

**Third Party Evaluation of
e-Classroom Project in Kendriya Vidyalayas**

2015

Evaluation conducted by



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Contents

| S.No | Item | Page No |
|--|--|----------------|
| 1 | Introduction | 1 |
| 2 | Scope and Objectives of the Evaluation | 2 |
| 3 | Analysis and Interpretation of Data | |
| | • Status of infrastructure in the selected schools | 4 |
| | • Analysis of feedback from the Principals | 17 |
| | • Analysis of feedback from the ICT teachers | 20 |
| | • Analysis of feedback from the subject teachers | 22 |
| | • Analysis of feedback from students | 27 |
| 4 | Results of the evaluation study | 31 |
| 5 | Recommendations | 33 |
| Annexure 1 Tools used for the study | | 34 |
| Annexure II List of schools included in the evaluation | | 45 |

1.0 Introduction:

Information and Communication Technology (ICT) encompasses a range of human-devised hardware, software and telecommunication technologies and facilitate communication and sharing of information, hence enabling to cross all the boundaries. It represents a 'diverse set of technological tools and resources, used to communicate and to create, disseminate, store and manage information'. ICT mainly covers computers, internet connectivity, broadcasting technologies (radio and television) and telephony. In the context of overall benefits, it is sometimes described as a third revolution in the dissemination of knowledge and in the enhancement of instruction. Proper utilization of these technologies can bring revolution atmosphere to re-establish educational goals, curriculum contents and effective teaching-learning methods. The importance of using ICT for improving education has been emphasized in India, right from NPE-1986. ICT has also figured comprehensively in the norms for schooling recommended by Central Advisory Board of Education (CABE), in its report on Universal Secondary Education in 2005, NCF-2005, NCFTE-2009 and National ICT Policy for School Education - 2012. Consequently, major government schemes have a component of funding allocated for using ICT and focused initiatives such as the Centrally Sponsored ICT@Schools Scheme are geared toward making opportunities available to students for developing their ICT skills at school level. The ICT@Schools Scheme was launched in 2004 with a view to provide opportunities for students to develop ICT skills as well as use ICT to aid the teaching and learning process. Under this scheme, support has been provided for procurement of Computers, peripherals, software, connectivity and so on. The scheme is currently being implemented in all States Union Territories (UTs) of India in government and government-aided secondary and higher secondary schools and autonomous bodies set up under MHRD, Govt. of India. Regarding this, the Govt. of India has made it mandatory to have a Third Party Evaluation of the implementation of ICT@Schools Scheme in all States and UTs respecting to establish an enabling environment to promote the usage of ICT to ensure the availability of qualitative content online and through access, to enrich the existing curriculum and pedagogy by employing ICT tools for teaching and learning, to enable students to acquire skills needed for the digital world, for higher studies and gainful employment, to provide effective learning environment for children with special needs through ICT tools, etc and linking it to future.

Initiatives in Kendriya Vidyalaya Sangathan (KVS)

Kendriya Vidyalaya Sangathan (KVS) having more than 1000 Kendriya Vidyalayas (1090 as on 01.04.2014) aim to develop various skills among students. To achieve such aim, KVs require state of the art ICT infrastructure and technologies which should be seamlessly integrated with the curriculum and curricular transaction. Teachers of KVs need to have continual support and training on ICT infrastructure and technologies to keep them abreast of current developments. As a part of this initiative the KVS has created E-Classrooms in at least 125 Kendriya Vidyalayas located in different regions. As a result of which one section in each class from class 3-12 has been equipped with the necessary hardware, including Interactive Board, Multimedia Projector, Response devise, Visualiser and a PC etc. These were procured through DGS&D. But the utilization and effect of these resources on imparting quality education needs to be assessed.

Therefore, CIET-NCERT has been entrusted with the responsibilities of evaluation of E-Classrooms set up in KVs with the following terms of reference to find out:

- Impact and effectiveness of e-class rooms on teachers and students
- Usefulness of e-class rooms in the knowledge construction of the students
- Motivation and happiness level of students/teachers, while using these technologies.

2.0 Scope and Objectives of the Study

Based on the above terms of reference the following objectives have been formulated

1. To evaluate the implementation of the e-classroom.
2. To ascertain the extent of use of - classrooms in general and pedagogical use of these in particular.
3. To ascertain the role of leadership in effective use of e-classrooms.
4. To determine the collaboration and general support offered to schools (Agencies responsible for implementation etc.)
5. To determine the level of professional development and expertise available in schools.
6. To explore how teachers integrate e-classrooms in teaching learning process.
7. To identify innovative practices followed in classroom.
8. To identify factors that affect e-classroom implementation in schools.

2.1 Methodology Adopted

A mixed method comprising the baseline survey, the case study, interview and classroom observation is adopted to obtain the valid and reliable responses from principals, subject teachers, ICT teachers, students, etc.

2.1.1 Population

At present KVS have about 3,000 e-classrooms in 124 KVs across the country. One section in each class (from class 3-12) are equipped with the necessary gadgets and hardware, including Interactive Board, Multimedia Projector, Visualiser, Response devise and a PC etc. It may be noted that the infrastructure were procured as per the DGS&D rates. Training for operation and meaningful use of these gadgets were provided to KV teachers by the concerned vendor /agency at the time of procurement.

2.1.2 Sample

All the 124 KVs covered under e- Class project constitute population of the study. In first phase it was planned to collect data online from all 124 KVs covered under e-classroom project through e-forms generated for this purpose. In second phase, it was planned to randomly collect data from 50 KVs [covering nearly 40% KVs under e-Classroom Project i.e. 50 Schools, 50 Principals, 100 ICT/Computer Teachers (atleast two from each school), 500 subject teachers (at least 10 from each school) and 1500 students (atleast 30 from each school)] through field visits using interview, interaction and focus group discussions as strategy. Actually, data has been collected online from 112 KVs. In all, the phase -I data was collected from 112 schools, followed by 52 Principals, 87 ICT Teachers, 624 Subject Teachers and 2097 Students in phase -II.

3.0 Analysis and Interpretation of Data

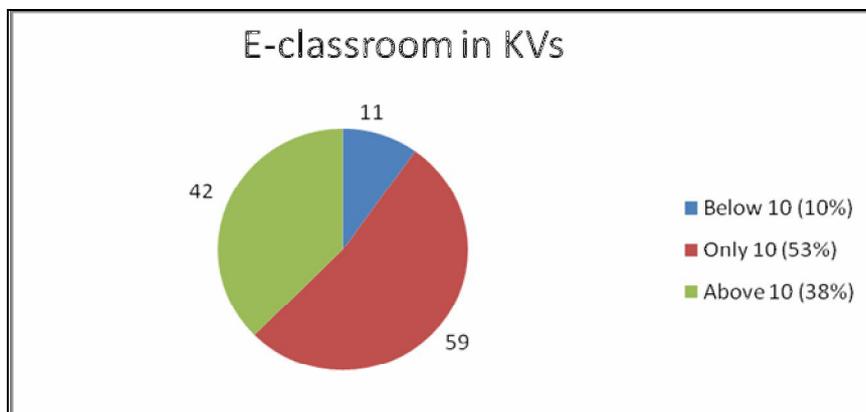
The analysis and interpretation of data has been spread across five sections. The infrastructure related issues have been dealt in 3.1 followed by feedback from principals 3.2, ICT teachers (3.3), subject teachers 3.4, and students in 3.5. Besides, problems and suggestions have been covered in 3.6, main findings 4.0 and recommendations in 5.0.

3.1 Infrastructure in KVs: e classroom

3.1.1 Status of e-classroom in the selected schools

In all 124 schools taken up for evaluation, e-forms were filled up by all the 124 schools in phase -I. Out of the 124 KVs included in the sample, 12 schools namely, K.V. No.2, Itanagar; KV Kimin,27,Assam Rifles,Papumparare; KV Jhaphan; KV, AFS Amla; K.V. No.2 Gwalior; K.V. No.1, Imphal; K.V. Cuttack; K.V. GC CRPF Agartala; K.V. No.1 AFS, Gorakhpur; K.V. No.1 Jhansi; K.V., New Cantt, Allahabad; and K.V. Ballygunge have not reported anything regarding e-classroom. Therefore, they have not been included further for analysis purposes.

Figure 3.1.1.1 Availability of e-classroom in schools



The data reveals that a total no of 1220 e-classrooms were found in all the 112 KVs. It may be observed from the data provided through figure 3.1.1.1 that 11 KVs have e-classroom below 10 and 59 KVs have 10 e-classroom followed by 42 KVs having more than 10 e-classroom & school-wise statuses of e-classrooms are presented from figure no. 3.1.1.2(a) to 3.1.1.2(d).

