

ANALYSIS OF THE MONITORING SEM IN GOVERNMENT SCHOOLS OF SHAHEED BENAZIRABAD

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Abstract

Monitoring system (MS) plays major role in any public or private organization. Monitoring system organizations observes the punctuality of their employees, enrollment, school building condition, drinking Water, furniture, electricity. Before the implementation of MS in government schools, the heads of schools were using manual system. This manual system has many flaws such as not secure, time consuming and less accurate. To overcome these problems in manual system, the Government of Sindh's Education & Literacy Department has introduced a Monitoring system named "Sindh Schools Monitoring System" (SSMS) in April 2016. The objective of this system was to improve the teacher's attendance by biometrically attendance and it also improves the quality of education at government schools. However, the SSMS still faces challenges in terms of its implementation and design. This research provides a detailed study of the existing SSMS used in government schools of Shaheed Benazir Abad. This research is based on survey to identify major problems in SSMS and provides recommendations to address the identified problems in order to improve the effectiveness and efficiency of SSMS.

Keywords: SSMS, manual attendance system, NGO, government schools of Shaheed Benazir Abad

1. Introduction

Now a day's most of the organizations are using SSMS system to ensure the attendance of their employees and monitor the activities of schools. The SSMS system monitors the attendance record, leave record of employees and as well as incoming and outgoing time of employees etc. Before 2016, different reports of NGO's, local newspapers and international newspapers were telling about the ghost schools and ghost teachers. According to their reports schools of rural areas were close due to absent of teachers. As indicated by their reports infrastructure of schools is not appreciated in Sindh [1]. In order to reduce absenteeism of teaching and non-teaching staff, government of Sindh initially introduced Monitoring system (SSMS) in April 2016. This was implemented in 15 districts at the start. Nowadays, this system was implemented all over the province. This application works offline. It consists different steps such as: Start Monitoring, Search Employee Option, Back Up and Reset, Settings, Logout and Location

option. The aim of this research work is to study of the existing SSMS used in government schools of Shaheed Benazir Abad. This research identifies major problems in SSMS and provides recommendations to address the identified problems in order to improve the effectiveness and efficiency of SSMS. Section 2 describes the literature review. Section 3 discusses methodology. Section 4 gives results and analysis. Finally, Section 5 presents conclusion and future work.

2. Literature Review

Zhang Yuruet *al* [1] worked on student attendance system based on RFID (radio-frequency Identification). Author suggested about application for attendance, design the structure of system. Author also simulate the data comparison of types of algorithm and suggest appropriate algorithm. Author used QT programming and compared improved algorithm and dynamic frame timeslot algorithm. This new system takes less time and reducing the human resources. But the author did not discuss the case of stolen or lost the Student RFID Tag.

Ramakrishnanet *al* [2] proposed an attendance monitoring system by using the fingerprint technology. Specifically they worked on fingerprint reconstruction technique for efficient automatic attendance system. The proposed algorithm has proved the prevention of two kinds of attacks. The proposed algorithm composed to five steps, they include pre-processing, minutiae extraction, orientation field, phase reconstruction, fingerprint reading and report generation. The proposed algorithm is used for reconstruction of the fingerprint. According to author, suggested algorithm used to automate the attendance and save the time. Limitations in this paper the author should discuss are more cryptographic technique to secure the fingerprint template.

Unnati A. Patel *et al* [4] Author investigated different biometric attendance system for taking attendance of student and suggests RFID and face recognition attendance system. They assess 8 different attendance management systems and proposed RFID based attendance system and face recognition based attendance system for taking attendance for student. RFID attendance system will take automatic attendance of students and face recognition attendance system will authenticate the students. Author discussed various algorithms like as Daugman's algorithm, Novel fingerprint image reconstruction algorithm and Viola Jones algorithm. The author did not discuss biometric security schemes to secure the fingerprint templates.

Naveed Khan Balchohet *al* [6] author worked on algorithm for efficient attendance management system. Author also compared the image result with the help of algorithm. According to their research the suggested algorithm is very efficient. This research paper is limited to one technique; it can be extended by implementing other algorithm.

