

# **Evaluation of Punjab's Government Schools Monitoring Programme**



**SHEHZAD ALAM**

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**SUPERVISOR: Dr. SHAHID UMER GONDAL**

**PIDE SCHOOL OF PUBLIC POLICY  
PAKISTAN INSTITUTE OF DEVELOPMENT ECONOMICS (PIDE)  
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Pakistan Institute of Development Economics, Islamabad  
*PIDE School of Public Policy*



**CERTIFICATE**

This is to certify that this thesis entitled: “*Evaluation of Punjab's Government Schools Monitoring Programme*” submitted by Mr. Shehzad Alam is accepted in its present form by the School of Public Policy, Pakistan Institute of Development Economics (PIDE), Islamabad as satisfying the requirements for partial fulfillment of the degree in Master of Philosophy in Public Policy.

Supervisor:

Dr. Shahid Umar  
M&E Specialist, Management Systems INT.

External Examiner:

Dr. Shujaat Farooq  
Director M & E,  
Benazir Income Support Program (BISP),  
Islamabad.

Head,  
PIDE School of Public Policy:

Dr. Talat Anwar  
Professor,  
Pakistan Institute of Development Economics,  
Islamabad.

## ABSTRACT

Technology-based monitoring interventions are commonly used in schools for improving school attendance all over the world including Pakistan. A vast body of literature exists on whether technology-based monitoring interventions are effective in terms of improving school attendance all over the world but this area has been vastly overlooked in the context of Pakistan. The present study fills this gap and seeks to answer the following research questions: to what extent, if at all, has the technology-based monitoring improved school attendance in Punjab, Pakistan. To answer this research questions, the study used students' attendance data from all the primary and secondary schools of 36 districts of Punjab for years ranging from 2009 to 2017. Ordinary Least Square method was to analyze this data. Results have found a positive effect of the technological-based interventions of the Government of the Punjab on the attendance of the students. Our results suggest that reducing student absentees can be one of the many benefits that Pakistan can reap by adopting policies that implement technology-based monitoring interventions in the education sector of Pakistan. Such intervention should be introduced for improving the education sector of other provinces as well.

**Keywords:** *Technology-based Interventions, School Attendance, Education, Punjab Pakistan, learning outcome.*

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## **DEDICATION**

*This humble effort is dedicated to*

*“My Family for Their Loving Wishes, Support Patience, Understanding and Guidance and All  
Those Who Seek Knowledge to Reach At Truth”*

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## **ACRONYMS**

ACE	Association Communal Para La Education
CSMM	Comprehensive Schools Monitoring Mechanism
DCO	District Coordinator Officer
DMO	District Monitoring Officer
EDUCO	Education Con Participation De La Comunidad
MEA	Monitoring and Evaluation Officer
OLS	Ordinary Least Square
PMIU	Punjab Monitoring and Implementation Unit
PSCCS	Primary-Secondary Color Coded Scheme
SBS	School Based System
WSN	Wireless Sensor Network

## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1 Background**

The inability of the educated individuals in Pakistan to find satisfactory and creative work over the past few decades has given rise to disappointment among most of the educated cohorts in the country. This, overtime, has led many to question the actual benefits of attaining higher education. Add to this the fact that the government and the institutions, since inception of the country, has grossly overlooked the education sector in Pakistan, resulting in relatively lower quality of education. This fact is also evident from the fact that almost 50% of the population believe that they don't have the required skills for the modern labor market and are also unable to find adequate opportunities to enhance their skills. This has also lead to this sectors inability in adopting new methods and techniques which are necessary for improving the literacy rate and quality of education in the country throughout the developed and developing world. The problems stated above are further exacerbated by the growing population, which means that the proportion of the population in need of education is constantly increasing.

One of the tools being employed all over the world which can also help Pakistan get out of this quagmire is Technology. In most of the developed world, technology is being employed to check and maintain the quality of education in schools and colleges. One of the ways that technology can be employed is to improve school student's attendance rates. Improving a student's attendance can have a multiplies effect on the dropout rate, his grades, getting higher education, availability of better opportunities and net positive effect on the society. This can also lead to increasing the confidence and satisfaction of business community on the domestic labor market.

The Leading businessmen and researchers of Pakistan have shown dissatisfaction with the ability of the labor market competing with the modern world. Education indicators extracted from

annual Executive Opinion Survey conducted by World Economic Forum also shows abysmal performance. These surveys take the reviews of officials of corporations about their businesses, social, economic and political environment throughout the world in which their business is operating (Akhtar et al., 2015). Questions of review were based on knowledge and capacities related to employees of corporations along with questions regarding the institutions which help to enhance the skill set of those individuals. Overall business leaders are dissatisfied with the educational setups ability to support the competitive economy, the dissatisfaction is regarding primary school education quality, science and math education. This result was found consistent but there is slight variation in the survey results of past four years (Cheema & Naseer, 2013).

This high level of disappointment is basically due to lack of education access, literacy and student and teacher ratios. As compared to India and Indonesia, primary education enrolment rate in Pakistan was 72% in 2011 while it was 90% more than in India and Indonesia. The enrollment rate of girls was fewer to it with 67% which were enrolled in primary school. The secondary school enrolled students are 35% and 29% of them are girls showing similar trend as primary school. Bangladesh and Indonesia are showing better enrolment with 47% and 74% respectively, there is no differentiation among girls or boys enrollment rate in Indonesia while in Bangladesh there is seen that girl's enrollment rate is more than boys. There is almost same story related to tertiary level facts and figures are near about 8% of two-year colleges while in India and Malaysia was 18% and 42% respectively high (Ahmad & Owais, 2013).

Education system in Pakistan is not sufficient to meet the global standards. Reasons of this poor education system are tremendous including untrained teachers, poor infrastructure and insufficient enrollment in primary schools. According to UNESCO the primary school enrollment rate in Pakistan was 97.71% but sees a significant decrease in enrolment over higher levels of

education. In order to tackle enrollment and absenteeism problem in school's government has made efforts during the past few years. Many solutions are proposed to solve the dilemma (Hazarika, 2001). Efforts are being made to reduce the constraints by providing cheap, accessible and incentive based education e.g. scheme of study by chief minister Punjab (Ghazi & Ali, 2010).

To ensure the quality of education and to reduce the absenteeism problem in schools we need to innovate the systems to monitor such causes. Despite the compelling reasoning, there is relatively little empirical evidence in developing countries to document the merits of technology-based monitoring of schools. The main reason is that these technological arrangements have only recently begun to be implemented (Childs, 2017). One such example is Schools smart monitoring mechanism, which is an innovative program that intends to bring improvement in student attendance rate because there is a need to closely look at the attendance patterns and reduce unexplained absenteeism. Only an innovative technology-based attendance tracking system can show the best picture to enquire about the absenteeism among students (Khan et al, 2016). Because, Pakistan has the second highest out of school population.

Similarly, there is a need to focus on the education of girls because its effects are limitless. There is inappropriate access of education to girls (Floro & Wolf, 1990). Parents of the rural areas show more reluctant behavior to enroll girls in school (Lloyd et al., 2005). Male literacy rate is higher i.e. 61% as compared to the female literacy rate which is below average 36.8 (Memon, 2007)

## **1.2 Brief Overview of How Program Works**

In order to improve the education system government of Punjab introduced schools monitoring program. This monitoring program is over sighted during its implementation by Program Monitoring and Implementation Unit (PMIU). PMIU's key task is to ensure effective data

collection at the district level. The lynchpin of this monitoring program is the office of District Monitoring Officer (DMO). There are 36 DMOs in all, each DMO per district. Their job is to supervise the field staff. The field staff comprises of Monitoring Evaluation Assistants (MEAs). There are 929 sanctioned posts of MEAs in the province of Punjab. Their job is collection of monthly data on specified indicators. MEAs are assigned school clusters to work on, but each month these MEAs are rotated to different school circles in order to prevent them from building personal relationships with school staff (Zakar, 2013).

Earlier these MEAs were provided by standard monitoring pro formas. Which they were supposed to fill up by physically visiting schools assigned to them. Towards the end of the month MEAs were duty bound to submit entire month's data to PMIU (Borghi et al, 2013). In this process, many discrepancies were found i.e., MEAs used to fill pro forms sitting in their homes without physically visiting schools. Resultantly, manual data collection turned out to be unreliable source for monitoring. The desired goals were not met (Hassan, 2010). Therefore, rethinking was done and manual monitoring system was replaced by electronic/digital system. MEAs were provided with geo-tagged tablet PCs connected to monitoring software through internet. These tablet PCs were geo tagged, so that their physical location can be tracked by central monitoring office of the province in Lahore. These tablets compelled MEAs to pay visits to schools on daily basis, from where, they directly upload data in the system. Monthly performance report is presented by DMO to DCO in district monthly performance review meeting based on a composite index, formulated on the basis of given specific indicators (Rumisha et al, 2007). This report also enables to draw a cross district comparison. Moreover, it also helps PMIU to provide feedback to districts in order to improve their performance on various indicators.

Though technological advancement is fruitful in every aspect including the education system of

any country causing huge impact to tackle the absenteeism and improve attendance rate of both male and female children in Pakistan still there is no empirical evidence of the case. As it is also highlighted in a recent study that we need to reform our education system and use technology-based interventions to improve the institutions. There is a need of detailed blueprint to reform the education system in schools of Pakistan (Aziz et al, 2014).

This study assessed technological addition made to the existing schools monitoring program. It attempts to measure effectiveness of technological intervention by analyzing student attendance rate before and after intervention period. This study highlighted that how technology-based monitoring system impacts the student's outcome of both male and female by tracking the absenteeism problem of the students. It tested whether the technological intervention which was introduced to gather data by PMIU is more efficient than the manual system or the traditional ways were better and how the technological monitoring system has improved the student outcome. Secondly how the technology-based monitoring system is impacting the female student outcome. i.e attendance rate.