Figure 3.1.1.2(a) School-wise number of e-Classrooms

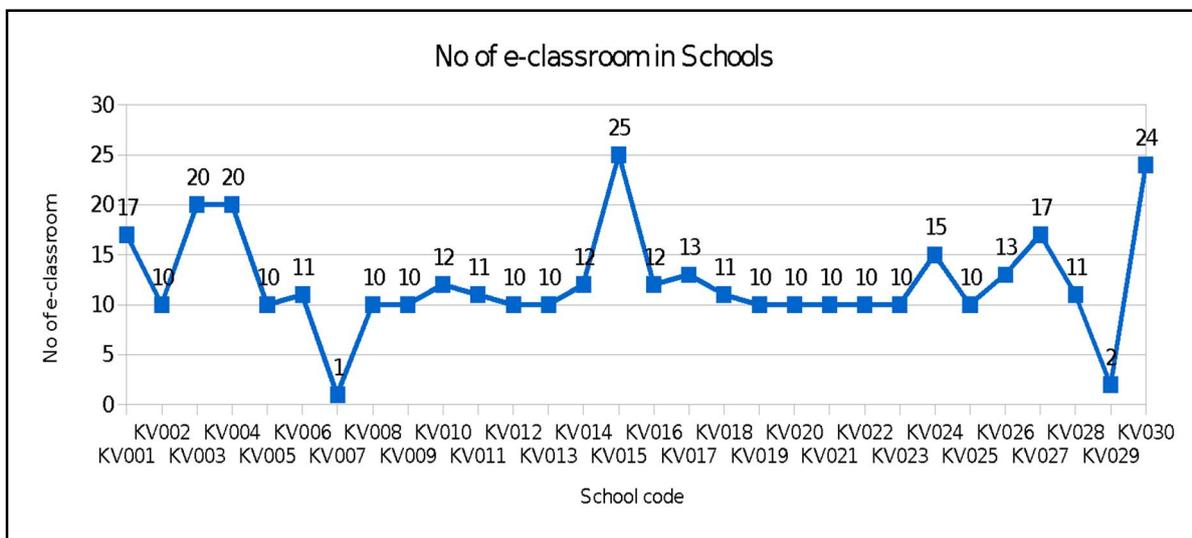


Figure 3.1.1.2(b) School-wise number of e-Classroom

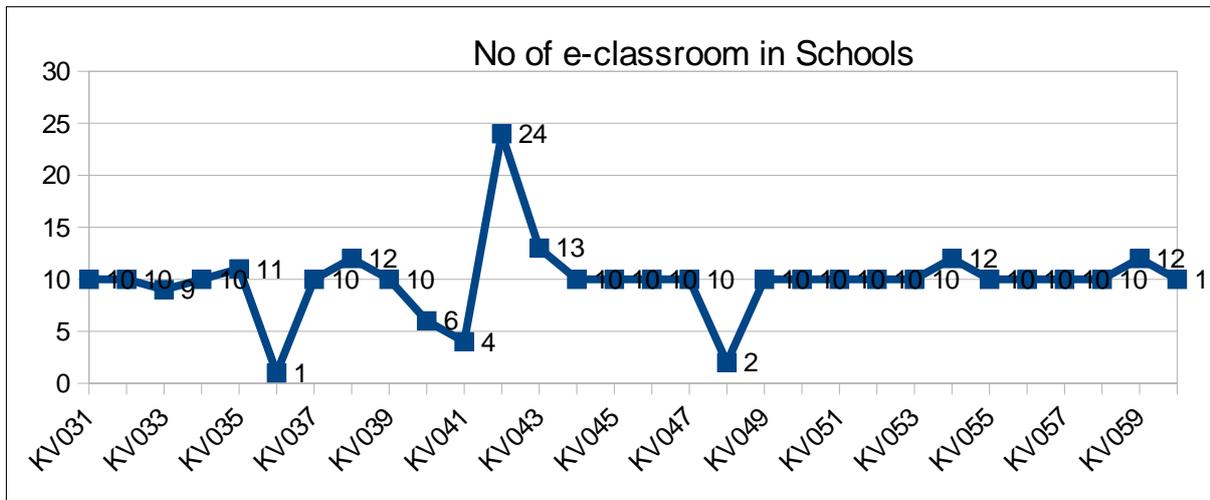


Figure 3.1.1.2(c) School-wise number of e-Classroom

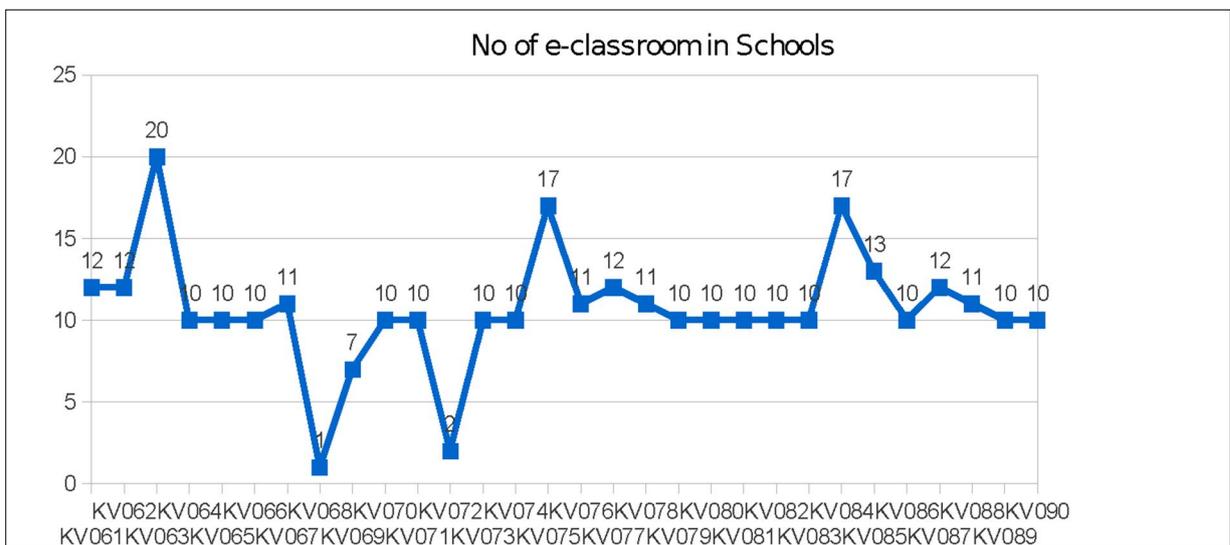
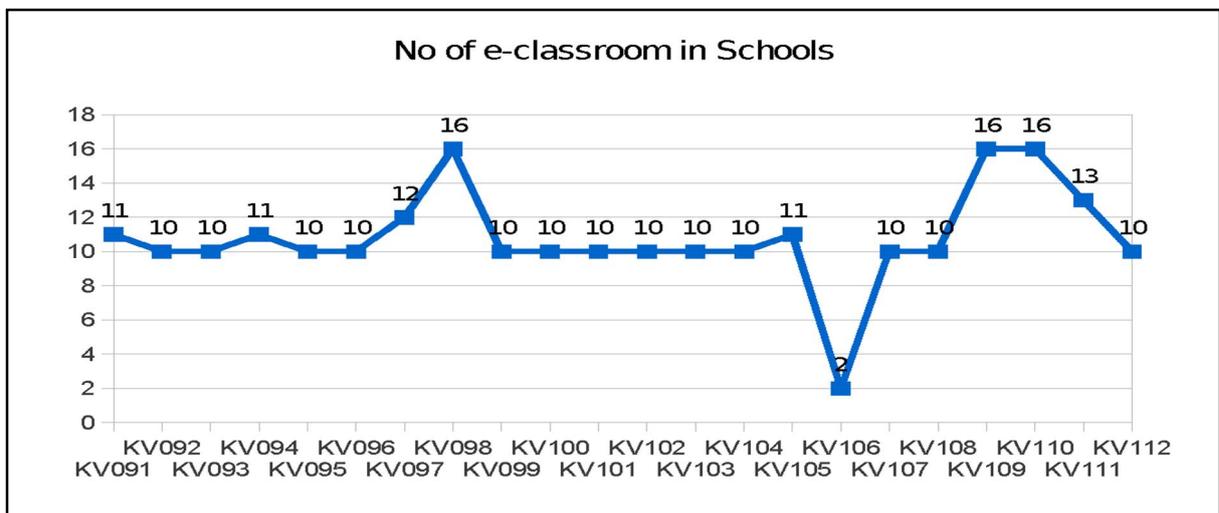


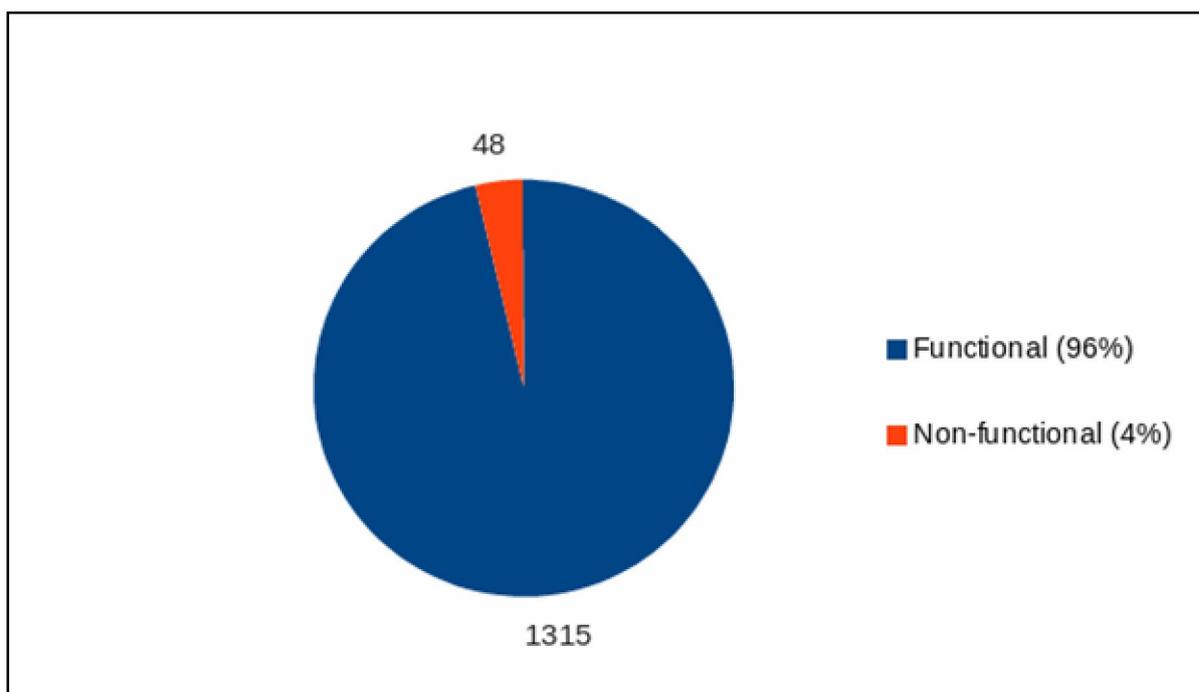
Figure 3.1.1.2(d) School-wise number of e-Classroom



The data shows that all the 112 KVs included in the sample have been provided with e-classrooms. The data provided in the figure no 3.1.1.2(a), 3.1.1.2(b), 3.1.1.2(c), and 3.1.1.2(d) reveals that a large number of schools i.e. 53% are provided with 10 e-classrooms each followed by 38% schools are provided with more than 10 e-classroom and only 10% schools have reported having less than 10 e-classrooms. Surprisingly three KVs (Kendriya Vidyalaya Berhampore, Kendriya Vidyalaya No.1 Raipur (C.G), Kendriya Vidyalaya Deeptinagar NTPC Kahalgaon) have reported to be provided with one e-classroom each and a highest number of e-classroom i.e. 25 has been reported from the KV, Gomti Nagar, Lucknow, U.P.

3.1.2 Status of Projectors

Figure 3.1.2.1 No of functional & non-functional projectors in school



The data analyzed in figure 3.1.2.1 reveals that 1363 projectors are provided in all 112 schools. Of these 1315 (96%) projectors were found to be functional and 48 (4%) were non-functional. Maximum functional (27) projectors were found in KV Aliganj, Lucknow, U.P. and maximum non-functional projectors (08) were reported from KV Rourkela, Odisha. School-wise status of the functioning of projectors is presented from figure no. 3.1.2.2(a) to 3.1.2.2(d). Further it is reported that the vendors reaction to attend the complaints are slow and responsible for non-working of 48 projectors.