Shermin Sultana *et al* [8] Author proposed a location based smart time and attendance tracking system. This system is android based it runs on android device. This system locates the employee's position and login and logout time. For this system Mobile location service is very important if mobile location service is not available then this system will not work more. Author did not suggest any biometric attendance system which is efficient than proposed attendance system.

An android based system (AMS) is also proposed by researcher in [9]. This system is very efficient than paper based attendance system. Manual computation process may produce errors and also it is time consuming. According to author faculty member and students can register themselves by signing in to system. In this system official authority can generate the results through this software. Author also discussed different attendance monitoring system.

Dedy Rahman Wijaya *et al* [19]. Suggested a Radio Frequency Identification (RFID) based attendance management system. According to author RFID technology is enabler and it is in developing process. For attendance system RFID tag used in the form of card. According to author this system can be integrated with IP camera to capture the photographs. Cards are using as a RFID tag but if lost or may be stolen then author did not suggest any alternate solution.

Seng Chun Hoo *et al* [24]. Author proposed, Biometric-Based Attendance Tracking System for Education Sectors, author take different biometric scanners like; iris, voice, fingerprint, and face reorganization, compare these scanner and conduct survey where these scanner use for attendance and proposed a suitable biometric scanner for attendance tracking for educational sectors.

Jagruti J. Raneet *al* [25]. Author proposed, a Biometric Access control system based on IoT is designed and implemented. The proposed system is simple and portable approach to student attendance in the form of an Internet of Things (IOT) based system that records the attendance using fingerprint scanner and stores them securely over the cloud. Author proposed an embedded system can connect to internet and could link to online storage space services like Google Drive, Drop box, etc. to log data and also discuss the effectiveness and efficiency of this system.

Another work [21] on the biometric system suggested that the automated techniques are better than manual attendance systems. Based on the historical knowledge provided in the research work, the suggestion to recognize the persons by live systems was given. In this paper, author did not suggest suitable and reliable biometric attendance system.

Shireesha Chintalapati *et al* [22] researcher proposed an automated attendance management system based on face recognition algorithm. According to author this system is secured and time saving. Through this project also identify the unknown person in class room. When students will enter in the class then camera will capture the image then this image will compare with stored data. This system also generates the email and excel sheet on the recognition time. In this paper, the author should discuss the problem face cannot detect when more than two persons enter in the classroom at a same time.

3. Methodology

3.1 Research design: This research has been done through survey. A survey is designed to collect the information with a questionnaire. It helps to analyze the quality of SSMS.

3.2 Questionnaire respondents: The research was done among the Chief Monitoring Officer and Monitoring Assistants from District Shaheed Benazir Abad. We investigated the impact of SSMS application. Chief Monitoring Officer and Monitoring Assistants is the end user of this application.

3.3 Data collection method: We performed data collection with departmental permission and take Snapshots of SSMS Application working. A questionnaire is also developed for data collection from chief monitoring officer and monitoring assistants. Questionnaire handouts provided in the office of Monitoring and Evaluation District SBA.

3.4 Questionnaire: Questionnaire were designed on the basis of analysis of gathered information regarding tool SSMS. All questions were related to research topic and related to problem statement to identify the pros and cons of existing system. Questions format which used in questionnaire was closed ended questions and open ended questions. This method is very much helpful for data collection because it give exact view and specific reply of any respondent.

3.5 Reliability test: Reliability is a method to measure the internal consistency of collected data. We used SPSS software to test reliability of collected data which provides the cronbach's alpha value. Cronbach's alpha value can be calculated through equation (1) given below:

$$\alpha = \frac{K}{K-1} \left(1 - \frac{\sum SDt^2}{SDt^2} \right) \dots\dots\dots(1)$$

Where,

α = Reliability

$\sum SDt^2$ = Sum of the variance of individual item in the questionnaire

SDt = Variance of the entire questionnaire

K = No. of the items in the questionnaire

3.6 Data analysis: Quantitative method is used to present the collected data. The feedbacks from the chief monitoring officer and monitoring assistants through well planned questions were calculated into descriptive analysis to observe mean and sum values in SPSS. After descriptive analysis these questions summarized and present in the form of charts to interpret easily in presentation, assessments and analysis. Graphs created in Excel 2007.