The findings of this thesis will help the program monitoring and implementation unit of school education department in Punjab by providing empirical evidence regarding the beneficial results of using technology-based monitoring system in Punjab, Pakistan and provide empirical evidence regarding the technology-based monitoring system that whether it should be spread across for effective results or not.

## **1.2 Statement of Problem**

Many factors indicated about both students and community being problematic as the student's absenteeism rate has increased at high level. It is found that students with higher absenteeism rate have academic or social problems. As per study of Baker and Jansen (2000), those students which

have low level of achievement and poor test score are found absent during their courses. As the absenteeism level is retained high it can lead to more truancy. (Baker & Jansen, 2000). It was experienced that when there is high level of absence of students there is major loss of learning and instructional time of students (Mayer & Mitchell, 1993). As the number of absenteeism increase there is one of the basic loss faced by students is that they miss their learning level but at this level teacher have to accommodate the students which are found absent during that courses. It is a fact that many implications due to absenteeism are found out of the class as well. Those students are drop out of schools which are found at high level of absenteeism and there is no recovery of their learning loss as they didn't pay attention to their studies (Mayer & Mitchell, 1993). The students which are dropped out from schools are found to adopt wrong ways such as criminal and negligence behavior of life which ultimately badly affect society. In study of Lotz and Lee (1999), it was pointed out there is more frequency level of criminal behavior and other bad activities in the students which are found to show low grades, high absenteeism level and due to low progress, they are dropped out from the school.

Educational sector of Pakistan is facing serious issues among many other factors which make our education system inefficient is the issue of poor student enrollment and absenteeism rate. Student attendance is one of the key monthly indicators on which PMIU has to collect data. It is seen that poor attendance rate of students in schools is major hurdle in achieving targets in educational sector at elementary and secondary level. Low attendance rate of male students is a serious challenge, but low attendance in case of female students has been even more problematic.

Though student's attendance is being measured manually from many years, but the manual monitoring of attendance has been inefficient and inconsistent. An electronic monitoring solution to gather and process data is considered to be more effective. Therefore, a technological

intervention was introduced to the erstwhile existing system of manually gathering data by PMIU, whereby, geo-tagged PC tablets in 2014 were given to all MEAs to make monitoring system more efficient, thus putting an end to manual monitoring system.

### **1.3 Research Question:**

There are several benefits of attending live lectures. Student attendance is not only a good predictor of academic performance. Attendance is also a key component in the education experience as students learn to manage their differences, work in teams, share, and observe the experiences of other students. By observing the arguments of others, students develop and polish their critical thinking skills and study techniques. They are also motivated to study more, to become better and more participative professionals, and better citizens. Moreover, by sharing experiences, university students also establish friendships that last a lifetime and help them to construct valuable professional and social networks. Later in life, they may use these networks to create non-government organizations and cultural groups, to pursue spiritual and political activities, to enhance their culture, and enrich their lives.

This study is primarily designed to investigate following research question.

1. To what extent, if at all, has the technological aspect (geo-tagged PCs) introduced into the monitoring system of schools improved the attendance of students in elementary and secondary schools?
2. How has the policy affected the attendance of boys and girls, separately?

### **1.5 Research objective:**

The objective of the study are shared below:

1. To investigate pre and post policy intervention of government of Punjab in education sector.
2. To look into the improvement of attendance of student based on the introduction of new



technologies into the education sector.

3. To identify existing loophole and give policy recommendations.

### **1.6 Hypothesis of Study**

**H1:** Technology-based monitoring system has a positive relationship with students' attendance.

**H2:** Technology-based monitoring is more effective in improving female students' attendance as compared to male students' attendance.

### **1.6 Significance of the study**

This study will investigate Pre and Post Policy intervention of government of Punjab in education. Also, this study will look into the improvement of attendance of students based on the introduction of new technologies into the education sector and paved the way for further investigation. Further, it will also help Policy Makers to design evidence based policies for future interventions in education sector. Additionally, this study will identify the existing loopholes and give policy recommendation to fill the existing gaps. Moreover, it will also give a clear picture to the Parents of the students regarding students' attendance rate, the efforts carried by the Administration and Policy Makers, and build trust between the authorities and the parents based on the information generated by this study. Last but not the least, this study will help School Administration to know about the positive effects of technology in the education sector and will provide them with information on student attendance both individually (for male student and female student) and collectively. Finally, this study will add to the body of literature as there is very little literature available in this regard.

### **Organization of the study**

In the first chapter discussed the background of topic along with objectives of study and research question, remaining study as following.

**Chapter 2-** Presents the relevant theoretical and empirical literature. This chapter will help to

identify the literature gap and theoretical framework, particularly focus on Pakistan.

**Chapter 3**-this chapter contains the research methodology, data description, and method of analysis. In this chapter we will construct the analytical framework for the empirical study.

**Chapter 4**- this chapter contains the results and discussion.

**Chapter 5** is about the conclusion and policy recommendation, and limitation of study.

## CHAPTER 2

### LITERATURE REVIEW

There is limited literature on the relationship of academic achievement with the attendance in higher education and it shows the voluntary nature of attendance in higher education. Investigation has shown that there exists a positive relationship between academic achievements and attendance so despite of its volunteer status, it plays an important role in higher education. (Romer, 1993; Paisey & Paisey, 2004). According to the previous studies, more attendance leads to the academic achievement but yet it is not tested for the causality of this relationship that is the extent to which attendance can play role in academic achievement. The Woodsfield et al (2006) provided an exception study through his studies regarding causality of this relationship. He investigated the degree outcome and its link to the attendance of 650 undergraduate students who were studying variety of subjects in University of Sussex. He investigated that there is there is a strong role of attendance in degree outcome. He investigated that along with attendance, the points of entry qualification (like A- levels) strongly impact on degree outcome. Therefore, for improvement in education, one of the most common practice of higher education is the attendance monitoring.

There is enough data in literature about the relation of the attendance and academic performance (Romer, 1993, Colby 2004, Newman-Ford *et al.*, 2008). But not all studies follow the same link. It might happen that attendance is more strongly linked to a specific sub groups of students in certain population (Gatherer & Manning,1998). It is also proved that monitoring of attendance is one of the important tools for the retention of students (Martinez 2001, Smith & Beggs, 2002 and 2003, Bowen *et al.*, 2007).

In 2007 Bowen et al, monitored the attendance of 79 undergraduates' students in 8 modules at business school of Glamorgan Uk by using the electronic data recording system named as Uni-

Nanny ([www.uni-nanny.com/default.htm](http://www.uni-nanny.com/default.htm)). Researcher took the views regarding attendance recording electronically and most of students gave a positive response as it shows that university cares about their success. Most students also said that university should also intercede to avoid unsatisfactory results of students. The most important reason identified for the positive response was due the fact that students do not know where or to whom ask for help and they feel that nonattendance trigger for support.

Research strongly supports the attendance system was to support and identify the struggle of those students who went unnoticed first. Imposing the compulsory attendance in the higher education that is opposed to the simple monitoring attendance system is an emotive issue. St Clair (1999) said that it is unjustified to enforce the compulsory attendance in the higher education and the system like uni nanny system is mentioned as harshed by the by national union of students. According to Romer (1993) relation of the absentees and its linked o performance justify that mandatory attendance should be implement in some undergraduates courses. In many courses there si need of the professional accreditation like medicines, nursing, dentistry etc, has the minimum attendance that is needed to be monitored enforced (Holdforth, 2007).

Pade and Moyer (1969) stated that the key success of student could be determined by class attendance but just when the indicators are non-standardize tests. Additionally, Buckles and McMahan (1971) found that if the classes are covering reading assignments only by explanation then it is understood that the attendance will not enhance the level of students in accordance of understanding. Browne et al.(1991) concluded in an article that the students who are busy in some other activities and they are not attending their classes as per Microeconomics Principles with their lessons are only lies in some students who have attended classes frequently and respond well on the Test of Understanding College Economics (TUCE).

Buckles and McMahon (1971) reported that when classes only explained material covered in reading assignments, attendance did not improve student understanding. An article by Browne et al. (1991) concluded that students who did not attend a typically structured Microeconomic Principles class with lectures did just as well on the Test of Understanding College Economics (TUCE) as those who had attended often.

Although, there are few factual evidences recommending that attendance at the learning point is highly related with the academic performance (Vidler 1980; Jones 1984; Brocato 1989; Launius 1997; Thomas and Higbee 2000; Martinez 2001) and the correlation associating the academic performance with the attendance as well as academic achievement is positively associated the time frame which is spend on attending lectures.

Street (1975) examined outcomes of assessment in an introductory course of business studies and the attendance was not mandatory. It was evident from results that absence of students described 52 % variation in the assessment outcomes of particular student. Findings of research resulted that one day of absence level reducing two marks in their final grades considered as student cost. The Van Blerkom(1992) assessed a class of psychology with 19 subdivisions allocated on the basis of attendance and assessment results. It was revealed by the researcher that the overall attendance reduced with the progress of semester. Immerman(1982) shows in their study by demonstrating the 23 adult students who registered their courses in a remedial mathematics and prospective results displays the level of significance between performance and student attendance.

Monitoring is precisely defined as, “the continuous assessment of project implementation against agreed schedule and use of inputs, infrastructure and services by project beneficiaries”(Bamelis, et al., 2005). The process of monitoring collects data on specified indicators. This data is utilized to measure inputs, outputs and processes to check out the functioning of key elements in the education system (Mishra, 2007). Monitoring is a continuous process that systematically gathers

data on specified indicators in order to provide management and stake holders of an intervention with indication of the extent of progress and achievement made on set objectives. The data on indicators assist in measuring impact or outcome change. Therefore, the data collected through monitoring is used for evaluation at a later stage (Nilsen, 2006).