Figure 3.1.2.2(a) School-wise functional status of projectors

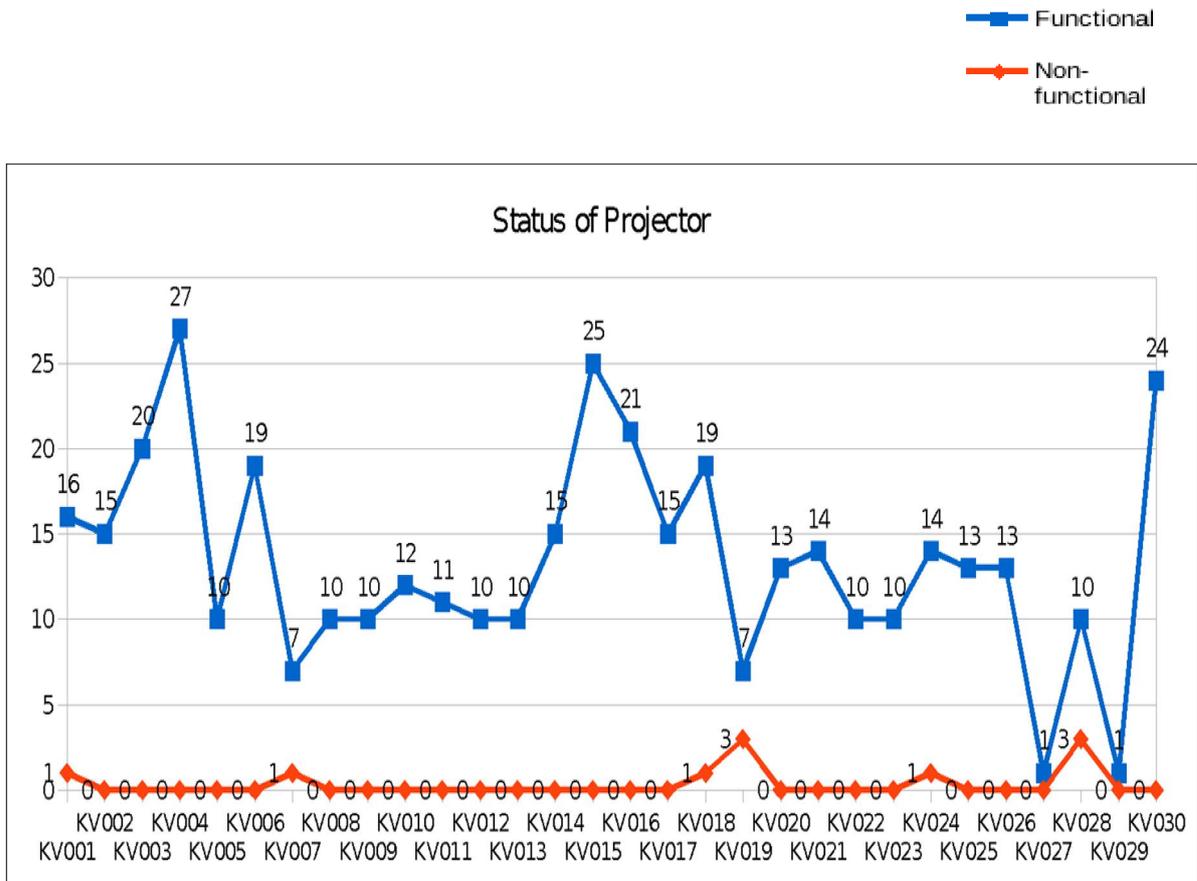


Figure 3.1.2.2(b) School-wise functional status of projectors

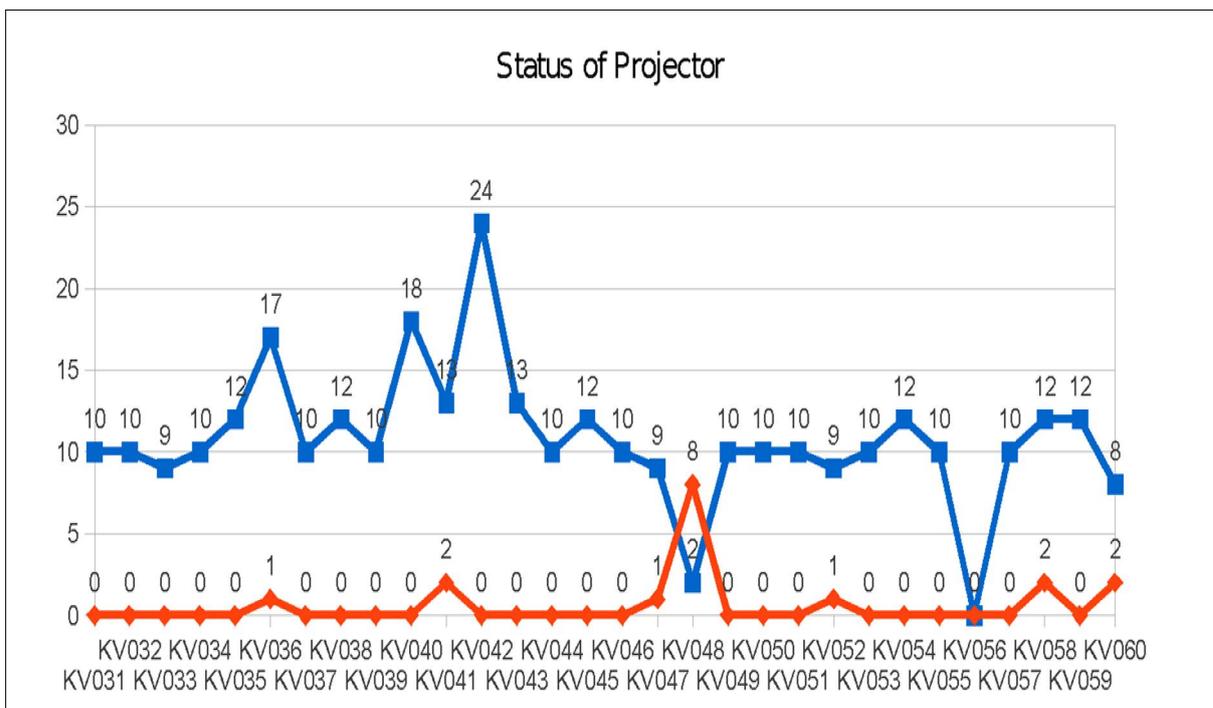


Figure 3.1.2.2(c) School-wise functional status of projectors

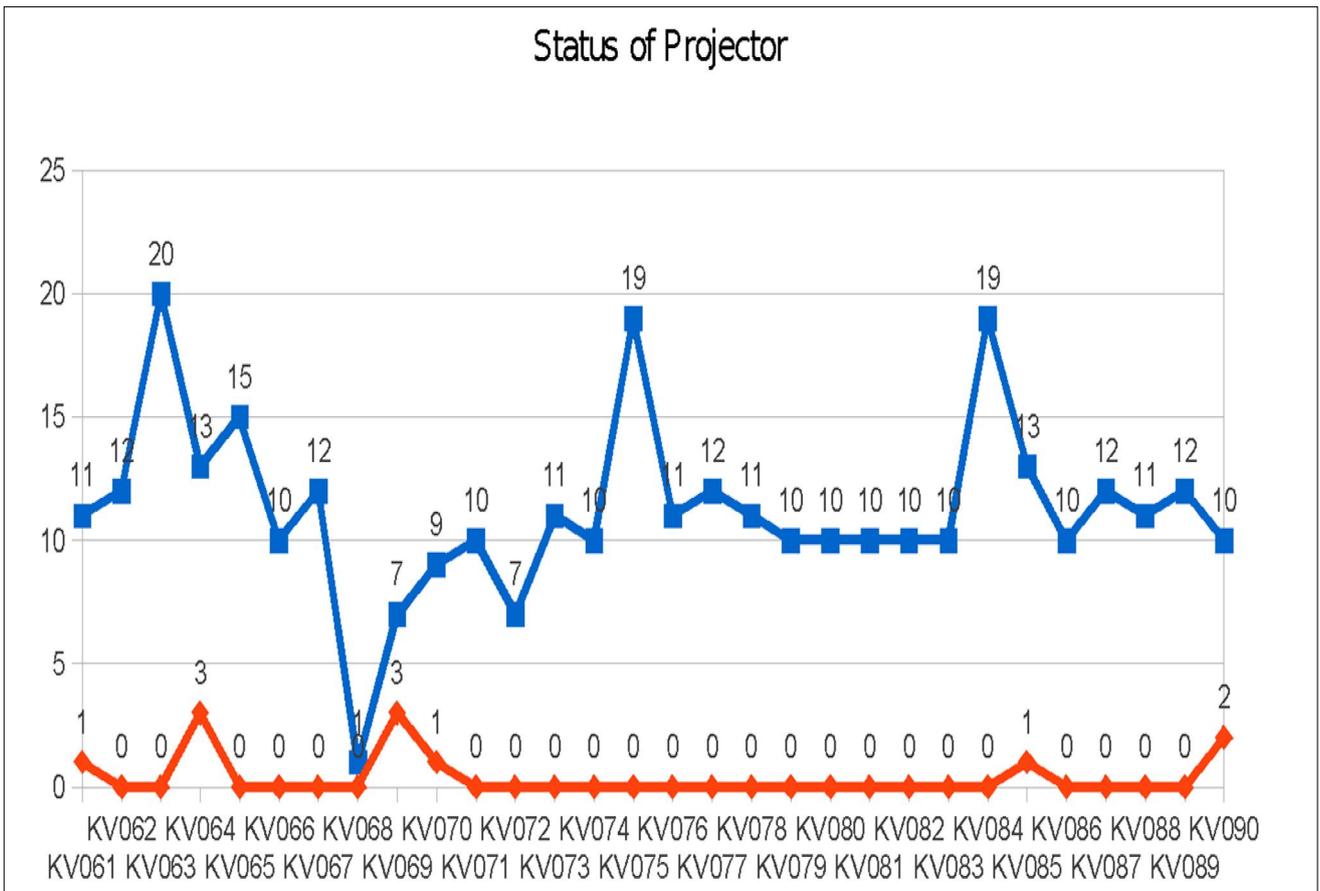
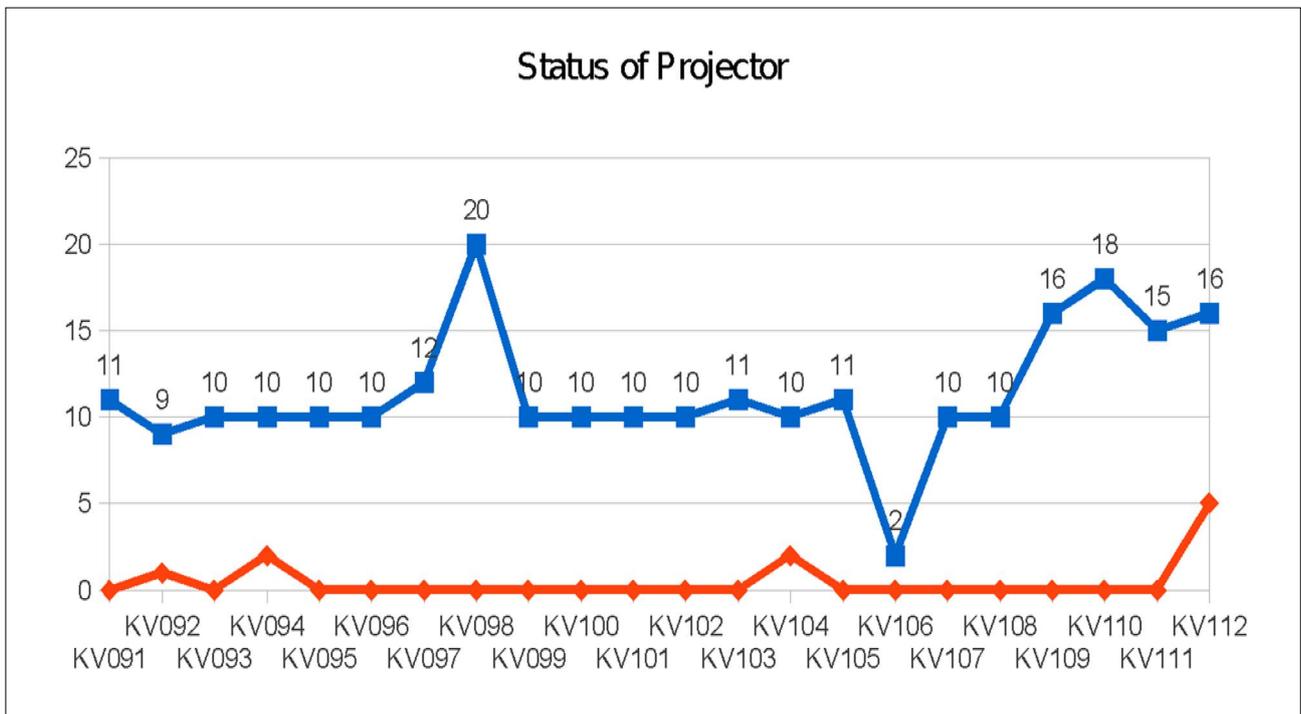
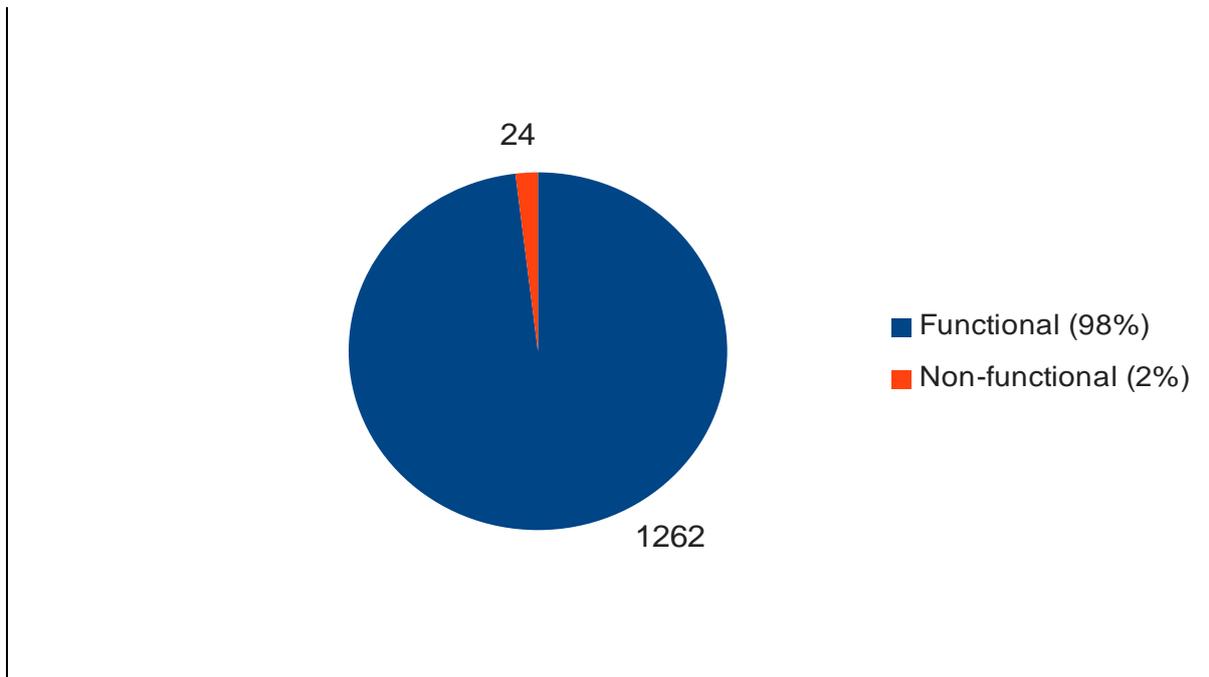


Figure 3.1.2.2(d) School-wise functional status of projectors



3.1.3 Interactive Board

Figure 3.1.3.1 Functional status of interactive board



It may be observed from the figure 3.1.3.1 that there are 1286 interactive boards provided across 112 schools included in the sample. While obtaining feedback on the functional status of these, it reveals that 1262 (98%) projectors are in working condition and only 24 (2%) projectors were reported as non-functional. School-wise status of the functioning of interactive boards is presented from figure no. 3.1.3.2(a) to 3.1.3.2(d). Again it is stated that the vendors reaction to these complaints are slow and responsible for not having timely repairing of the projects.