4. Performance Evaluation

For this study, sample questionnaire were distributed in one Chief Monitoring Officer and 23 Monitoring Assistants in hard copy. All end users are replied. The collected data was further analyzed using reliability check and descriptive analysis.

4.1 Reliability of survey: Reliability test of collected data is done by using cronbach's alpha value. The resulted value is 0.869. Which showing high value of alpha and it mean this survey is reliable.

4.2 Descriptive analysis in SPSS: Figure 4.1 to Figure 4.7 shows descriptive analysis of all questions given in questionnaire. These questions were divided into groups. In these figures, 1st column N represents number of respondents, 2nd and 3rd column represents minimum and maximum value of response. The 1 is minimum value (i.e., strongly disagree) and 5 is maximum value (i.e., strongly agree). The Sum column represents sum of selected options by respondents. Where, mean column is showing average

	N	Minimum	Maximum	Sum	Mean
With the help of SSMS Application the schools monitored effectively.	24	1	5	93	3.88
Attendance of School Employees ensured effectively with the SSMS.	24	1	4	76	3.17
Attendance of Student record accurately with the SSMS App.	24	1	5	97	4.04
Basic facilities for schools monitored effectively and accurately with the SSMS.	24	1	5	94	3.92
Schools Funds, Expenditure and Other facilities provided to schools monitored effectively with SSMS App.	24	1	4	62	2.58
SSMS Application collected information of schools at real time.	24	1	5	102	4.25
Valid N (listwise)	24				

	N	Minimum	Maximum	Sum	Mean
Monitoring of Schools is done in less effort and time with SSMS Application.	24	4	5	106	4.42
With SSMS App, the attendance of school employees recorded efficiently as compare to Manual System.	24	4	5	102	4.25
Attendance of Students of schools is less time consuming.	24	4	5	101	4.21
SSMS Application monitor the basic facilities of schools efficiently (Less time).	24	4	5	101	4.21
SSMS App is collecting data about the school funds(SMC, SSB etc), expenditure and other facilities easily.	24	4	5	104	4.33
Valid N (listwise)	24				

Figure 4.1 Descriptive analysis 1st Group of Questions

Descriptive Statistics					
	N	Minimum	Maximum	Sum	Mean
Over all, how satisfied with the SSMS Application?	24	1	3	37	1.54
Which of the following words would you use to describe the SSMS. Select multiple that apply	24	1	4	54	2.25
How would you rate the quality of the SSMS?	24	1	2	28	1.17
How satisfied are you with the reliability of the SSMS?	24	1	3	51	2.13
How satisfied are you with the security of the SSMS?	24	1	3	57	2.38
Valid N (listwise)	24				

Figure 4.2 Descriptive analysis 2nd Group of Questions

Descriptive Statistics					
	N	Minimum	Maximum	Sum	Mean
Login with User ID & Password	24	1	5	101	4.21
Online Fetching/Downloading assigned schools data.	24	1	3	43	1.79
Start Monitoring	24	1	3	63	2.63
Search Downloaded schools for Monitoring	24	1	5	98	4.08
Status of School (Open/Closed)	24	1	4	89	3.71
Capture the picture of front of school	24	1	5	97	4.04
Remarks	24	1	3	57	2.38
Collecting School Management Committee Data (SMC)	24	1	4	85	3.54
Attendance of School Employees	24	1	4	78	3.25
Connection of Finger Print Scanner with SSMS Application	24	1	5	97	4.04
Taking attendance with finger Print Scanner	24	1	5	99	4.12
If employee finger print not match or absent then other options work(Absent, Absconder, thumb not match, leave, official work etc)	24	1	5	91	3.79
Capture musterroll Picture Enrollment (Record Attendance of Students Class wise)	24	1	4	86	3.58
Census of School	24	1	5	91	3.79
Capture condition of Boundary Wall	24	1	5	106	4.42