The significance attached to the evaluation of monitoring program that it shows the extent of success achieved on the predetermined objectives set by the monitoring program and secondly, it helps in carving out strengths and weaknesses within the monitoring system and gives suggestions to fix the flaws and loopholes in the monitoring system, hence brings improvement in system. Evaluation is a powerful means for improving programs (Murphy, 2008). Compton & M. Manus (2015) argue that the organizations must carry out evaluation of monitoring programs to assess its effectiveness (Slee & Mohyla, 2007).

Improvement of schools has proven to be a persistent challenge (Luginbuhl et al., 2009). Effective monitoring mechanism has been recognized as a core element in improving school system (Mariott & Goyder, 2009). Monitoring does not include teacher training or shaping of curriculum. Though, it has a far-reaching effect on management operations and working of teachers. Monitoring comprises of an assessment of how well a school is performing. It also identifies the weaknesses and strengths of the educational system. Besides, it also makes suggestions for improvement in the program. However, monitoring is not an end itself. Rather it is a management tool used to promote reforms, modern management practices, good governance, transparency and accountability. Proper usage of the monitoring system results in collection of reliable information. And the same information/data can be used by executive authorities of education system to make well informed decisions. Policymakers can also utilize same data to formulate better policies. The educational system in developing nations finds it difficult to accept the monitoring and evaluation

(M&E) culture. Authorities perceive evaluation as a potential threat rather as a support for bringing improvement in system. Data in most of these countries is unreliable. Quantitative data can be inconsistent, while qualitative data may be misinterpreted (Kusek, 2004).

### **Technology Acceptance Model (TAM)**

In 1989 Davis develop the technology acceptance model. In this model, there was a link between the two key beliefs : perceived usefulness and perceived ease of use and users' attitudes, intentions and actual computer usage behavior, behavioral intentions are attitude and the perceived usefulness. While the attitude is find out by the perceived usefulness and perceived ease of use (PEOU) .TAM replaces eh determinants of attitude of TRA through the perceived ease of use (PEOU). TAM specify the common determinants of the individual technology acceptance and its being applied to predict or explain te behavior of individuals with the wide range of the end user computing technology and users (Davis, Bagozzi & Warshaw 1989).

The aim of the TAM is to give the elaboration of the determinants of computer acceptance that has ability to explain the behavior within the wide range of end-user computing technology and the user populations but at the same time it is justified from technological point of view. But it incorporates the accumulation for more than decade of the IS research. It is according to the modeling computer acceptance. Fred F.D. in his dissertation Slone School of Management, Massachusetts Institute of Technology, Davis introduced TAM as the adaptation of the TRA in 1986. He entitled his dissertation as "A Technology Acceptance Model for Empirically Testing New End-User Information Systems: Theory and Results" In MIS quarterly, he published "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology". Along with Bagozzi and warshaw, he also published "User Acceptance of Computer Technology: A Comparison of Two Theoretical Models" these works contributed in original work of TAM. Now Fred D. Davis is a Professor at Sam M. Walton College of Business, University of Arkansas.

In his area of study, technology acceptance model made him famous. Institute of the Scientific Information's Social Science Citation within 10 years, TAM became a well known and a powerful model for prediction of user acceptance (Venkatesh & Davis 2000). In 1989, Davis provided the better measure for explaining the use by focusing on two theoretical aspects. One is perceived usefulness and other is perceived ease of use that are the fundamental components of the system. Apart from the theoretical values, the strong measures of the fundamental determinants of the system has high practical value not before the wonders about also for those who evaluate the offers of the vendors. TAM found out that the external variables like system characteristics, training development process etc are mediate by the perceive use of ease and perceived usefulness. Perceived use of ease has an influence on the perceive ease as the other things are equal than system is easier and it becomes more useful to use. TAM made an assumption that use of the particular technology is voluntary. It is also assume that if the sufficient time and knowledge is given to a specific behavioral activity, than sated preference of the individual to perform the activity will be close to the way they do behave. This only applied when behavior is under the volunteer control. It means that when someone is indented to act than he is free to act without any kind of limitation (Bagozzi 1992).

Present study uses TAM in order to assess the impact of using technology monitoring system on the attendance rate of students. It examines that how monitoring system brings changes in the attitudes of students and in turn how it effects their performance.

### **2.1 Impact of technology-based monitoring system on school Attendance:**

Attendance in the class is very important for high performance. It is also analyzed that gender is also one of the factor that plays a role in the attendance problem and students achievement. Students get a chance to absent themselves from classes in tertiary educational institutions due to



the academic freedom. The rates of the absentees vary from one institution to the other institution and there are different reasons behind that. The learning achievements of students depend upon the attendance in class. In 1995, Durden and Ellis find out the link between the self reported attendance and the course grades of the economic students in the 3 semesters of 346 students. The results were concluded on the basis of the OLS controlling for ability and motivational factors like college entrance exams scores, GPA etc. these results shown that attendance has a role in academic performance. It is also observed that the low level of the absentees has little effect on the final outcome but the high level of the absentees has the high effect on final outcomes of students. Rodger (2001) analyzed the performance of 167 students and he find out at the attendance has low but a very important role in the performance of students. Kirby and McElory (2003) analyzed the sample of the first year 368 students of economics and find out the strong relation between performance and absentees.

Monitoring is the way to track the parameters already set for a system. This term is used to measure the performance of a system, to correct the system and to improve it after evaluation. There are many ways in which we can monitor a system whether manually or by some other way. Monitoring system of school is a tinted topic to enhance and produce effective education to improve the capability of children. Developed and emerging economies are using feedback system in schools to enhance the quality of education (Scherman et al., 2016).

A lot of academic work proves that low student enrollment rate and high dropouts in schools is the major hurdle on the way to achieve higher literacy rate. Educational experts in Pakistan believe that poor quality of education is linked to low level of enrollment and dropouts in schools. Reasons behind Poor quality of education include teacher absenteeism, lack of infrastructure, inappropriate or poor teaching methodology etc. Punjab has taken several educational reform initiatives in order

to improve educational outcomes in the country (Habib, 2013). Educational reforms process started in Punjab in 2003. Ten years on, a report titled “The Good News from Pakistan “by Sir Michael Barber highlighted the importance of service delivery, the science of “deliverology”. Fixing infrastructure and getting teachers to show up in schools is a low hanging fruit. Pakistan hardly spends 2 percent of its GDP on education. It is an alarmingly low amount that a country spends on providing education. Even this small amount is not spent efficiently (Habib, 2013).

One way of making the educational projects effective and efficient is constant evaluation of programs in the educational sector. Countries with better educational systems have institutionalized evaluation of programs. Some examples in this regards are discussed below from literature. A famous study was conducted at university of Glamorgan, UK which highlighted the importance of attendance monitoring in educational setups. The findings showed how attendance monitoring benefits both the individual as well as the institution. The other major dimension it covered was the comparison that this study made between paper-based manual attendance and electronic attendance piloted in Business school of university of Glamorgan. The comparison was done in order to test the set hypothesis that electronic attendance monitoring provides with better quality and improved quantity of data, besides, speedy gathering.(Price et al., 2005).

Likewise, another study evaluated a program titled PSCCS (Primary-Secondary color coded scheme) aimed at reducing student absenteeism, controlling truancy and improving attendance rate in schools. Its findings include (1) the monitoring program being introduced to oversee student’s attendance is very much helpful at primary level as it helps to identify at earlier stage the attendance problem. Since school going children are so young at primary level their attitude can be more easily changed by adopting different strategies. And it also brings improvement in their learning as early learning years are of paramount importance in schooling (Reid, 2003). Similarly,

it is of quite great assistance to teachers as they can identify which kids need more attention and time. In the same manner, the benefits it offers to secondary school level include (1) it has greatly reduced absenteeism over the period of monitoring project and beyond. (2) The secondary schools will see truancy problem controlled in the long term. (3) It also results in indirect improvement in student's behavior (4) Above all, the quality of literacy improves in schools with better attendance rates (Reid, 2003).

Another study on similar lines was conducted in England. Whereby, an intervention was designed and implemented in a particular school that was performing worst in student attendance for last two decades. The monitoring program designed was named as School-based system (SBS). The methodology adopted was case study approach. The findings are highly significant showing success of monitoring program in increasing student attendance. The year following program implementation showed 5 pc increase in student's attendance. Later, it was implemented to all schools of local education authority and all these schools showed 4 pc increase in student attendance (Reid, 2006). It also comes with the conclusion that such smart digital systems are easy to use and manage (Reid, 2006).

Besides, a study undertook in India analyzed the issue of teacher absenteeism in rural areas of developing countries. The idea was to attach the monetary intervention (Salary) of teachers to monitoring mechanism. And the mechanism introduced was that all the teachers were provided with date and time tamper proof cameras. The teachers were asked to click two pictures daily, at the beginning and end of school time. And the salary of teachers was subject to the pictures being provided by teachers themselves. Out of 120 schools randomly 60 were chosen and the monitoring program was implemented. The introduction of the program resulted in an immediate decline in teachers' absence. It also positively affected child achievement after year of its implementation

(Duflo & Hanna, 2005).

An elementary school anti-bullying intervention is made to reduce or overcome the aggressive, violent, bullying attitudes in schools. This intervention was evaluated by Menard and Grotmeter in 2013. This evaluation study used a pretest-posttest study design involving treatment and comparison groups (Riecken et al., 1974; Shadish et al., 2002). Evaluation is comprised of 5 years study plan. Before intervention, a survey is conducted to gather baseline data. During intervention years, process evaluation is carried out to assess implementation of the program. And after completion, a post intervention survey is conducted. This helps in evaluating efficacy of the intervention (Menard & Grotmeter, 2014).

A team of researchers evaluated El Salvador's EDUCO program. This program was developed with the presumption that locally managed schools perform better if monitoring and oversight by elected representatives is done. Therefore, Community Education Association comprised of elected representatives was formulated for this purpose. Community Education Association is termed Association Communal Para La Education or ACE. These ACEs are assigned central role in management of EDUCO schools. They are given complete powers of hiring and firing of teacher's by closely monitoring teacher's performance. They are also empowered for maintenance of schools (Jimenez & Sawada, 1999).