Figure 3.1.3.2(a) School-wise functional status of interactive boards

■ Functional
◆ Non-functional

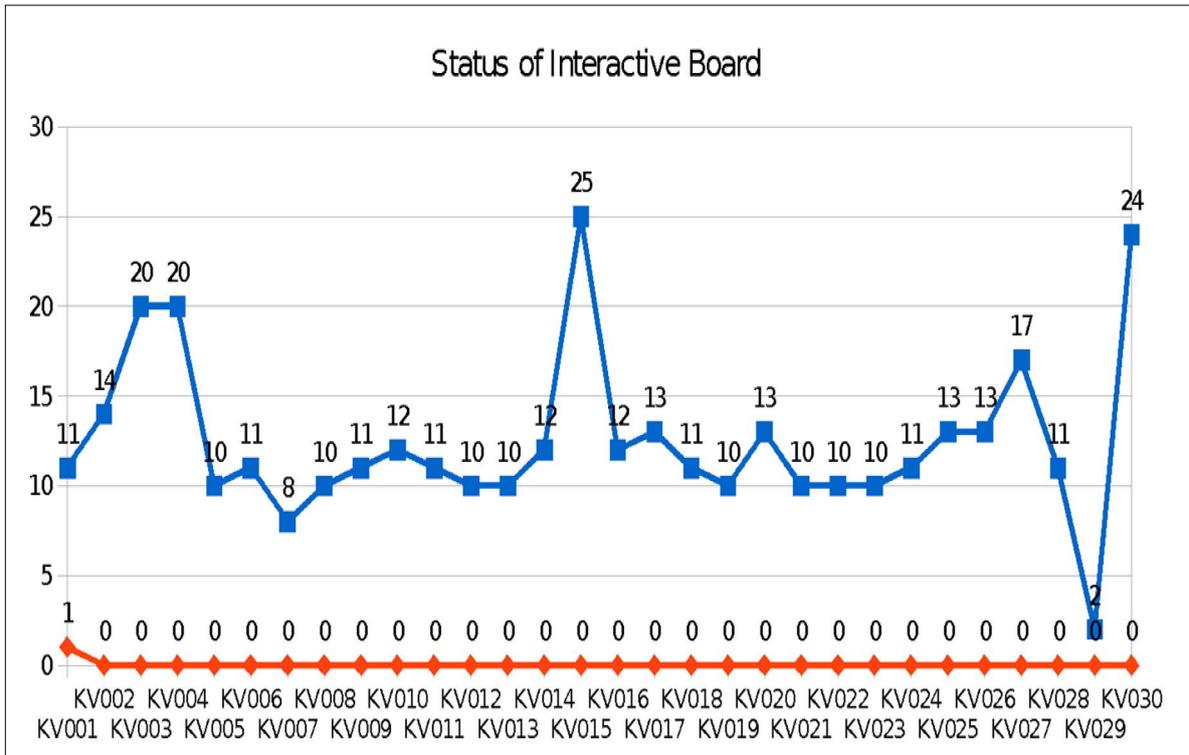


Figure 3.1.3.2(b) School-wise functional status of interactive boards

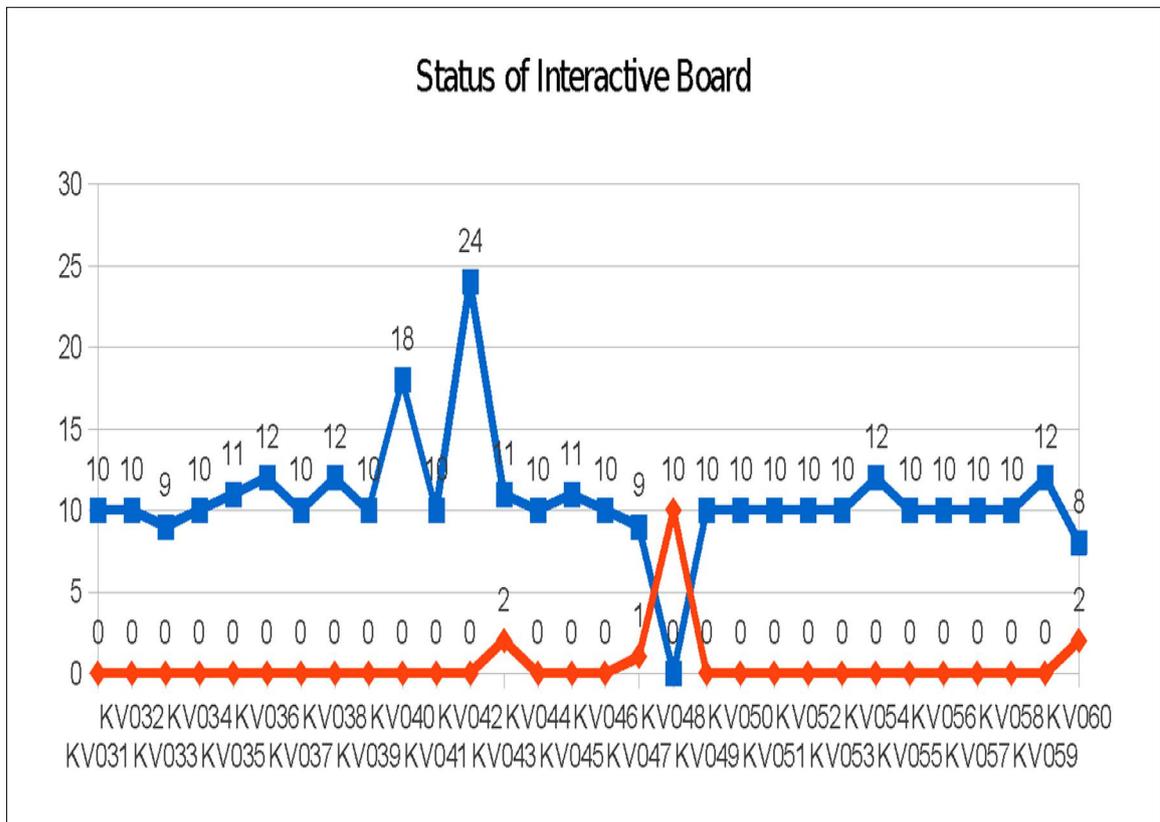


Figure 3.1.3.2(c) School-wise functional status of interactive boards

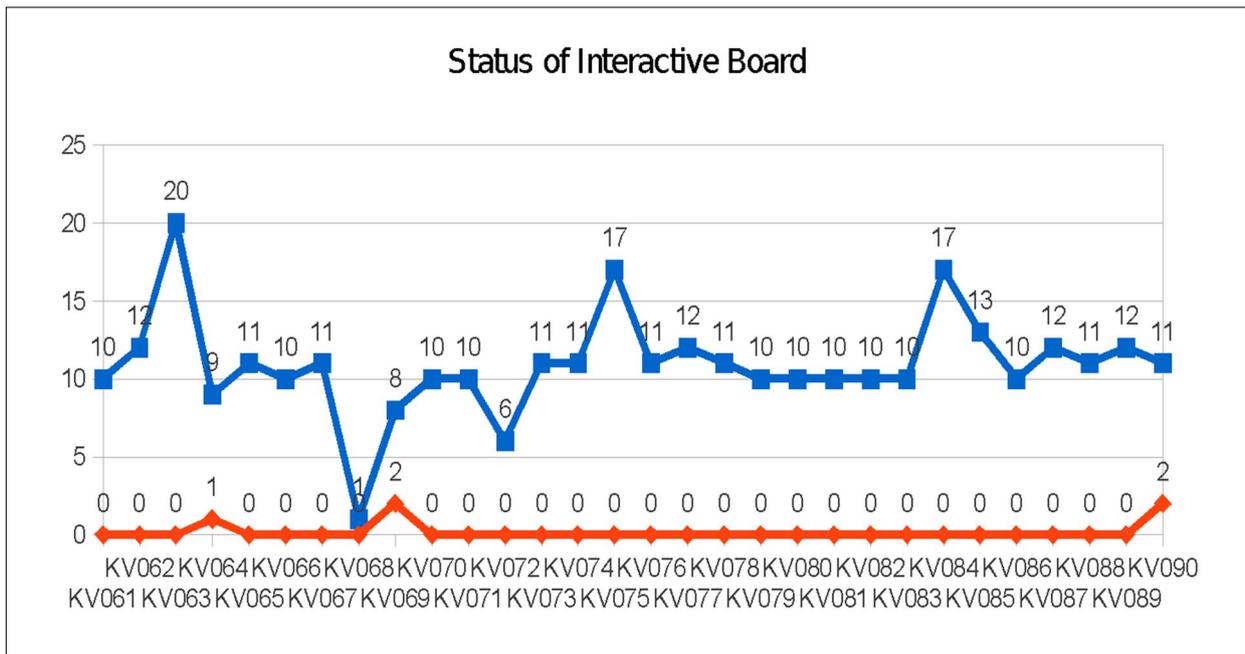
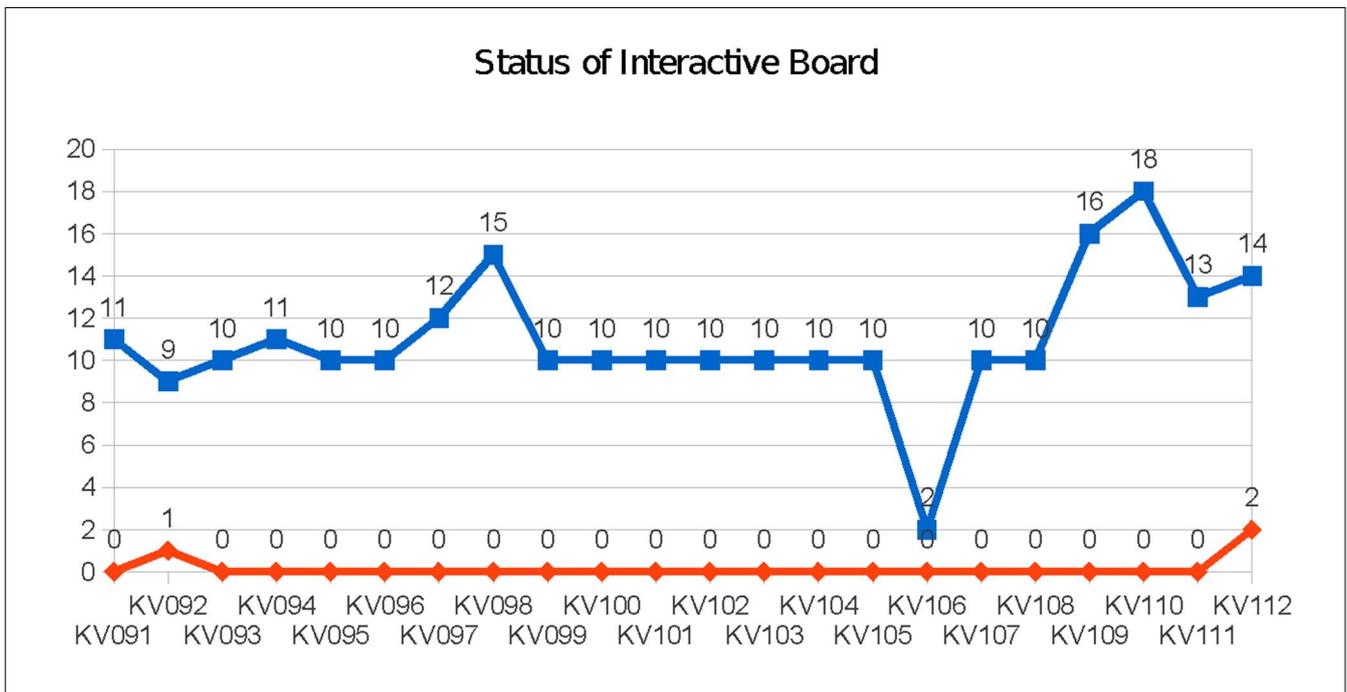
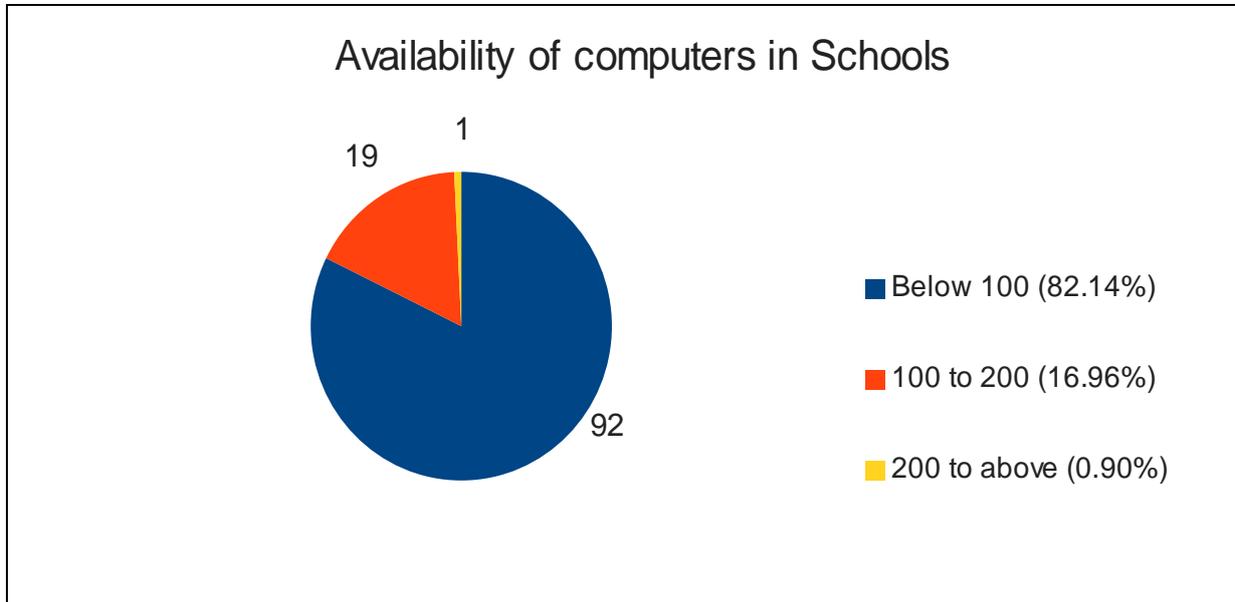


Figure 3.1.3.2(d) School-wise functional status of interactive boards



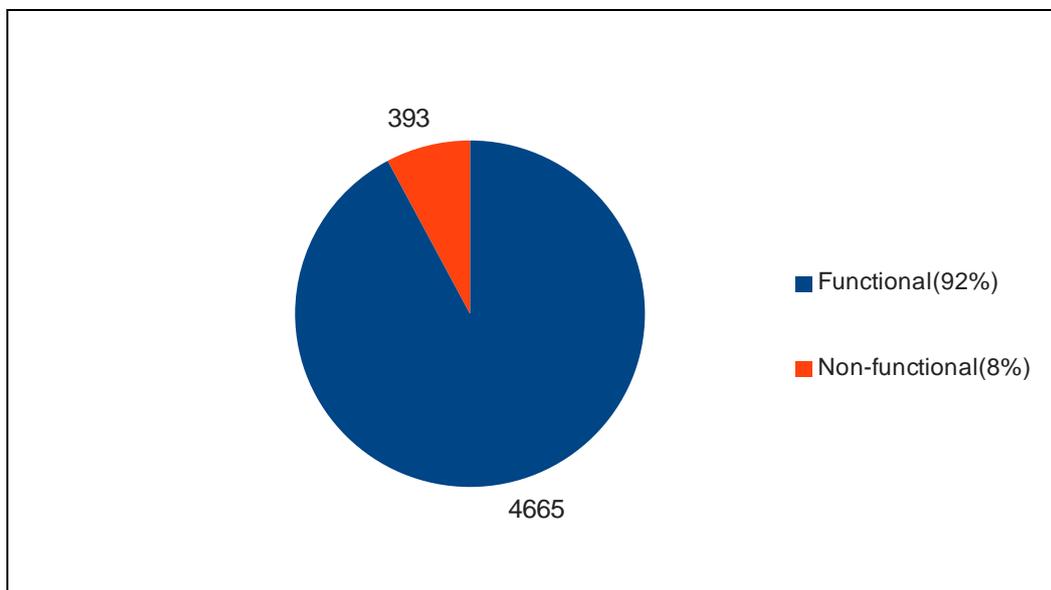
3.1.4 Computer

Figure 3.1.4.1 Status of availability of computers in schools



It may be seen from the data that all the 112 KVs included in the sample have been provided with very good computer labs. The data provided in the figure no 3.1.4.1 reveals that a large number of schools are provided with less than 100 (82.12%) computers, followed by 19 (16.96%) schools are provided with more than 100 computers and only 0.92% schools have reported having more than 200 Computers. The ICT @ Schools scheme of Govt. of India is instrumental for creation of such infrastructure in KVs.