Figure 4.3: Descriptive analysis 3rd Group of Questions

Check Availability of Drinking Water	24	1	5	109	4.54
Check Availability of Washrooms (Functional/Non Functional)	24	1	5	111	4.63
Check Availability of Electricity	24	1	5	106	4.42
Collect data about Sanctioned New Expenditure	24	1	5	108	4.50
Check Text Books	24	1	5	109	4.54
Class Rooms Condition	24	1	5	107	4.46
Check Other Facilities (Working and Repairable Furniture and Other Equipments)	24	1	5	91	3.79
End Monitoring and Saved all collected Information	24	1	5	109	4.54
Search Employees of Schools	24	1	4	81	3.38
Backup & Reset	24	1	4	84	3.50
Synchronization of School collected data	24	1	3	63	2.63
Reset Data	24	1	5	109	4.54
Backup Data	24	1	5	111	4.63
Restore Data	24	1	5	111	4.63
Settings (Change Password of User ID)	24	1	5	113	4.71
Logout	23	1	5	108	4.70
Valid N (listwise)	23				

Figure 4.4: Descriptive analysis 4th Group of Questions

Descriptive Statistics					
	N	Minimum	Maximum	Sum	Mean
Online Data					
Fetching/Downloading of assigned schools is time consuming.	24	1	2	38	1.58
In SSMS Application the Online schools data download is not completely	24	2	3	55	2.29
Incomplete Data of schools in SSMS Application create problems during Monitoring like (thumb not match during attendance)	24	1	2	36	1.50
Size of Remarks boxes in SSMS Application is very short (only for 25 characters)	24	1	2	39	1.62
All visit data lost when SSMS App automatically logout.	24	1	2	31	1.29
In SSMS Application the Search Employees Option only search in downloaded schools	24	1	2	41	1.71
SSMS Application crash during Monitoring due to large data of schools or some feature not work (night duty option)	24	1	2	40	1.67
In Start Monitoring option the downloaded schools information incomplete(without Prefix and Name of UC)	24	1	2	37	1.54
In School Management Committee Option is not asking about the utilization of SMC	24	1	2	42	1.75

Figure 4.5 Descriptive analysis 4th Group of Questions

When Monitoring the Primary schools, the SSMS Application also ask all information of middle and Hi-Secondary schools.(Enrolment of Class 6 to 12, labs detail etc)	24	1	2	31	1.29
Synchronizations of Schools is difficult in rural areas because the ssms required minimum 4G Network for Sync	24	1	2	29	1.21
Valid N (listwise)	24				

Figure 4.6: Descriptive analysis Group of Questions

4.3 Effectiveness of SSMS:

Figure 4.8 is showing results of 5 questions which comes in same category. These questions were related to effectiveness of monitoring system. This figure is representing the feedbacks from the respondents. This graph shows that the monitoring of Schools with the help this monitoring system (SSMS) is effectively. Some Monitoring Assistant disagrees in attendance section and collection of schools funds detail.

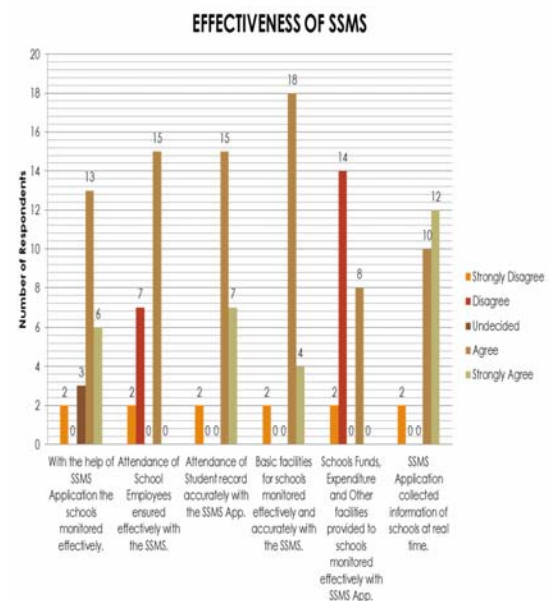


Figure 4.8 Effectiveness of SSMS

4.4 Efficiency of SSMS:

Figure 4.9 and Figure 4.10 represents views of end users about the efficiency of SSMS system.