School's production function is used to measure educational outcomes of EDUCO program. Thus, two independent variables are used to assess outcomes. One, scores achieved in standardized tests of mathematics and language. Two, school days missed by a student due to teacher absence. The findings of the study termed EDUCO program a big success. The program has been remarkably successful in achieving its goals. It also says that teacher's absence has been significantly reduced due to number of visits by ACEs and involvement of parents in monitoring process (Jimenez &

Sawada, 1999).

Another study conducted to assess the effectiveness of whole-schools approach in controlling bullying comes up with the similar findings that programs implemented under a systematically monitored mechanism tend to be more effective than programs executed without any monitoring (Schneider et al., 2004).

Comparing and contrasting the above literature studies there is a need to find out the exact mechanism in which technology-based monitoring system plays its role to improve the education system by improving attendance rate. Impact of technology-based monitoring system on female student outcome

Technology is derived from a Greek word techno which means a skill or art or cunning of a hand. (Liddell, 1980). There has been many basic tools which are being introduced to perform better and do better. In order to monitor the absenteeism issue and student outcome different types of technologies are being introduced in Punjab, Pakistan e.g PC tablets to mark the attendance of the students. Punjab province is advancing toward the use of technology-based items in schools for effective performance (Ali et al., 2015).

In school attendance is very important as students get the success when they attend the school regularly (Pascopella, 2007). It also becomes difficult for the teachers to built skills if large number of the students become absent. Students who fall behind in the academics get indulge with the laws and create problem with the communities and societies (Hocking, 2008). Students develop the negative attitude toward the schools due to several reasons like location of school, inadequate supervision, and activities of teachers and parents, poor methods of teachings, lack of facilities sin school etc (Oghuvbu 1999; Alio 2003: 66-69). Students whodevelop the negative attitude toward the school leads toward the less attendance in school. Students with the right age, commitments of

family, nature of jobs, change of working hours, good health and good motive are more regular in school (ChiuMochi 1993). According to Okpupara and Chukwuone (2007), females headed by the household are ore regular in schools and educated have more impact on regularity of their children in school as compare to the educated mother it si also revealed by the studies that attendance of female is effected by the age factor. The administrator and teachers on the delta state keep the record of the student attendance as it play a role in control of discipline and academic achievements (Oghuvbu 2006).

According to Hennessey et al. (2010) the use of technology in secondary and primary education improves the quality of education in classrooms. It has been indicated that government institutions offer technological access to teachers for academic purpose (Iqbal et al., 2015). But the use of technological products is still not widely used to track absenteeism. According to Yusuf (2005) there is little emphasis on the use informational technology products in the education system of Pakistan.

Technological products are becoming the main force to improve the education system of the country (Achimugu et al., 2010). Information technology is not only being used to enhance the improve attendance rate it is also being used to enhance the learning habits (Anderson, 2005). The technological products are also being used to measure the improve attendance rate i.e. improved attendance rate because it is very important to impart female education in the country.

According to (Pakistan Bureau of Statistics 2013) only 48% girls in Pakistan are literate as compared to 60% of the boys. Though many of the Pakistani foundations are also working on the cheap and quality education of girls in order to track the record of girl's attendance, technology-based gadgets can improve the attendance rate i.e. the low absenteeism rate.

These gadgets being floated by the Punjab government in schools is helping to figure out the

number of girls reaching out schools so that if the percentage of school going girls starts decreasing measures could be taken to come up to the required attendance level to improve literacy rate. Like the Africans have moved toward the digital systems for improvement of the education systems and their government is still taking measures to improve the systems (Andema, 2014).

The monitoring and follow up system of attendance in Punjab Pakistan predicts the drop out ratio of the girls because many girls drop out from school across provinces. According to shirkatgah (2005) it is in our society that women inequality can be seen in each sector of Pakistan including health and education. If the women of a country isn't strong and educated the country can't prosper.

The reason that why the absenteeism is being linked to the performance is due to the previous researches which provide clear support that attendance impacts the performance of the students so it should be up to the required level to improve the quality of education. Students who miss the lectures they miss the opportunity of learning new things demonstrated and taught to them (Sleigh & Ritzer, 2001). So the digital technology monitoring system is being used by Punjab Pakistan to ensure the higher attendance rate.

Increase in attendance not only enhances the learning of an individual it also enhances motivation of the student to learn and grasp more and gain knowledge from the atmosphere and discover new things being discussed and taught in the classroom on the daily basis (Longhurst, 1999; Massingham & Herrington, 2006; Moore et al., 2008). So the government of Punjab Pakistan is taking measures to increase the attendance of the females as well so that they could learn more.

Economic benefits of the education are very much clear to all of us and those economic benefits can't be flavored if we do not give due importance to the education of our females. According to Benavot (1985) primary and secondary education has clear and positive effects on the economy of a country. And the more huge impact is due to the primary education of the girls. Women like men

receive direct economic benefits.

Previously many studies provided substantiation regarding the primary and secondary education impact on the economic condition of the country. There is a very shocking fact found in the previous studies which states that if your education is a failure and you fail to impart primary education then whatever you do in the industry and the kind of projects that you make will fail because of it. So it is very important for benefitting other aspects and industries of Pakistan. Therefore due importance should be given to the education sector. As Mingat and Tan (1987) says that if population will not be literate then many of the projects will fail.

According to a study conducted in Colombia there is higher rate of labor force or working women having primary education as compared to the women who have never been to school (Mohan's, 1985). Usually the impact that women make on the economic condition of a country is influenced by gender biasness and different policies and it has also being seen that usually the wages of the females are lesser than the males so this may also be the factor of the girls drop out from school because they get less wages thus they concentrate more on the household.

There are not only direct effects of imparting female education but there are many indirect effects as well which can't be measured easily. For example if the female members of our family are educated they will not only bring monetary benefits they will also indirectly effect all the members at home. Because she doubles everything which you give her. She will impact the children at home because children are more attached to their mothers usually.

Though absenteeism can be because of many reasons e.g family pressure, illness, engagement in other work like merrymaking. All of these girls' issues should be solved on gross root level.(Longhurst, 1999; Paisey&Paisey, 2004; Moore et al., 2008). Because girls all over the world face such problems more or less still they come to school including the under developed countries



like Bangladesh, Indonesia etc.

There is also a concept that we can learn from our course books but those are not enough to meet the purpose because studies suggest that by interacting with the students you learn more and make additional class notes. Sometimes class work becomes interesting due to amazing examples being discussed. You come to know about different angles of a topic by class discussion so attendance is very important and essential element of learning.(Sleigh &Ritzer, 2001). So along with government, parents should also ensure that their daughter's sisters and female cousins are attending school on regular basis to improve the education system of our country.

Female education brings a shift toward the economy of any country so there is a need to focus on female education to survive in the global world. Despite of the fact that many challenges are being faced by the Punjab government to enhance female education in Pakistan still there are many hurdles and difficulties which need to be catered.

## **CHAPTER 3**

### **RESEARCH METHODOLOGY**

In this section, the methodology is illustrated which is employed to stumble on the relationship of technology-based monitoring system on students' attendance. The methodology chapter contains research design covering all data collection techniques (population and sample).

#### **3.1 Universe of Study**

As the current study inquires about the impact of technology-based monitoring system on students' attendance so the specified population is according to total number of public schools, students and teachers in the aforesaid province which are 52,231, 11,241,899 and 342,320 respectively.

#### **3.2 Data Collection and Source of Data**

The program monitoring and implementation unit (PMIU) is the authority that oversees the implementation of Comprehensive Schools Monitoring Mechanism (CSMM) in Punjab. They collect monthly and yearly data of the program with the help of visits conducted by MEAs. The data collected is acquired through a monitoring pro forma which includes questions on student enrollment rate, teacher attendance and basic school facilities. This data can be accessed at <http://open.punjab.gov.pk/schools>. They have online real-time data gathered through smart monitoring mechanism using tablet-PC based system since September 2014. However, the data collected through visits of MEAs in schools is available with PMIU since 2009.

All primary and secondary public schools from 36 districts of the Punjab province are included in sample. Total number of public schools, students and teachers in the aforesaid province are 52,231, 11,241,899 and 342,320 respectively. There was no non-intervened school available for

comparison group study as this program covers all public schools of the province of Punjab. Selection of any private school from Punjab or any other public school from any other province does not fit the criteria of a comparison school. As different socio-demographic characteristics of treatment and comparison schools would weaken the study design.

The questionnaire used to collect data is actually a pro forma which consists of questions inquiring for information about students, teachers and school facilities. The student level data contains information about student’s attendance and enrollment rate. This data collection is done by physically visiting schools. The data thus collected is organized on yearly basis by PMIU providing annual performance statistics about schools.

Two sets of data were taken on our selected indicators, a comparison would be made to check effectiveness of “intervention” in monitoring program. One set would comprise of data prior to 2014 (pre-intervention; 2009-2013), and the other set would consist of data post 2014 (post-intervention).

The study employed quasi-experimental design, i.e., one group pre-test post-test design (with multiple pre-tests and post-tests).<sup>1</sup> The data was analyzed using interrupted trend analysis technique. The design is diagrammed as follows:

2009	2010	2011	2012	2013	Technolog y-based	2014	2015	2016	2017
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<sup>1</sup> Many scholars have named this type of study design as interrupted time series design. The interrupted time-series deign (analysis) was not used because the data did not meet the properties of time series.

Students' attendance before intervention		Students' attendance Post intervention
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*Source: Author's Conceptualization*

The basic premise of this design is to gather measurement of outcome of interest prior to and after application/execution to intervention. No control or comparison group has been used to conduct this study. Monitoring programme under discussion covers all public/ government schools in the province of Punjab. Therefore, it leaves no public school in this province to be used as comparison group in this study. Besides, private schools cannot be taken as comparison group due to vast socio-economic differences with public schools.

