachers and students together, they use them to their maximum level, feeling joy and pride because the materials they are using were designed by them (Khan et al., 2019).

The inquiry-based method is one of the best methods of teaching physics and science generally, and it is also cited in many studies as the best and most effective method of achieving scientific literacy. Moreover, it is also found that inquiry-based methods are a medium or source for the development of personal meaning and may lead to higher student achievement. This method causes a shift in the transition from dependency on the text book to a more hands-on approach in which students learn more by inquiring themselves under the guidance of teachers. Therefore, it can be said that in the inquiry-based method, students have a central role to play as compared to other methods of teaching physics. The findings of this study reveal that students gained valuable learning experiences with the help of this method, and they shared appreciation for the learning experiences and opportunities provided to them by this inquiry-based method. Students also explained that this course was totally different from other courses in which this method (the inquiry-based method) was not being used, and that this method proved beneficial and useful for future careers as science teachers (Duran et al., 2004).

#### Conceptual Framework



## ***Research Questions***

Three questions have been developed for this research.

- 1 What are the perceptions of students about physics learning materials?
- 2 What are students' practices of interacting with these learning materials in physics classroom context?
- 3 How much these materials are used effectively in physics classroom?

## **METHODOLOGY**

This study had been designed to find out the evidence about the perceptions and practices of students about physics learning materials. This section of the research article aims at describing an orderly sequence of approaches and procedures that will be employed in order to conduct this research. It also describes the rationale behind the selection of each particular approach in specific connection to carrying out this research.

### ***Research Method***

The research method of this study is qualitative, and within it, a comparative case study is being done. In accordance with the research topic, the qualitative method is suitable and appropriate to be adopted, which is why this research method is used. The reasons for selecting the qualitative method are that the researcher aims to gather in-depth insights about the topic under study, and the reason for using a comparative case study is that this study is carried out in a specific area, and from that area, two particular schools are selected for this study. As a case study requires that it be carried out in a particular area, the same condition exists. It is also intended to compare the data of two schools in order to see the difference. Therefore, I use a comparative case study. Moreover, it was also suggested by Yin (2018) that case studies are used when questions of research start with "how" and "why". In addition to this, case studies are utilized when research is being conducted in a specific context or area.

### ***Participants***

Total number of research participants for this study was ten (10), all participants were the students of both Private and Government schools, Khairpur Mirs. The five participants were selected from each school. Within ten participants, five participants were boys and five were girls. These participants were the students of 9th and 10th grade.

### ***Instruments***

The instruments used for data collection were semi-structured interviews and classroom and laboratory observations. Firstly, participants engaged in semi-interviews in order to gather detailed data about the topic. After conducting interviews, four observations were done in each school, including two classroom observations and two laboratory observations.

### ***Data Analysis***

In the beginning stages of data analysis, interviews were being translated and written in text form. Observations were documented in the form of reflective notes. The translations of the semi-

structured interviews and the observations were re-read and reflected to ensure that the translations of both tools were matching. After this, coding was done from the translations of the interviews, and then the frequently recurring codes were used to develop themes. At last, themes were carefully developed by rearranging codes. Thematic analysis was done to reach the findings of this study.

## **RESULTS AND DISCUSSIONS**

This portion of the research study aims at discussing the findings that have been extracted and emerged from the data of semi-structured interviews, classroom observations, and laboratory observations. Moreover, the findings of the study have also been supported by the literature. During the data analysis, six themes emerged from the interview, classroom, and laboratory data analyses, which are:

### ***Positive and negative attitudes about physics***

One of the main questions of this study is about the perceptions of students regarding physics subject. This question was asked to know how they see physics subject and what kinds of perceptions students have developed about physics subject. It was found from the semi-structured interviews that most of the students of the government school have positive perceptions about physics as an interesting subject; physics is fun, etc. Few of them shared their negative perceptions about physics, such as that physics is not very easy and is not more difficult, but it is coverable, but all students told that they also face many challenges during learning physics, and the reasons for facing challenges are many in number. While students of private schools also shared the same perceptions as students of government School that most of them had positive perceptions while a few had negative perceptions about physics. During classroom observation of both schools, it was observed that students of the private school face fewer challenges as compared to the students of the government school. The reason for facing fewer challenges is that there was a well-equipped laboratory and the teacher was using it properly, students were engaged in practical work, different methods of teaching were being used, etc. During classroom and laboratory observation at both schools, it was affirmed that they, rightly, have developed such perceptions about the physics subject accordingly. Aina and Akintunde (2013) found that physics is the subject that students find more difficult, and due to this reason, students do not have high achievements in this discipline.