Figure 3.1.4.2 No of functional and non-functional computers in school



It may be observed from the figure 3.1.4.2 that there are 5058 computers provided across 112 schools included in the sample. While obtaining feedback on the functional status of these, it reveals that 4665 (92%) computers are in working condition and 393 (8%) computers were reported as non-functional. Poor response of vendors are reported the cause of delay in repairing of computers. School-wise statuses of the functioning of computers are presented from figure no. 3.1.4.3(a) to 3.1.4.3(d).

Figure 3.1.4.3(a) School-wise functional status of computers

■ Functional
 ◆ Non-functional

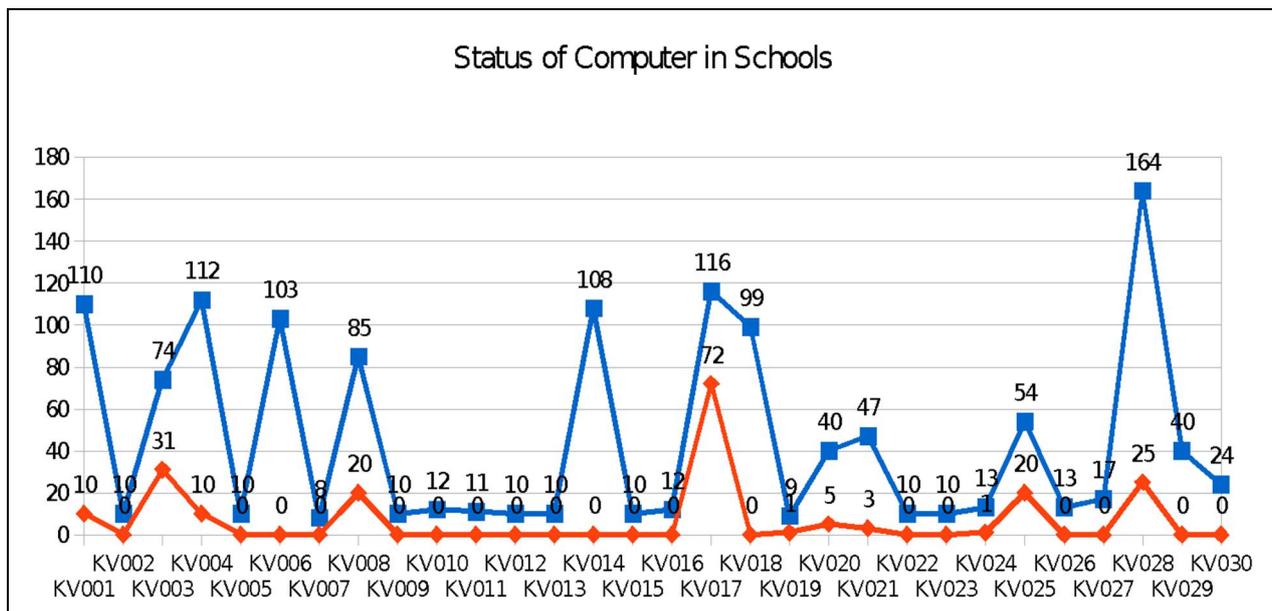


Figure 3.1.4.3(b) School-wise functional status of computers

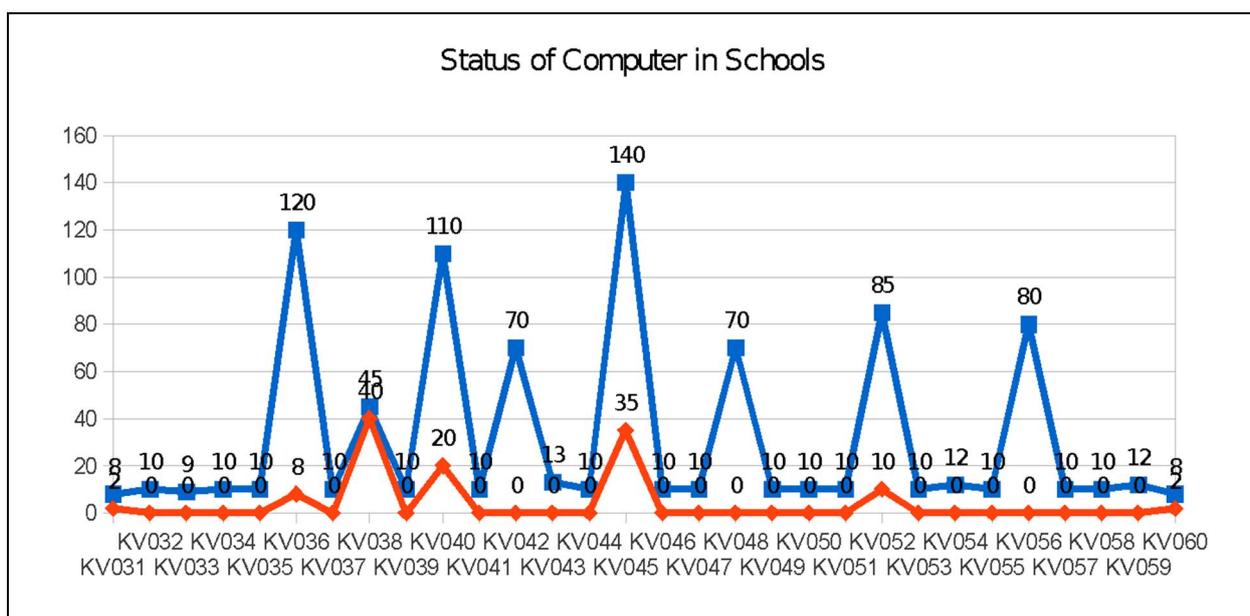


Figure 3.1.4.3(c) School-wise functional status of computers

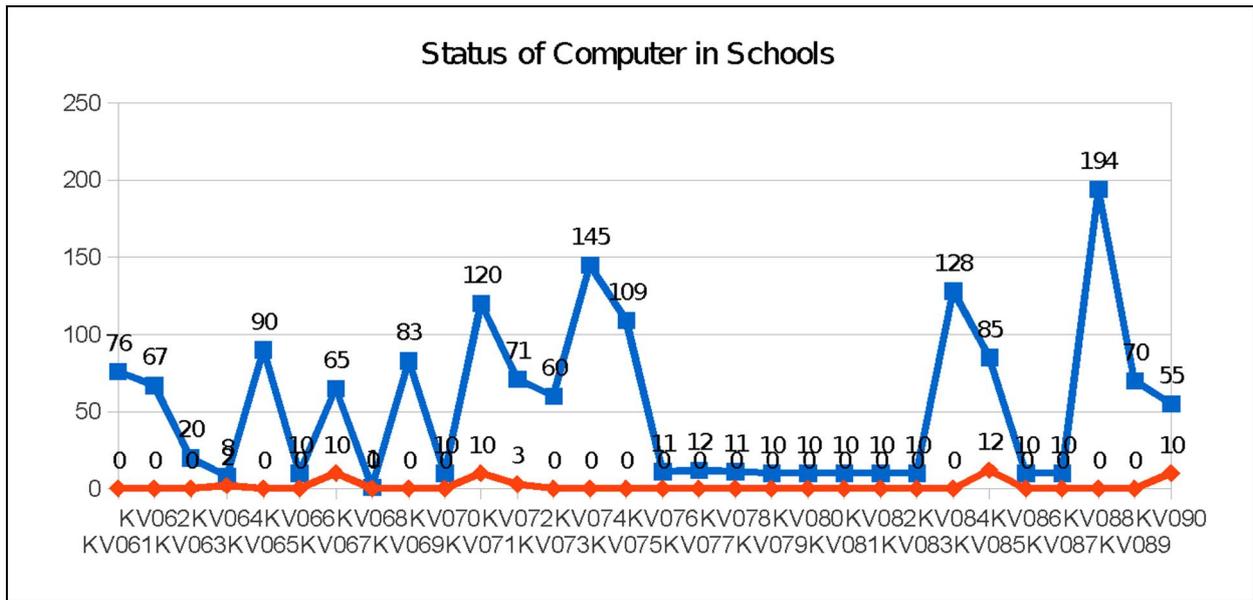
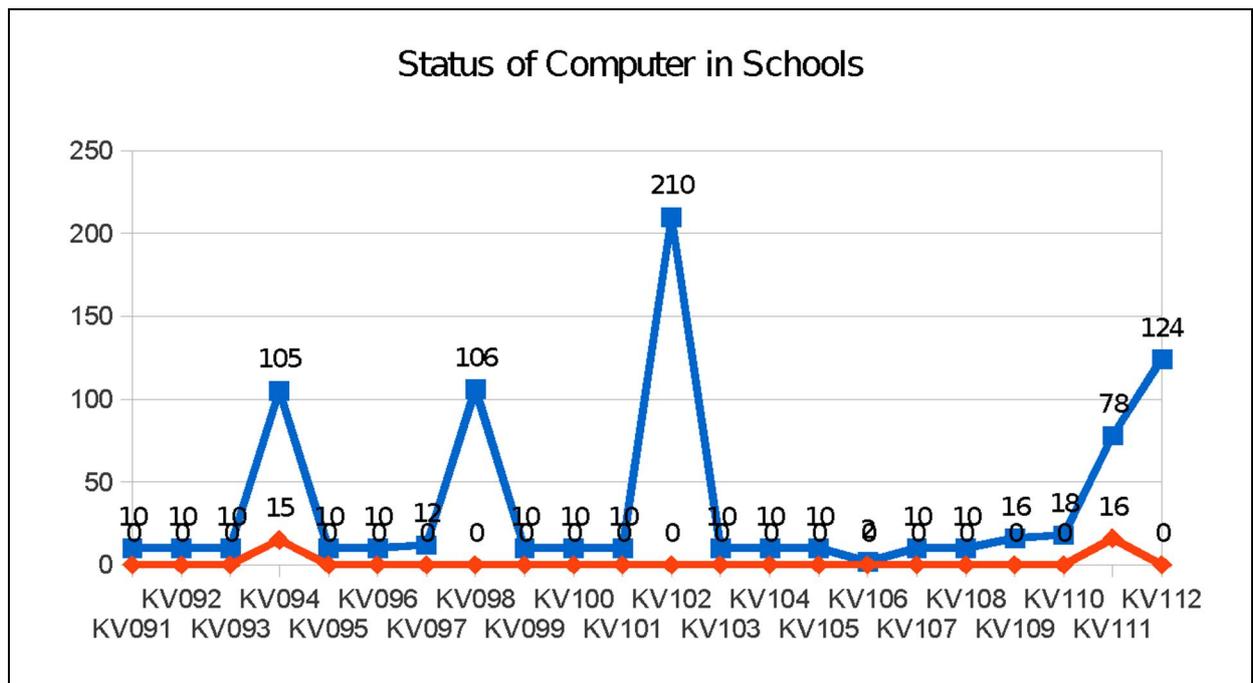