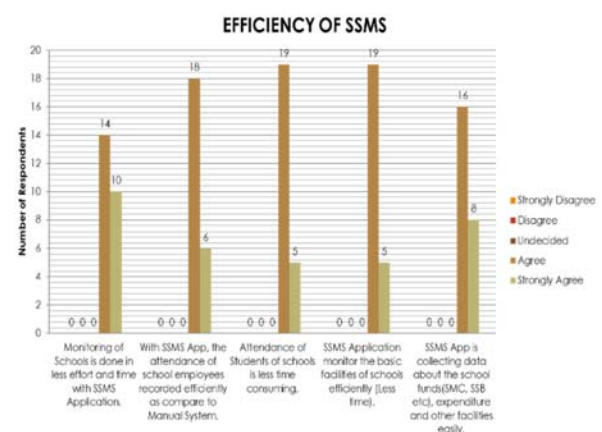


Figure 4.9 Efficiency of SSMS

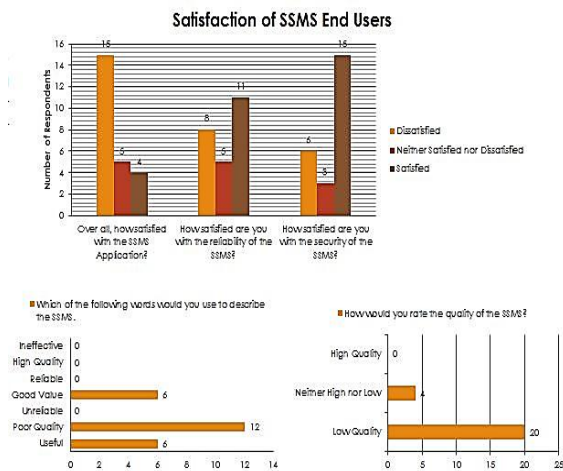


Figure 4.10 Satisfaction of SSMS End Users

4.4 Assessing features of SSMS:

Figure: 4.11 shows that the evaluation of features of this Monitoring System (SSMS). This graph shows that Online Downloading of schools for monitoring and remark is very poor. Figure: 4.12 shows that feature of collecting data of schools basic facilities (School building condition, furniture, Drinking Water, Washroom, Electricity etc.) is working properly. Figure: 4.13 and Figure 4.14 shows the other features of SSMS Application like; Search employees, backup data, reset data, settings and logout is working properly. SSMS Application save data in database server this feature name is synchronization. Synchronization of collected data of school is not working properly.