### ***Challenges and strategies in learning physics***

Students also shared that they face many challenges while learning physics. Moreover, they shared reasons for facing challenges, and they also shared some strategies that can be helpful for them in getting rid of those challenges. It was found that physics is more challenging for students of government schools because teachers of those schools use the lecture method, and physics is also challenging for students because of mathematics, which is problematic because mathematics is based on remembering as students need to remember formulas, derivations, and then the process of solving any particular problem. These reasons were also observed during classroom observation. They suggested that mathematics should be excluded from physics so that this subject would be easier for them to learn. Secondly, physics is challenging because of a lack of practical work, and teachers do not relate physics to daily life through examples. It was also found during classroom and laboratory observations. It is suggested that teachers engage students in practical work and also give more examples from daily life. On the other hand, students of private schools do not face

many challenges during learning physics. The reason for this is that teachers use different methods of teaching in accordance with the nature of the topic, there is a well-equipped physics laboratory where students do the things practically, learning materials are being used during teaching physics, etc. Sometimes, students face issues in mathematical problems of physics and in some topics where they need something from our daily lives that will help them understand that topic. Then, they use different resources, such as taking help from their physics teachers, using the internet, doing group study to help each other, etc. Therefore, physics is easy and interesting for them as compared to the students at the government school. It was also observed during classroom and laboratory observation that teachers used different methods of teaching appropriate to the nature of the topics, students faced fewer challenges, and they were using different resources during learning physics. Mazur (cited in Gok, 2011) has reported that students learn more physics in lectures where they interact with faculty, collaborate with peers on interesting tasks, and are actively involved with the material they are learning. Oladejo, Olosunde, Ojebisi, and Isola (cited in Aina et al., 2013) also emphasized that students cannot gain or achieve full mastery over all the concepts of physics without using the learning materials. 4.3 Process of making physics subject effective

The second question of this study is about making physics subject effective. Students also shared some processes for making physics subject effective based on their experiences. It was suggested by students of both schools (government and private) that first of all, teachers should develop an interest in physics among students. Secondly, teachers should teach physics in an interesting way so that students do not feel bored. Teachers should give examples from daily life and show some materials if they are available. Moreover, teachers should allow students to use different resources and not limit them to only text books. Besides this, teachers should engage students in practical work as they do the things practically to get an in-depth understanding of the topic. It was also suggested that teachers should not use the lecture method all the time but should use appropriate methodology with respect to the nature of the topic. Nchunga and Kira (2016) found that students showed agreement that when teachers used the real-life material approach (RLM), the classroom became an effective place as it encouraged learning by doing. Students also expressed that because of this approach, they got opportunities to participate and found themselves engaged in many learning activities, which enabled them to perform the experiments on their own. Besides this, students also expressed that the real-life materials approach is a source to increase or develop interest in learning physics.

### ***Views about physics learning materials***

The third question of this research study is about the perceptions of students about physics learning materials. In response to this question, students shared their perceptions about the availability and usage of physics learning materials and the role of these materials in the teaching and learning of physics. Moreover, they shared the benefits of these learning materials. It was found among the students of the government school that few students had knowledge about physics learning materials, as they responded that these are materials that are part of physics, such as stop watches, screw gauges, vernier callipers, etc. In their point of view, physics learning materials are only laboratory tools. Moreover, it was also found that teachers do not bring such materials into the classroom for showing students or engaging them in practical work, but teachers used to show them pictures of instruments that are given in the text book. Furthermore, teachers do not use any materials, but they give examples from daily life in order to relate physics topics to daily as students can learn physics easily. It was also observed during classroom and laboratory observations



at the government school that teachers do not use learning materials when teaching physics in the classroom. Moreover, the government school was deprived of a physics laboratory; only a science laboratory was there, and the laboratory was lacking in instruments. In the science laboratory, few instruments were available, and they were not in good condition. As instruments were scattered here and there in the laboratory, it meant no organisation was there. The science laboratory was used as a staff room where teachers used to sit in leisure time, and it was clear from that that no class related to practical work was running in that laboratory because teachers used to sit in the science laboratory. On the other side, most of the students in private schools had knowledge of physics learning materials; in their point of view, learning materials are not only limited to laboratory tools but may include technological tools or other materials that are used in the teaching and learning of physics. Furthermore, it was found that teachers bring such learning materials into the classroom to show them and also engage them in practical work. Besides this, teachers used to show them models and pictures related to the topic that they were studying at the time. Moreover, teachers give more examples from daily life in order to relate physics topics to daily life so that students can learn physics easily. It was also observed during classroom and laboratory observations at a private school that teachers use learning materials when teaching physics in the classroom. Moreover, private schools had well-equipped physics laboratories, and all the necessary instruments were available in an organized setting. Abimbola (cited in Aina et al., 2013) also contributed to the importance of physics learning materials in the teaching and learning of physics; he explained that the primary purpose of physics learning materials is to make learning more effective and facilitate it too. Bellen (2017) explains that science education requires that schools have appropriate laboratory equipment (materials) in order to facilitate learning effectively.