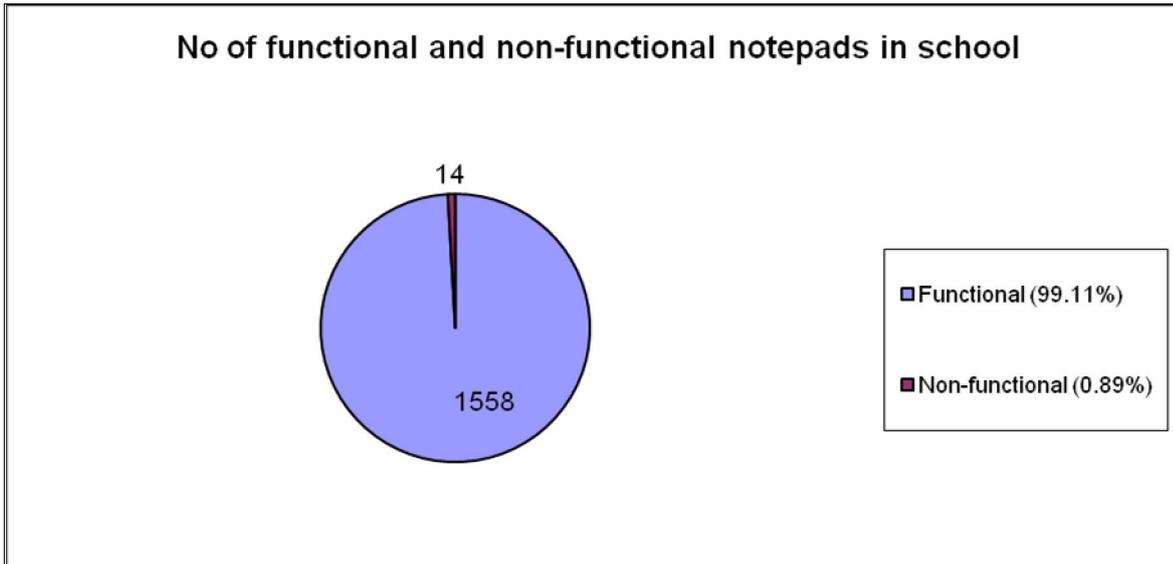
Figure 3.1.4.3(d) School-wise functional status of computers



3.1.5 Status of Response Devices

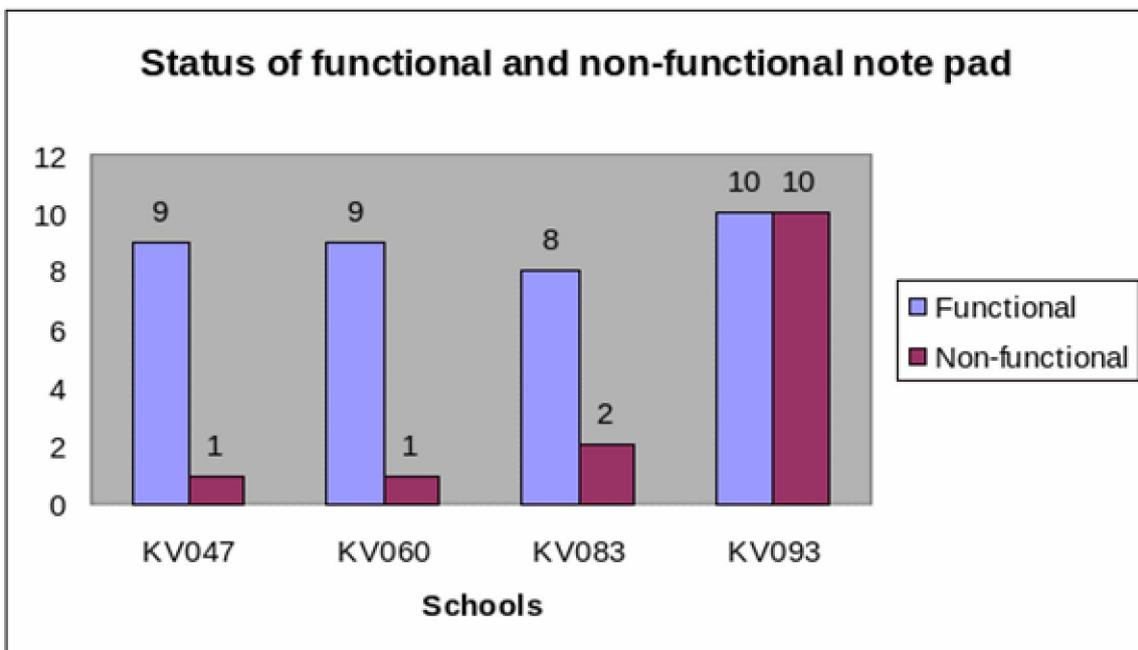
It may be noted that the KVS have supplied visualisers and hand held response devices for its use in classroom. However, these response devices were not found in classrooms. Hence utilization of these devises is questionable. Appropriate mechanism need to be evolved.

Figure3.1.5.1



It may be noted that 1572 note pads have been provided in 112 KVs across the country. The data reveals that 1558 (99.11%) note pads are in working condition and only 14 (.89%) are not functional. Further, it is worth to mention that the research staff visited 50 sample schools and in none of these schools note pad was found to be used as part of the e-class. Besides, in few KVs these note pads were found to be packed and kept in the stores.

Figure 3.1.5.2

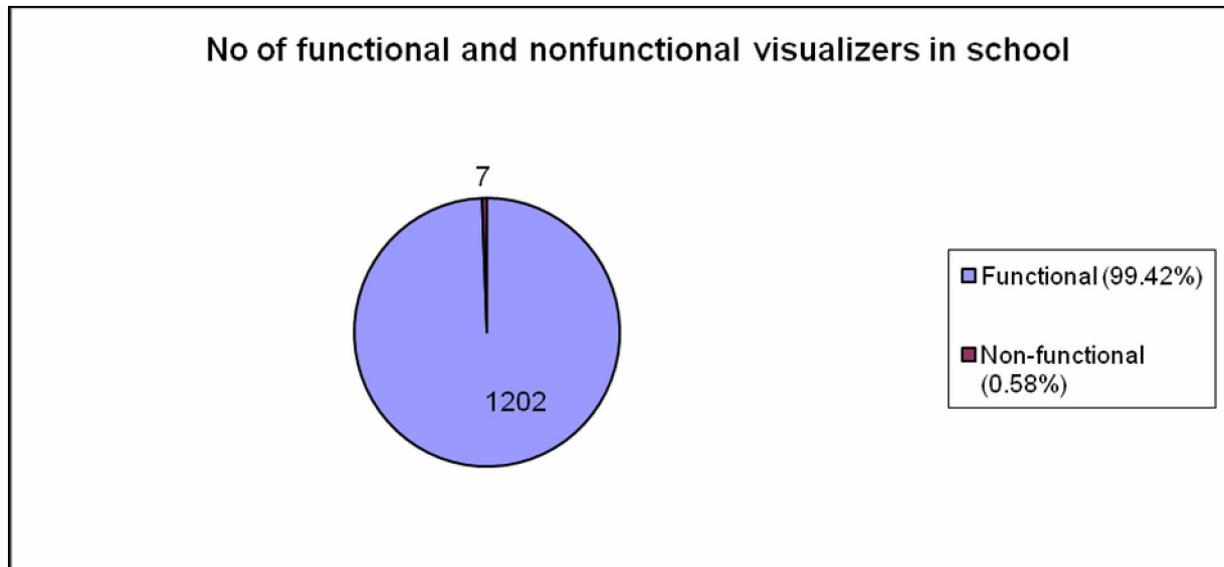


Above data reveals that four schools, namely Kendriya Vidyalaya Picket, Kendriya Vidyalaya AFS Jorhat, Kendriya Vidyalaya No. 1 Tezpur, Kendriya Vidyalaya No.1 Jalandhar, have non-functional notepads. In which highest no of non-functional notepads were found in Tezpur, Kendriya

Vidyalaya No.1 Jalandhar 10(50%) while Kendriya Vidyalaya Picket and Kendriya Vidyalaya AFS Jorhat have less no of notepads 1(10%).