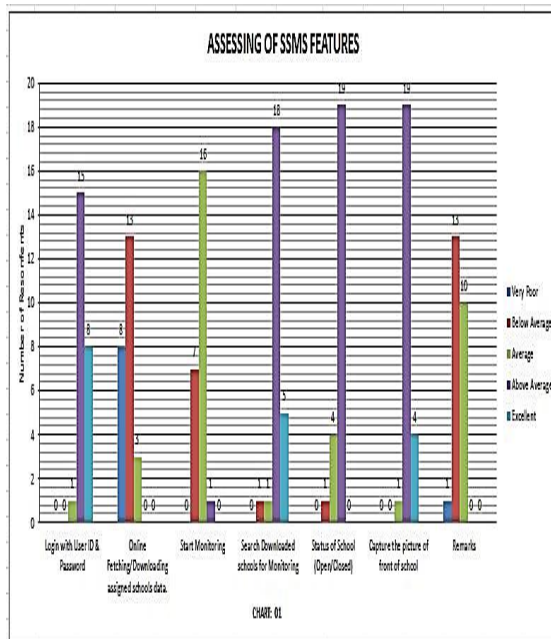


Figure 4.11 Assessing of SSMS Features

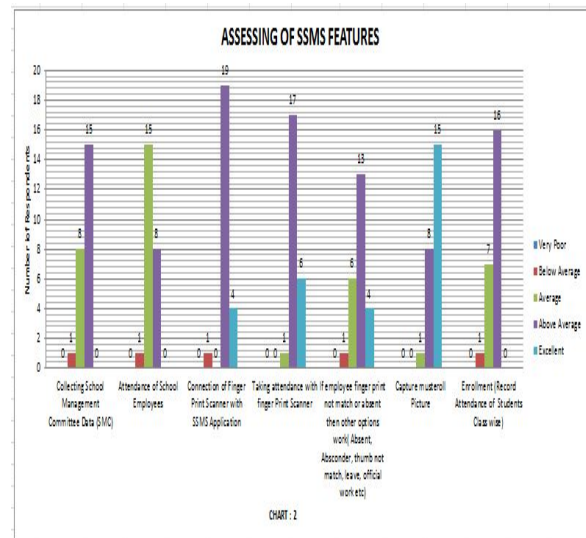


Figure 4.12 Assessing of SSMS Features

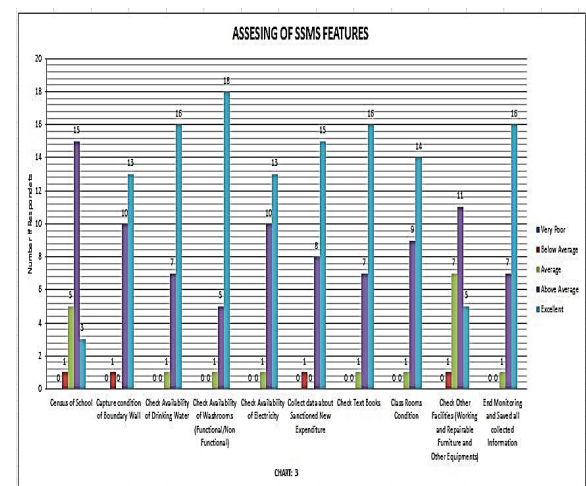


Figure 4.13 Assessing of SSMS Features

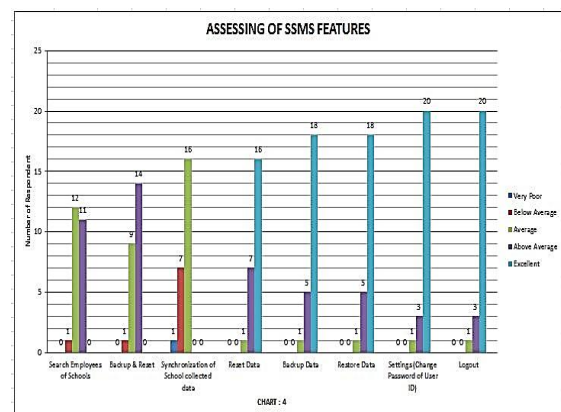


Figure 4.14: Assessing of SSMS Features

4.5 Major Problems in Monitoring System (SSMS)

Figure 4.15 shows the major problems facing by end users in the terms of agree or strongly agree.