### ***Role of physics materials***

The fourth question in this was about the role that these physics learning materials play in the teaching and learning of physics. Students shared their thoughts about the role of physics learning materials and also explained how much these materials help teachers and students in the teaching and learning of physics. It was shared by the students of the government school that these learning materials play a very crucial or important role as they make teaching and learning physics easy. These instruments help students understand physics topics easily, and because of these materials, conceptual and effective learning of students takes place. Moreover, these learning materials reduce the possibility of challenges that we face during the teaching and learning of physics. That is why students in private schools face fewer challenges because their teachers use physics learning materials, different methods of teaching, and engage them in practical work in order to get detailed information and an in-depth understanding of physics topics. The use of these learning materials provides a platform where students get real-world experience. Moreover, students get the experience of practical work because when they are given such instruments, they use them and gain awareness about their functions. Furthermore, because of these instruments, the knowledge that students get remains in their minds for a long time, which means long-term learning of students takes place (Abimbola, cited in Aina et al., 2013). Kira (2016) explained that using learning materials in the classroom could enhance students' involvement in the learning process and also develop a positive attitude towards the use of real-life materials in learning the selected physics concepts. Morohunfola (cited in Aina et al., 2013) states that learning materials prove useful for teachers to meet the individual differences of students in the class by using different learning aids that appeal to diverse senses.

### ***Suggestions to improve physics***

The last question of my research study is about the suggestions of students about making physics more effective. It was suggested by the students of the government school that the teacher's voice should be audible as all students can listen properly; otherwise, students cannot learn any topic easily and effectively. It was also observed during classroom observation that the teacher's voice was slow and students were having difficulties listening to the teacher. Secondly, it was suggested that there should be a well-equipped physics laboratory in the government school, as it was observed that the school was deprived of a proper laboratory. It was also suggested by students of both schools (government and private) that teachers should use more learning materials, especially those that are part of our daily lives (low-cost, no-cost materials), because such materials help us learn physics easily. Government school students suggested that teachers should bring materials into the classroom related to the topic as students do the things practically. Teachers should promote practical work, as practical work helps students learn physics easily, and those topics remain in students' minds for a long time. It is also essential that there be a well-equipped physics laboratory because a laboratory provides a platform where students can do practicals or experiments related to physics. Students at a private school suggested that besides using low-cost teaching materials, teachers should pay more attention to the methods of teaching that they use when teaching physics. For instance, teachers should use graphical representation, use a projector for showing examples, and also use more things from our daily lives (low-cost, no-cost teaching materials). Aina and Akintunde (2013) suggested that there is a dire need to use instructional or learning materials in order to facilitate students' learning of physics and also to develop their interest in this subject. It is reported that students learn more physics in lectures where they interact with faculty, collaborate with peers on interesting tasks, and are actively involved with the material they are learning (Mazur, cited in Gok, 2011). This is the age of information and communication technology (ICT), and in this modern period, teachers must be capable of using available local resources in order to produce physics learning materials in school (Daniel, as cited in Aina et al., 2013).

### **CONCLUSION**

This research study aims at knowing the perceptions and practices of students about physics learning materials at the secondary level. Research findings show that students of government school face more challenges as compared to students of private school and there are many reasons why government students face more issues or challenges. It is also found that government school is deprived of well-equipped physics laboratories. In government school, there is only one science laboratory that also lacks instruments, which means all required instruments are not available in the laboratory. On the other side, private school has separate laboratories such as physics laboratories, chemistry laboratories, biology laboratories, etc. The physics laboratory of a private school is well equipped, and all the necessary materials are available in the laboratory. Findings of this study also showed that teachers in government schools do not use learning materials during teaching and learning of physics. They do not use any kind of materials, such as laboratory tools, technological tools, low-cost teaching materials, etc. It was observed that learning materials were not available in the classroom and laboratory, such as computers or other technological tools. On the other hand, teachers of private schools use learning materials during the teaching of physics in the classroom; they commonly use laboratory tools and technological tools because such tools are present in the classroom, but they do not use low-cost teaching materials commonly, as students shared during the interview that once or twice a teacher used low-cost teaching materials in this whole course. It was

also found that government teachers use one method, which is the lecture method, and they use only this method for teaching all the topics of physics, which demand other methods be used. While the private teachers use different methods according to the nature of the topics in physics.

## RECOMMENDATIONS

Based on the findings of this study, some recommendations are also given. The study proposes following recommendations:

### *CPD (Continuous Professional Development)*

Professional development programmes are designed to improve the teaching and learning approaches of teachers. It is necessary for educators to organize certain programmes to discuss issues regarding physics as a whole and particularly the usage of physics learning materials in the physics classroom. Continuous professional development (CPD) programmes should develop the skills of teachers so that they can teach physics effectively in schools. There should be training programmes for government teachers for using physics learning materials, as government school teachers lack expertise in these areas.

### *Development of Physics laboratories*

It is a high recommendation from the researcher side that the government of Sindh should develop the physics laboratories in all government schools so that students can learn physics easily and effectively. As students of the government school expressed in their interviews, physics laboratories play a pivotal role in learning physics and are a kind of platform where students can do things practically. When students learn physics theoretically and then do the practical work related to that topic, effective learning will take place. Because of physics laboratories, students will get the chance to do things practically, and as a result, their scientific approach will be developed. By doing so, there will be a greater possibility of increasing the number of scientists in our country. In terms of results, our country will soon be counted among those countries that are more advanced in inventions and technologies.

### *Limitations*

One of the limitations of this study is that study is limited on the perceptions of Higher Secondary School students. Besides this, contextually this study is limited to the Government and Private schools of Khairpur Mirs. Last but not least, methodologically, this study is qualitative.

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