One-case/group study design comes under umbrella of quasi-experimental design. However, it has its own limitations. Herein one group/ participant's averages are analyzed over stretched time period. It makes it a kind of time series data research. But over this time period that group is monitored or analyzed with respect to only one specific treatment or intervention. Though it gives a trajectory of change in group being studied regarding that one particular aspect we are looking at, however, the effect that other possible confounding factors could have brought in that group is overlooked. Nevertheless, it is worth mentioning here that one-group case study design is widely used in educational and clinical psychology due to its merits and practical research appropriateness with both of these fields. Besides, the studies conducted in educational organizations do not include such comparison groups based on ethical and moral reasons too.(Shadish, Cook, & Campbell, 2002).

Though, there are few researchers do not include it under quasi-experimental designs based on the reason that it does not involve any comparison group. However, it is a commonly used experimental design (Russ-Eft & Hoover 2005). First step in this design is to conduct a pre-test (e.g., student attendance in schools), then the group is exposed to intervention/treatment (implementation of students attendance monitoring program) , and lastly the post-test (students attendance post monitoring program) is administered to measure the effects of the intervention (Sekaran & Bougie, 2016).

The difference between the pre-test and the post-test tells us the effect of the treatment (Russ-Eft & Hoover 2005). In table 1.0, X represents the treatment/independent variable, the effects of which are to be measured. O1 represents the pre-test score, while O2 shows post-test score. And treatment effect is computed by  $(O_2 - O_1)$ .

Table 1.0

Group	Pre-test score	Treatment	Post-test score
Experimental	O <sub>1</sub>	X	O <sub>2</sub>
Treatment Effect	$= (O_2 - O_1)$		

## CHAPTER 4

### RESULTS AND DISCUSSION

#### 4.1 Overview of Chapter

This chapter contains three main sections, the first section is about the descriptive analysis of data and second section is about estimation of regression model. Third section is about the discussion of empirical results.

#### 4.2 Empirical Results

Table 1 Average Male and Female School Students Attendance- Pre and Post Intervention

Districts	Pre-Policy Intervention		Post Policy Intervention	
	Male	Female	Male	Female
Overall (All Districts)	83.7	80.3	91.7	90.5
Attock	84.3	83.8	92.1	92.0
Bahawalnagar	82.2	79.5	92.6	91.3
Bahawalpur	81.6	78.4	92.4	90.8
Bhakkar	83.7	78.7	89.2	86.1
Chakwal	91.2	89.5	93.6	93.5
Chiniot	87.3	84.1	93.9	92.6
D.G. Khan	76.2	71.1	87.0	84.1
Faisalabad	85.4	83.8	92.0	91.9
Gujranwala	83.0	82.2	91.7	90.8
Gujrat	84.3	83.2	92.4	91.5
Hafizabad	83.7	81.1	93.3	92.5

Districts	Pre-Policy Intervention		Post Policy Intervention	
	Male	Female	Male	Female
Jhang	86.1	81.6	93.3	92.3
Jhelum	84.9	85.5	93.7	93.9
Kasur	84.0	82.4	93.7	93.5
Khanewal	87.6	83.6	93.0	92.2
Khushab	85.4	83.0	92.1	91.7
Lahore	83.4	81.0	92.7	91.7
Layyah	81.0	80.2	90.7	90.4
Lodhran	90.1	82.9	93.1	90.9
Mandi Baha Ud Din	88.4	87.5	92.7	92.2
Mianwali	80.3	73.8	92.1	88.7
Multan	82.4	79.1	93.0	91.7
Muzaffargarh	78.3	72.5	90.8	88.7
Nankana Sahib	79.2	77.0	91.7	90.0
Narowal	80.8	78.7	89.0	88.1
Okara	91.6	90.8	94.3	94.1
Pakpattan	78.2	72.7	93.4	92.4
Rahimyar Khan	78.7	75.7	88.1	86.2
Rajanpur	75.7	68.3	85.4	79.5
Rawalpindi	86.3	84.8	89.9	89.2
Sahiwal	84.2	80.6	91.3	88.8
Sargodha	80.7	78.5	90.5	91.0
Sheikhupura	88.9	85.8	91.4	89.8

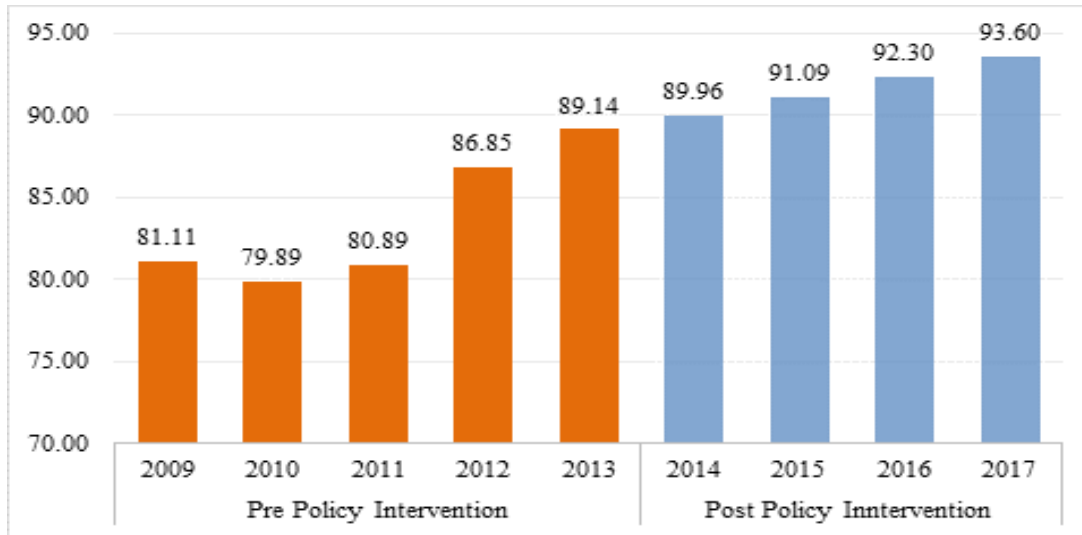
Districts	Pre-Policy Intervention		Post Policy Intervention	
	Male	Female	Male	Female
Sialkot	83.7	82.1	91.6	89.5
T.T.Singh	85.0	84.7	92.9	92.8
Vehari	83.7	81.4	91.8	91.7

*Source: Punjab monitoring and implementation unit*

Table 4.1 shows the average attendance of female and male student before and after the policy intervention by district. “Table shows that improvement is seen in the student attendance in post intervention period. The government of Punjab introduced Punjab Education Sector Reform Program which includes a component on replenishment of missing facilities. The following table shows the varying proportions of boys and girls attendance across each over the plan period. The first column shows pre-policy intervention average student attendance of girls and boys across all primary and secondary public schools of the Punjab province while the second column shows same data on post intervention period. There is a positive increase recorded in school attendance of boys and girls after the policy intervention.”



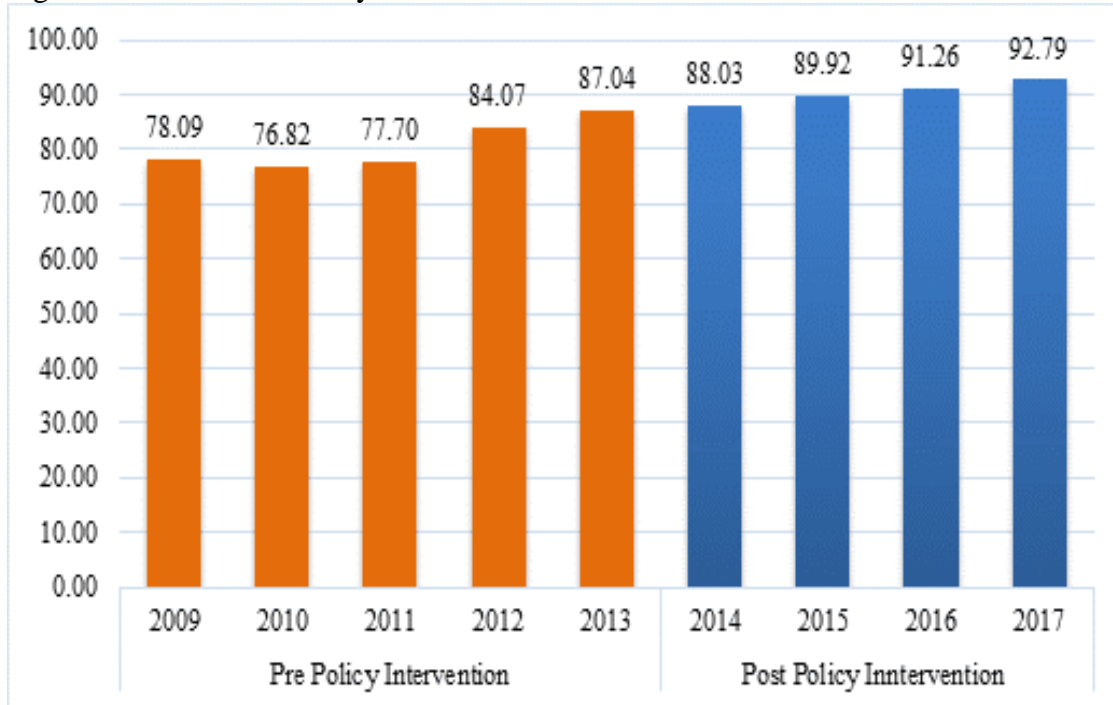
Figure 1 Pre and Post Policy Intervention Male Student Attendance



*Source: Punjab monitoring and implementation unit*

Figure 4.1 shows the pre and post intervention period of boys attendance in 36 district of Punjab. This Figure shows the progress made over the 4 years since implementation began. The target that was set in 2011 was exceeded for the first time. Before the intervention, the graph is seen to show different results for different years with no uniformity. The drop in student’s attendance in 2010 is because of the outbreak of dengue in Punjab. It was also worsened by the damage to schools by floods. Dengue in Lahore and the surrounding regions made the education department, close the schools. Due to closure of schools thousands of students’ and teachers’ got affected. It is worth pointing out that these figures mean one million extra students are now attending school every day. The figure illustrated that there is over increase as compare to target set by the government of Punjab during the 2016-17 in attendance of boys.