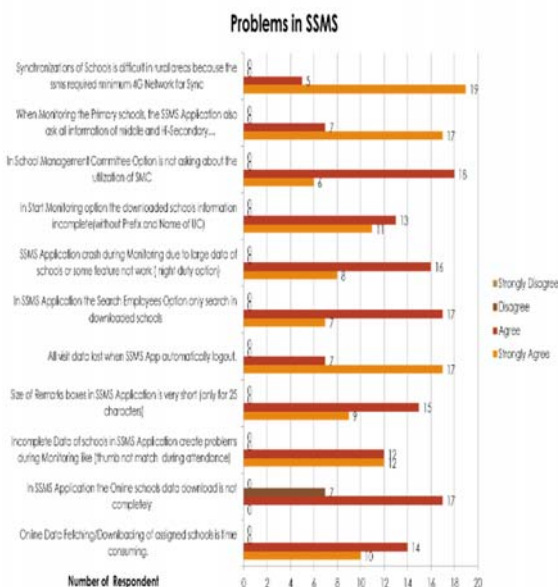


Figure 4.15: Problems in SSMS

4.6 Problems in SSMS Application and Suggestion:

Most of the problems occur due to the lack of proper training or implementation of this Monitoring System (SSMS). Table 4.1 shows the list of major identified problems facing by end users in this monitoring system (SSMS) and also represents the suitable solution for these identified problems which will be help full in improvement of this system.

S#	Identified Problems in SSMS	Recommendations
1	Online Data Fetching/Downloading	Sometime end users facing online data fetching/ downloading problem which could be resolved by add the facilities of importing data from the Head Office of District
2	Size of Remarks boxes in SSMS Application is very short (only for 25 characters)	Size of Remarks boxes in SSMS Application should increase (100 character)
3	All visit data lost when SSMS App automatically logout	Resolved this issue to add auto backup option of current data.
4	In SSMS Application the Search-Employees Option only search in downloaded schools	In SSMS Application search employee option should be improve, it can search employees of schools overall Sindh
5	SSMS Application crash during Monitoring due to large data of schools or some feature not work (night duty option)	SSMS Application should be improve that can handle large data which help to resolving the crash problem
6	In Start Monitoring option the downloaded schools information incomplete (without Prefix and Name of UC)	Downloaded schools show with complete information (with Prefix and Name of UC)
7	In School Management Committee Option is not asking about the utilization of SMC	The School Management Committee Option must be asking about the utilization of SMC
8	When Monitoring the Primary schools, the SSMS Application also ask all information of middle and Hi-Secondary schools (Enrolment of Class 6 to 12, labs detail etc)	In SSMS Application ask information according to school level.
9	Synchronizations of Schools is difficult in rural areas because the SSMS required minimum 4G Network for Sync	Synchronization of collected data in to steps: 1 st the application sync text data only in low network coverage. 2 nd In the background the other data (images etc) sync automatically when the user in range of 4G network coverage
10	There is no any details/options in SSMS about of total allocated facilities to schools by Education administrations	Option for Total allocated facilities of schools should be added
11	There is no options for working and need repair electrical facilities like fans, bulb, electric board etc. not in SSMS Application.	Option for working and need repair facilities should be added.
12	In SSMS Application Monitoring Assistant cannot marked absent more than one day.	SSMS Application should be allow to end user to mark absent more than one day
13	Employee attendance history option is not available in SSMS.	Employees attendance history option must be added help to insure the attendance of employees more effectively
14	Monitoring Assistant (End user) cannot visit school more than one time.	SSMS Application must be allow to the head of school, so that he monitored the schools on daily basis. Moreover for rural areas government should provide internet facility to the schools for implementation of SSMS.

Table 4.1 Identified Problems and recommendations in SSMS

5. Conclusions and Future Work

In this study, we analyzed the existing monitoring system (SSMS) and survey was conducted to find out the Effectiveness, Efficiency, Satisfaction of end users of SSMS and the major problems facing by end users in this Monitoring System (SSMS). Results show that 66% users are agree and 44% are not agree with effectiveness of this Monitoring System (SSMS) because poorness of some features. Furthermore, 97% users are agreeing with the efficiency of this Monitoring System (SSMS), they agreed for that the application collect data in less time and effort. Also, 53% users of this Monitoring System are not satisfied because of the low quality of this system (SSMS). After the Assessing of SSMS features, find out most of the features are working properly but some features like; online fetching, remarks, synchronizations are very poor and missing of some features. There are many identified major problems in this Monitoring System (SSMS). The recommended solutions would be helpful for the improvement in the effectiveness and efficiency of this Monitoring System.

In future this research can extend by collected data from other district of sindh province of Pakistan. Also, we can extend data collecting from Office staff.

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