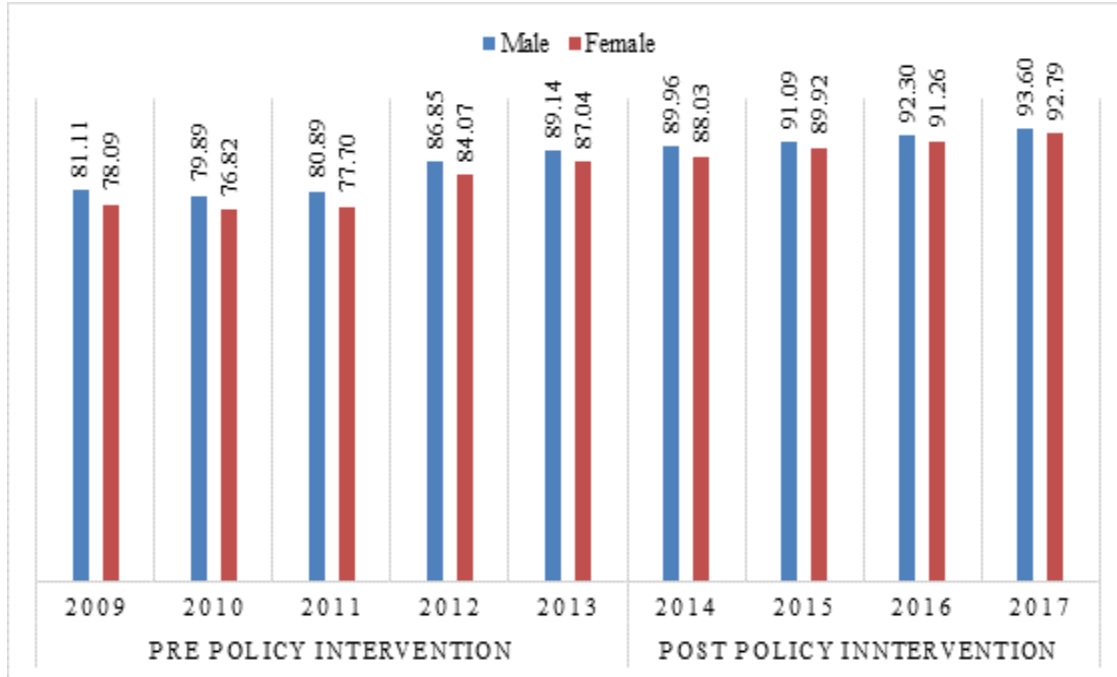
Figure 2 Pre and Post Policy Intervention Female Student Attendance



*Source: Punjab monitoring and implementation unit*

Figure 4.2 shows the girls attendance before and after policy intervention from 2009 to 2017. There is a significant challenges to approach 90 per cent attendance. Where progress over the past year has been insufficient. Moreover, with the remorseless growth of Punjab’s population, 100 per cent enrolments a moving target. Apparently there is no fluctuation in attendance seen when we compare boys and girls attendance for consequent years. There has been a gradual increase in girl’s attendance like boys. Upon investigation from Education Department Punjab, it was discovered that certain scholarship programs for girls, have shown promising results. With introduction of technology based monitoring mechanism in schools, not just students, but the attendance of teachers have been improved.

Figure 3 Pre and Post Policy Intervention Male and Female Student Attendance



Source: Punjab monitoring and implementation unit

Figure 4.3 shows the comparison of both male and female student’s attendance before and after the policy intervention in all 36 district of Punjab. Student “attendance has risen steadily since 2011 which was in part result of the Dengue fever outbreak. December 2012 again represented a of over 90 per cent presence. This level of student attendance is far higher than elsewhere in Pakistan and, incidentally, than in most of India and Bangladesh. In fact, it is now higher in Punjab than it is in any other 22 countries. These improvements are largely a result of much-improved management and particularly from squeezing unauthorized absence to below 1 per cent.

Table 2 Pre and Post Policy Intervention - Percentage Change in Average Male and Female Student Attendance

	Pre- Intervention	Policy	Post- Intervention	Policy	Percentage Change
<b>Male</b>	83.65		91.73		8.08*

<b>Female</b>	80.82	90.50	9.68*
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Table 4.2 shows the percentage change in attendance of both girls and boys in 36 districts of Punjab before and after policy intervention period. Percentage change in annual average attendance of male students is calculated to be 8.08%, which is undoubtedly, a very positive and significant change. Similarly, the percentage change found in attendance 9.68 percent.

### 4.3 Regression Analysis

Table 3 Regression Analysis: - Dependent variable Percent Attendance of School Students

<b>Variables</b>	<b>Model 1</b>	<b>Model 2 – Robust</b>
Intervention	9.708*** (0.576)	9.708*** (0.593)
Male attendance	2.828*** (0.545)	2.828*** (0.668)
Male * Intervention	-1.589* (0.814)	-1.589** (0.764)
Constant	80.79*** (0.385)	80.79*** (0.511)
Observations	644	644
R-squared	0.44***	0.44***

Standard errors in parentheses\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

To test the study hypotheses, ordinary least squares (OLS) regression analyses were performed using percentage students' attendance as dependent variable (Table 4.3). The independent variables are policy intervention, male students' attendance and interaction of intervention and male students' attendance. To avoid any potential problems of heteroscedasticity, we also used robust standard errors to assess statistical significance of the regression coefficients.

We find support for both of our hypothesis. Specifically, hypothesis 1 suggests that implementation of technology-based monitoring systems in schools improves students' attendance. The results

indicate that implementation of the policy intervention improved students' attendance on average by 9.71 percent ( $p < .01$ ). Moreover, as hypothesized, the technology-based monitoring is more effective to improve the attendance of female students as compared to that of male students. That is, on average, the policy intervention improved the attendance of female student by 1.59 percent ( $p < .01$ ) as compared to the attendance of male students. Both OLS regression models estimated in this study accounted for 44 percent of total variance ( $R^2 = .44$ ,  $p < .05$ ), that is, the independent variables explain a good amount of variation in the dependent variable.

### 4.3 Discussion

The issue of absenteeism has led researchers to consider the possible consequences of nonattendance, particularly its effect on student performance. According to (Barlow, 2011), students are often required to make trade-offs during their degree work; one of which is the work–life balance. A common view is that students habitually make the choice not to attend lectures, believing that they can make up the work missed in some way later; for example by obtaining a copy of the lecture notes. (Fay, 2013) analyzed the impact of student attendance on performance within a single first-year undergraduate module. His study aimed to discover by measurement any correlation between student presence at teaching sessions and subsequent assessment results.

Findings showed the impact that non-attendance has on final marks, suggesting that the student belief of catching up from missed lectures is unrealistic, though, of course, these findings may be attributable to other factors that determine academic performance such as student motivation and educational engagement, which are only proximate by attendance. Colby collected attendance data for 178 students on a first-year module, Internet Application Development, within the School of Computing at the University of Central England, Birmingham. A signature and honesty method was used to record student attendance during each teaching session. A strong, positive relationship between student attendance and success was observed, and further investigation revealed two general rules and alarm points for action Lindsay (2007) found that class attendance was key to student success, but only when non-standardized tests were used. (Douglas, 2007) reported that when classes only explained material covered in reading assignments, attendance did not improve student understanding. An article by (Glazer, 2006) concluded that students who did not attend a typically structured Microeconomic Principles class with lectures did just as well on the Test of

Understanding College Economics (TUCE) as those who had attended often.

However, there is some empirical evidence to suggest that attendance at learning events is strongly correlated with academic performance (Ferreira, 2012), and that time spent attending lectures is positively associated with students' academic achievement. Moore (2006) examined assessment outcomes in a large introductory business course at which attendance was not obligatory. Results showed that student absence explained 52% of the variation in student assessment results. Findings also suggested that each day of absence cost students, on average, two marks in their final grade. Gump (2005) investigated attendance and assessment outcomes in a large psychology class with 19 subdivisions. Results showed the correlation varied across sections from 0.29 to 0.73 with a mean of 0.55. He also reported that overall class attendance declined as the semester progressed. Moldayabev (2013) conducted a study using 23 adult students enrolled in a remedial mathematics course. Results of the study showed a statistically significant correlation between student attendance and performance. Regression equations for predictive purposes appeared most appropriate: therefore, by using attendance as the predictor variable and performance as the criterion variable instructors could predict an individual student's performance based upon attendance.

Moore (2004) studied how students' attendance and grades in different sections of a large introductory science class were affected by ongoing, quantitative emphasis on the importance of class attendance for academic success. Findings showed that attendance and grades were higher in a class in which the importance of attendance was stressed, than in a comparable class in which it was not, despite students receiving no credit for attending class.

Marburger (2006) found evidence to suggest that student motivation is an independent factor with regard to average student assessment marks, and that classroom attendance may serve as a proxy for the effects of internal motivation, but the effect is rather weak. In addition, Teixeira (2016)

showed that attendance significantly contributed to the academic attainment of students in a large macroeconomics course, and this conclusion held even after controlling for student motivation. Similarly, Barlow (2011) explicitly took into account the effect of unobservable factors correlated with attendance, such as ability, effort and motivation, and found that attendance has a positive and significant impact on performance.

Results indicated that, after controlling for unobservable student characteristics, teaching has an important independent effect on learning. A study by Woodfield, Jessop, and McMillan (2006) revealed that men are more likely to be absent from classes than women, with the worst offenders being males with the highest levels of prior academic achievement. The research, which involved two studies of almost 700 students from various courses at the University of Sussex, showed that women students missed, on average, one in every 8.27 classes, while men were absent for one in 6.32. The article also revealed that the rate at which a student attended classes emerged as the strongest predictor of degree outcome amongst a number of variables examined.

Absenteeism is also a strong forecaster of educational drop-out, which, although defined by a single event, invariably culminates the process of long-term disengagement (Alexander, Entwisle, & Kabbani 2001). Research on truancy and absenteeism indicates that students with high attendance score better marks in academic assessments than their more frequently absent peers (Lamdin 1996). Chronic absenteeism can result in other negative consequences, as students who are not in class have fewer opportunities to learn material that enables them to succeed academically in later life.

Attendance Monitoring System is ordinarily utilized in the majority of the instructive relationship of made nations. It is a structure that can see the understudies and screen their venture regularly.



This structure can uproot the paper-based speculation checking framework which needs persevering quality, exactness, consistency, and effectiveness. In by a long shot a large portion of the AMSs, the front end contains an obvious proof unit. Everything considered, perceiving bits of confirmation are done expose to different current advances, for example, RFID, biometrics, Bluetooth, go up against attestation, voice assertion, and so forth. Among these, RFID is a victor among the most exceptional headway in context of its cost ability, adaptability and supportability (Kadry, 2013). As the greater part of the instructive foundations require understudy ID cards, it is helpful to utilize a near ID card for tallying the intrigue.

These kind of ID cards are known as insightful card names. A RFID module incorporates a tag and a peruser. The RFID stamp stores and transmits information to the RFID peruser. There are two sorts of RFID tag, the dynamic tag, and the inert tag. The dynamic tag contains a locally open battery. It doesn't rely on the peruser for power supply and it may be utilized from a long division. Obviously, the uninvolved tag does not pass on any battery. It is lighter and humbler than the dynamic tag. There are a microchip and a curve inside it. The chip has an internal EEPROM where a striking ID is anchored. The turn fills in as a radio wire (nainan. 2013).

Effective monitoring is an essential element of a learning and ultimately sustainable educational initiative (Marriott & Goyder, 2009). Although monitoring reach far and deep into the workings of a school and the function of its staff in particular of its teachers, they do not in most cases serve to dictate how you should teach individual classes. Technology-based Monitoring is positively associated with Improve in attendance rate. Studies highlight that the education system in Pakistan is not sufficient to meet the global standards. Reasons of this poor education system are tremendous- including untrained teachers, poor infrastructure and insufficient enrollment in primary schools. According to the studies and the analysis of the market, it is observed that, with

the use of new and modern technologies and other centralized system of the monitoring and observations will affect the performance of the teams and staff in positive way. The first variable studied in this research is the relationship of Technology-based Monitoring with better outcomes of schools. The Results suggest that there is a relationship between Technology-based Monitoring and successful implementation of the software development projects to improve the attendance rates. Therefore, it is suggestive of the fact that in this changing market the demand is to shift toward those methods which are recognized and which would deliberately lead us to the success of the projects and betterment of schools with much required attention and motivation. There is a need to analyze the methods being followed in their organizations along with those latest methods which is Technology-based Monitoring that whether we are capable of implementing such methodologies or not in which the Technology-based Monitoring and work can be balanced enough. Literature suggests that Technology-based Monitoring is the most emerging concept and a collaborative thing which is required to be used at each iteration of the project which leads to successful project implementation in many ways (Stankovic et al., 2013),but in Pakistani culture collaboration on some specific method is missing as different members of team required different level of specialty and skills and it take time to train each members of the team prior to implementation of any new method, it was also observed that the moral capabilities are much important in the working environment to solve and to manage things accordingly.

Technology-based Monitoring has a positive relationship with improve attendance rate female students. Schools plays a very critical role in the living system of any society as they act as mind transformer and help in the development of countries culture. In every organization and institution it is very important to monitor and calculation of working hour for better results. Normally, there are two types of systems available for attendance, one is Manual and the other one is automated.

Manual system of attendance is on paper sheets where teachers fill out the attendance sheets and the responsible authority oversee that for accuracy. This method could be incorrect because there is a chance of damage or loss of attendance sheets. Furthermore, the withdrawal of pertinent data and the manual calculation of hours is very time consuming. For this the organization should have employee an extra worker to check attendance and timing of employees which includes cost overhead for the organization as well (Sultana, Enave& Mouri, 2015). On the other hand, in automated attendance system everything is automated. The importance of automated monitoring system is that when the employee enters in the workplace the systems are connected to the office internet and it sends the employee identity and time to server then these information are stored in the database. Also when the employees leave the workplace the system inform the server that the employee is leaving. In these types of monitoring system everything is automated and the data are present in databases which can be retrieved anytime on a single click. If these types of technology-based monitoring system is install in the schools to monitor the attendance of student it will enhance the student attendance rate also it will increase the student creativity.

But, the timeliness of a reporting system is a critical function in any surveillance system. Web-based application and mobile technology can potentially enhance the use of school absenteeism data for syndromic surveillance and outbreak detection. This study presents the factors that determine the implementation success of this reporting system. (Lawpoolsri et al., 2014). Direct access to this information by supervisors eliminated the possibility of data fudging and inaccurate reporting by workers regarding their mobility. (Chandir, 2017). Wireless Sensor Networks (WSN) are one of those independent sensing devices to monitor physical and environmental conditions along with thousands of applications in other fields. Jamil et al. (2015). There should be different trainings sessions to improve and to educate the staff accordingly, these training sessions can be

helpful for organization in achieving its goals effectively and efficiently as improve individual performance leads to better organization performance.

However, “the government of Punjab introduced several policies Recognizing education as a right of the citizens, it is the aim of the State of Pakistan to provide equal and ample opportunity to all citizens to realize their full potential as individuals and citizens through an education that enriches the individual with values/skills preparing him/her for life, livelihood and nation building. “Such a statement, however, is of little operational value. It is like a dream of what one would like to see in the future, but it does not provide any guidance on how to actually provide all these opportunities.”

However, after the monitoring and evaluation program by the government of Punjab there is significant improvement such as improve the teachers and student presence at schools. The overall finding of this study is that policy-intervention (under discussion) improved student (both male and female) attendance in the schools. “Intervention Strategies aim to Increase Access to schools and Reduce Dropout. Common factors known to affect student access are distance from home to school (particularly for girls), poverty, absence of female teachers, lack of water and sanitation facilities, language of instruction and corporal punishment. The policy and managerial responses to addressing such problems range from school mapping and construction of new schools, provision of scholarships, recruitment of female teachers and/or the provision of secondary education for girls to awareness campaigns and disciplinary action by the head teacher or district authorities. Local interventions, for example, assisted or led by SMCs, could play an important role in the identification of out of school children and various supportive measures to bring them (back) into school. This research helps an organization to identify factors that restrict employees to show creativity at workplace and those elements that hinders Employee Performance.

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poor infrastructure and insufficient enrollment in primary schools. According to the studies and the analysis of the market it is observed that with the use of new and modern technologies and other centralized system of the monitoring and observations will affect the performance of the teams and staff in positive way. The first variable studied in this research thesis is the relationship of Technology-based Monitoring with better outcomes of schools. Results suggest that there is a relationship between Technology-based Monitoring and successful implementation of the software development projects to improve the attendance rates. Therefore, it is suggestive of the fact that in this changing market the demand is to shift toward those methods which are recognized and which would deliberately lead us to the success of the projects and betterment of schools with much required attention and motivation. There should a need to analyze the methods being followed in their organizations along with those latest methods which is Technology-based Monitoring that whether we are capable of implementing such methodologies or not in which the Technology-based Monitoring and work can be balanced enough. Literature suggests that Technology-based Monitoring is the most emerging concept and a collaborative thing which is required to be used at each iteration of the project which leads to successful project implementation in many ways (Stankovic et al., 2013),but in Pakistani culture collaboration on some specific method is missing as different members of team required different level of specialty and skills and it take time to train each members of the team prior to implementation of any new method, it was also observed that the moral capabilities are much important in the working environment to solve and to manage things accordingly.

Technological usage has vast scope to offer. Besides, student attendance betterment it can be equally effective in managing teachers to show up in schools. In countries like Pakistan, student absenteeism is bigger and serious problem than student attendance. Because students presence

would be of no benefit if teachers won't show up in schools to teach students. Across Pakistan teacher's absenteeism is a genuine problem in public schools. World Bank estimates that in developing countries on a given day about 11% to 30% teachers are not present. This directly causes huge loss in teaching time and students learning opportunities (Jayant, 2016). Many experiments have been carried out to reduce teacher absenteeism by using technologies, such as photograph monitoring, biometric attendance and classroom camera approach. In India, all these experiments produced drastic reduction in teacher absenteeism in schools. However, when these technologies used are attached to certain financial incentives, they may produce great results. Else teachers find their usage quite inconvenient (Rao, 2013).

Another aspect that needs to be paid attention is, though, technological innovations certainly bring improvement in educational sector. However it does not fulfill one size fits all formula. Technological innovation that has successfully worked in certain area and time may not produce desired result or even can prove to be counter-productive in some other areas. This decision demands ground realities regarding infrastructure, cultural willingness and level of technological awareness should be kept in mind (Baloch, 2012).

## **CHAPTER 5**

### **CONCLUSION**

The study concluded that Technology Based Monitoring Mechanism has improved the student's attendance in schools. These interventions have helped school management figure out the issue of absenteeism in school going children. The policy intervention also benefited the education department in identifying the causes of absenteeism of teachers along with students'.

Technological solutions are viewed by developing world as panacea with potential capability to solve some of the very critical problems that they are facing. Many in the educational sector are of the opinion that school systems will get civilized, student learning outcome will improve and teacher absenteeism will reduce. This study was conducted to analyze the impact of technological intervention on improve attendance rate. Result shows that use of technological intervention greatly influencing absenteeism of both male and female students of Punjab Pakistan. It will help to monitor not only absenteeism but the school dropout ratio as well. Technological intervention monitoring mechanism should be introduced in other provinces as well. So that literacy level could be improved.

Similarly technological interventions should not be only limited for monitoring absenteeism. There are many other activities in schools which should be done through the use of technology. If we look at the global picture education in school is being improved by the use of technological gadgets. Because it's an era of technology and education is the backbone of any country.

#### **5.1 Limitation of Study and Future Directions**

As the social science researches can't be 100% authentic there is always a room comprising the hidden effects and faults in the study. Like every other research there is also a limitation in this



study too. As far as limitations in the study design are concerned, the methodology of one group case study design puts it on technically weak position. Unlike experimental studies where a cross comparison is made between control and comparison group, here we only have one group and that is treatment group. We don't have any comparison group to make comparison analysis with.

## **5.2 Policy Recommendations**

Our results are based on consistent data in Punjab province ranged from 2009 to 2017. Any policy suggestions made can be generalized and applied across Pakistan as the data pool from Punjab is of large size. It is worth noting that, correlation found between use of technology in schools monitoring and positive improvement in attendance rate is consistent with evidence from small scale thus concreting its validity. Besides, interesting outcome of the study is that this technological addition to monitoring system resulted in improvement in female attendance rate. Technology-based intervention in education should be expanded in other regions of Pakistan to produce effective results keeping in mind the results of the current study it is also recommended that its expanded progression should be utilized to remove all other hurdles in boys and girls education including distance learning, enhancing mental health, improvement of systems and conceptualization.

It can be drawn from the global impact and current study's conclusion that all the manual procedures should be reassessed to fetch best results. They should be immediately replaced with new technological systems. It would not only save our time but it will also produce beneficial results.

Likewise new generation preferences should be kept in mind while introducing any new system for education. As absenteeism control is providing us the authenticity and effectiveness of such

technological systems.

Education reformers in Pakistan must consider that the country does not have the luxury of focusing only on parts of the system. Each of the subsectors of the system – primary/secondary schooling, higher education, and vocational training – has a vital role. Each can expand opportunity for different cohorts of Pakistani youth, enabling them to contribute to Pakistan’s economic growth. It would, for instance, not be in the best interest of Pakistan to focus on school reform now and return to higher education 5 or 10 years down the road. It would also not be wise to neglect vocational training while focusing on the other two sectors first. That said, each sector of the education system has its own constituencies, challenges, and constraints. Therefore, the approach to mobilizing those constituencies, raising resources, and addressing challenges will be very different (Memon, 2007).

Still, we believe some common reform design principles can be applied to all subsectors of the education system. *First, any reform must be systemic*, i.e. select a minimal set of areas for each subsector (such as governance, fiscal resources, human resources, and curriculum) and address them simultaneously rather than omitting one. Of course, the nature of these areas and thus appropriate solutions will vary across the subsectors. For instance, governance reform for managing and monitoring of schools will likely be more focused on government bureaucracy. In universities, however, it may also encompass the often complicated structures of governance within institutions. Similarly, human resource development is very different for school teachers versus university faculty, in terms of resources required, the time needed, and the eventual roles teachers and faculty are expected to fulfil (Malik, 2011).

*Second, standards of excellence must be tailored to purpose.* Systems of education are like terrains, with peaks, valleys, and vast plains. The notion of excellence at the system level is not definable in the same way as it might be for a particular class of institutions. This notion for the system must be defined as “fit for purpose”. An institution is excellent if it delivers well on the purpose for which it was designed, within the constraints it has. In that sense, design of any reform at the system level must recognize that imposing uniform standards of performance may work for subsets of the system, but not the whole system (Ali, 2011).

For instance, a private school may have the resources and the flexibility to admit only the brightest students to achieve world-class results, but a public school in a rural area may not, as its primary objective is access and affordability within the means it has. Holding them accountable to the same standards may be counter-productive and will in fact generally be infeasible. Similarly, in higher education, not all universities need to be world-class research universities. That would be beyond capacity for most countries, not just developing ones. A teaching university may be excellent if it graduates a large number of students with solid fundamentals, even if its faculty does not conduct substantial research. A vocational institute may be excellent if it graduates a large number of students who have no trouble obtaining international certification for their skills, even if it does not cover all vocational areas (Afzal et al., 2011).

*Third, implementation resources must be carefully nurtured and protected.* This principle is particularly important because of the preciousness of implementation resources in Pakistan. Implementation eventually comes down to people – especially those with the motivation, skill, experience, and stamina to steward the reform effort. Sometimes a promising reform effort fails if one or two key people exit. This is partly because of the difficulty of replacing talent in Pakistan

and the high cost of learning for new participants to carry out reforms successfully in Pakistan's environment. For this reason, it is important for political and civil society leaders to nurture implementers of reform over a reasonable period of time and recognize the pitfalls of attempting to replace teams before the ground gained in reform has been secured. Since much of the primary and secondary education is handled by the government, two complementary approaches to strengthen implementers of reform would be to identify and empower reformers within the government and give them the time and space to effect reforms in education; and/or bring into the government at very high levels of administration, a few highly talented and proven people from civil society or the corporate sector, with experience in reform, management, or education administration (Jaffer, 2010).

Some of the ends any reform effort must seek to obtain are simple to describe and not controversial. Broadly, these must be to (i) increase enrolment, (ii) decrease inequality across gender, income, location (urban/rural), and ethnicity, and (iii) improve overall quality of education (Aziz et al., 2014). This simple codification, appropriately interpreted, should apply to each sector of the education system (schooling, higher education, and technical education).

Inequality deserves a special note as it is most likely to be overlooked in reform efforts, and also because some of the means employed for addressing other ends may exacerbate the inequalities. For instance, an emphasis on private schooling as a major vehicle of policy may end up further disadvantaging girls in rural areas. Private schools are likely to be the last option for the poor and girls to catch up in rural areas. Poor families will forego private fees especially for girls, so private schools are unlikely to become major instruments of opportunity for poor rural girls. Areas such as these are where the state must take ownership of the problem (Asghar, 2012).

In addition, there may be other legitimate ends that reformers seek to undertake, such as increasing tolerance and civic sense. But these are not measurable in the same sense as the ends listed above. Moreover, because explicit goals inevitably raise explicit challenges by interest groups, goals such as these are perhaps best weaved into the reform effort rather than made explicit (Afzal, 2010).

Given the daunting number of problems in Pakistan's educational system, it is easy to get distracted by creating a laundry list of potential challenges and reforms. But such a strategy is unlikely to be informative. Reform processes can often dissipate their energies by tackling (Afzal et al., 2011) too many challenges (some of which are not strategically important) and by omitting one or more key areas (the absence of which causes the reform in the intended area to fail).

We believe that four areas are key to the development of an effective reform program for the educational system as a whole, and are systemic in the sense that none can be avoided without seriously hampering the outcomes of the reform. Broadly construed, these are: (i) governance (including federal and provincial bureaucracy as well as the appropriate public and private sector regulation), (ii) fiscal resources (including efficient use of such resources), (iii) human resource development (including incentives for teachers and faculty), and (iv) curricular reform. In our view, none of these areas can be implemented without support from a subset of the other three areas. Appropriately interpreted, these areas are relevant to each sector of the education system. Below are some examples of what reform in these areas might entail, described mainly in terms of the school system (Raees et al., 2011).

### **5.3 Future Study**

Though the research model and results were properly analyzed but there may be variations and choices so in future the data should be collected in different contextual setting by increasing the sample size. Secondly the research was carried out in education system of Pakistan so in future the

impact of technology-based monitoring system should also be studied in other industries as well. It can be investigated that whether we should doubt the traditional methods in other sectors or not. Thirdly many other factors which are unexplored related to the improve attendance rate so those factors should also be studied which are impacting the improve attendance rate.

The first challenge in educational reform is to get serious system-level reform – rather than piecemeal or cosmetic initiatives – firmly on the government agenda and to get it endorsed with visible resolve. This is likely to be difficult because the new government takes charge at a time of other highly emotive and visible problems such as the economy, energy, and security. The economy has seen double-digit inflation in the last three years, and growth has been meagre in comparison with South Asian neighbors; energy riots are increasing; and growing sectarian violence and other security incidents are constantly in the news. Taken together, they distract the focus from long-term development as political parties instinctively understand that the return (in terms of votes) from investing in these problems is likely to be greater than investing in education. Visible resolve is also important (Barber, 2010).

Even though Article 25(A) enshrines basic education as a fundamental right, and even though education was an election issue and the political parties were responsive in their manifestos, the long history of failed education reform in Pakistan should make reformers cautious in interpreting political declarations. At the same time, reformers should also recognize the opportunity at hand for getting education reform onto the public agenda. Theories of agenda-setting suggest that problems are most likely to get onto the public agenda when three streams combine:<sup>28</sup> (i) a problem stream (a long-standing and well-recognized problem), (ii) a political stream (a fortuitous political change that opens the doorway for that problem to get onto the agenda), and (iii) a policy stream (when a base of potential policy solutions is available, perhaps through previous work or

through the availability of think tanks and consultants) (Ali, 2011).

The second challenge in initiating reform is the institutional impasse created by the recent constitutional changes that have affected education. This impasse has left the government bureaucracy uncertain about who is responsible and has authority and accountability for different sectors of education. Resolving this uncertainty is crucial because actors will be reluctant to stake personal and political capital as long as it is unclear who can take credit from achievements in reform. Thus it will be extremely challenging to mobilize communities of reform and to build and maintain their momentum over a 5- to 10-year effort, a period of time which is likely to be required for reform. And it is unclear if the federal government can force all of the provinces to focus equally on education and to maintain a uniform push towards reform. But even after this impasse is resolved, the ease and difficulty of initiating education reform will vary greatly across Pakistan's four provinces (Sharma, 2013).

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