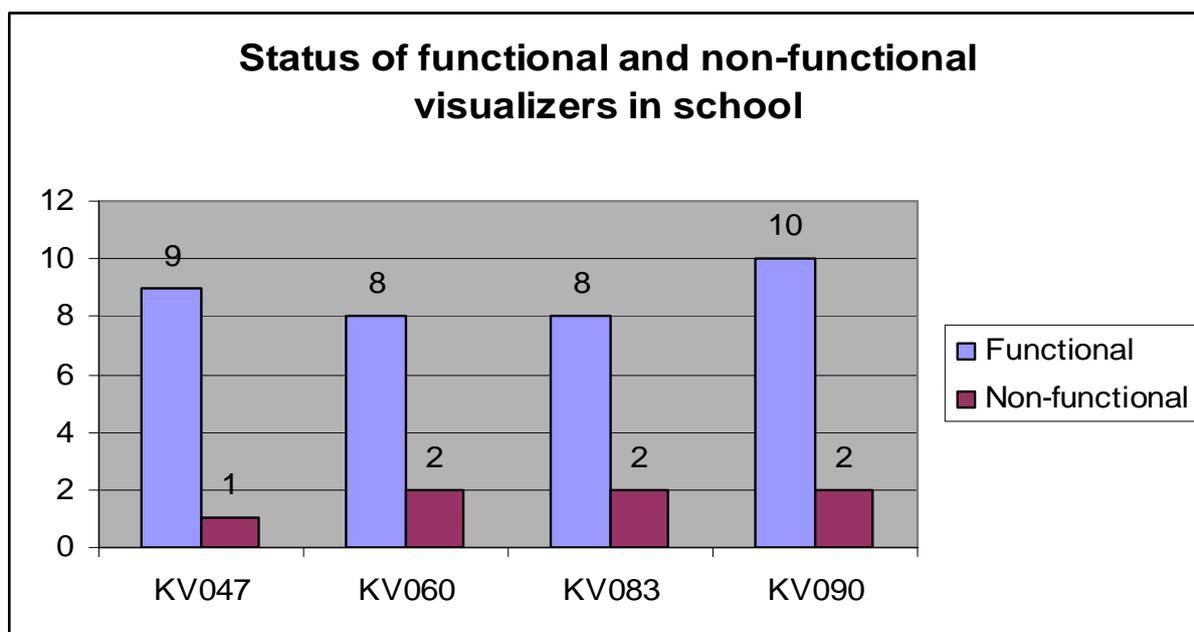
3.1.6 Status of Visualizers

Figure 3.1.6.1



It may be noted that the visualisers are supplied as part of the e-classroom project and meant for using in the class to show images/objects/print materials etc. during teaching learning process. However, the data reveals that 1202 (99.42%) visualisers supplied in KVs are in working condition and only 07 (.58%) are not working.

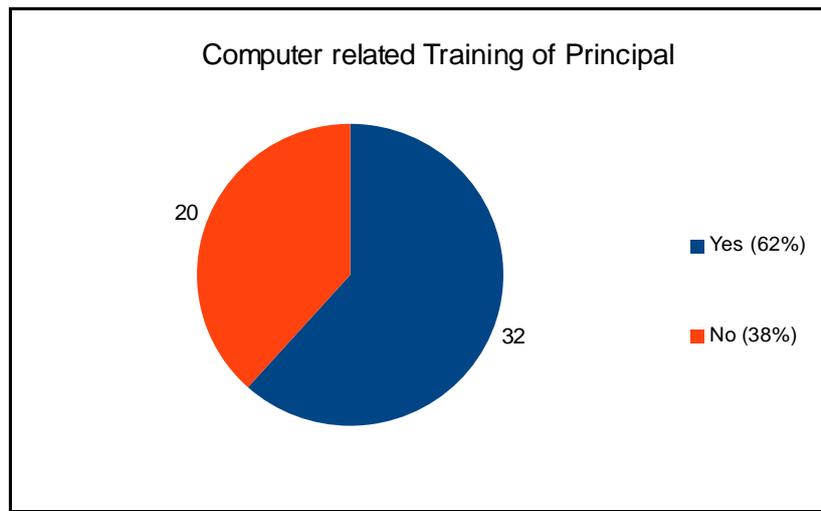
Figure 3.1.6.2



Above data reveals that in four KVs, namely Kendriya Vidyalaya Picket, Kendriya Vidyalaya AFS Jorhat, Kendriya Vidyalaya No 1 Tezpur and Kendriya Vidyalaya No 1 Ferozepur Cantt Visualizer were not found in non-working conditions. It shows that KV APS Jorhat, KV No 1 Tezpur and KV No 1 Ferozepur Cantt have maximum no of non-functional visualisers while KV Picket have less no of visualizers.

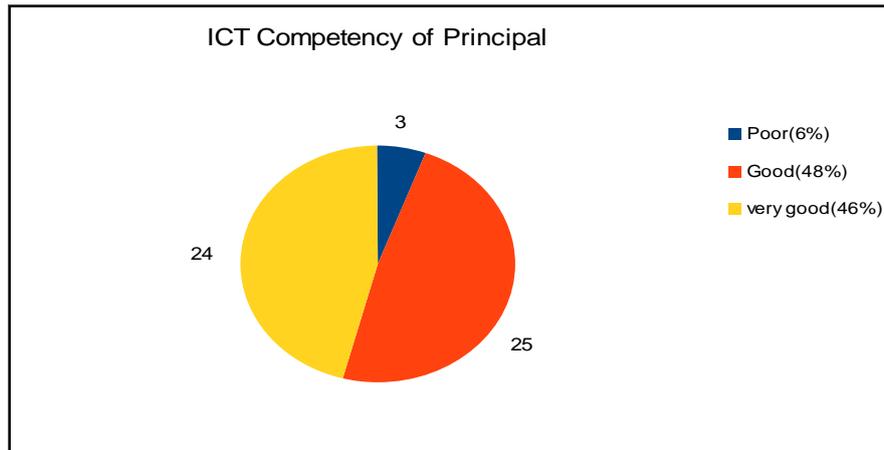
3.2 Analysis of feedback from the Principals of the schools (N=52)

Figure 3.2.1 Computer Training of Principals



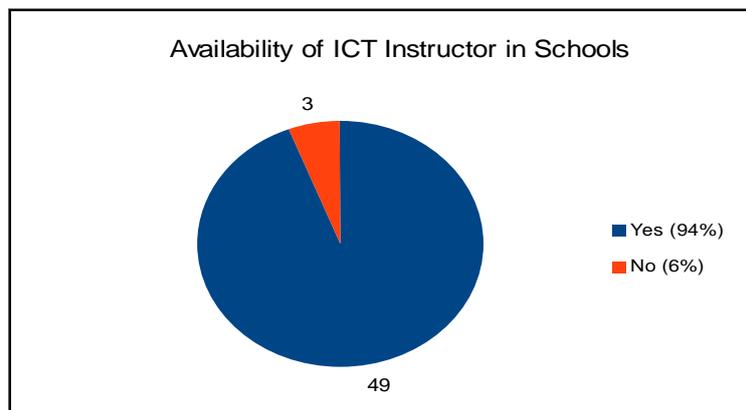
Principals play an important role in effective school management. Their awareness and proactive action can motivate all stake holders and enhance performance of the school. In the present context an ICT savvy/ trained principal can lead the school for effectively using ICT for achieving quality. As far as the computer related exposure training is concerned the data entered in the figure 3.2.1 reveals that about 32 (62%) Principals have received computer education related training and about 20 (38%) principals reported having not attended any computer education training. ICT training of KV principals needs to be done on priority and on regular intervals.

Figure 3.2.2 ICT Competency of Principals



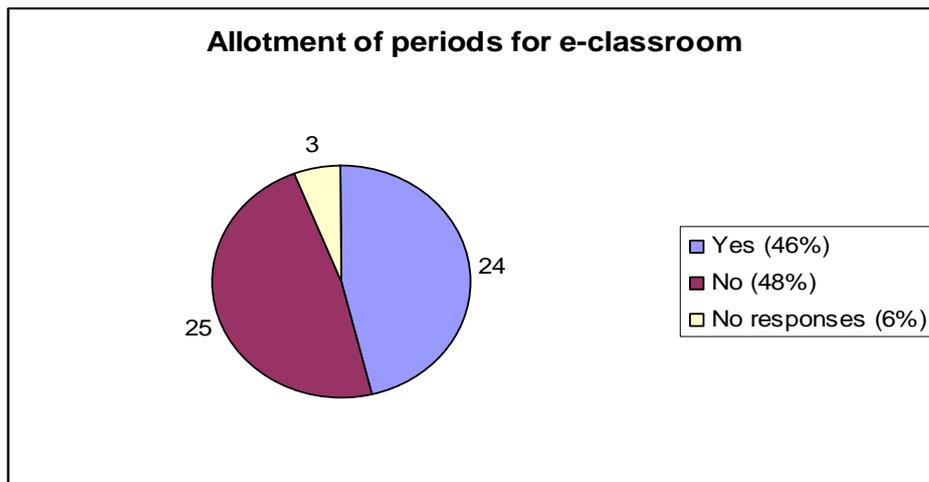
It may be observed from the figure 3.2.2 that a large number of principal & have reported having ICT Competency as per the following details: 48% have reported as good, 46% very good and 6% as poor in ICT Competency. Therefore, adequate efforts need to be made to train all principals in use of ICTs in teaching-learning and school management.

Figure 3.2.3 Availability of ICT Instructor in schools



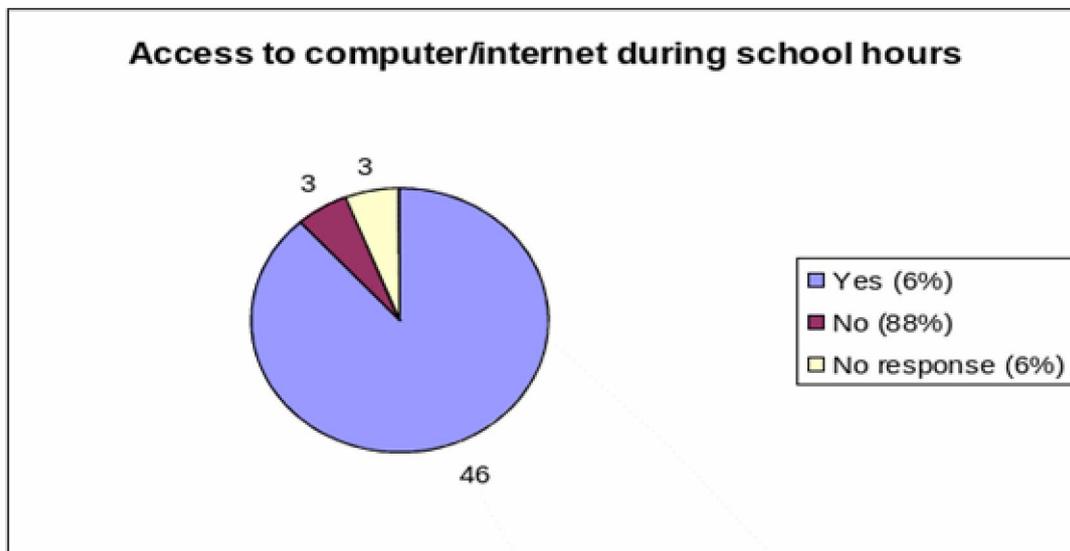
Even if we have hardware available in schools, deployment of trained human resources is required for smooth functioning of these resources and hand holding of other stakeholders. Therefore, the data collected from 52 principals reveals that in 49 (94%) schools computer teachers are deployed and in 3 (6 %) schools no computer teachers are deployed. Deployment of such teachers may be done on priority.

Figure 3.2.4 Allotment of periods for e-classroom in schools



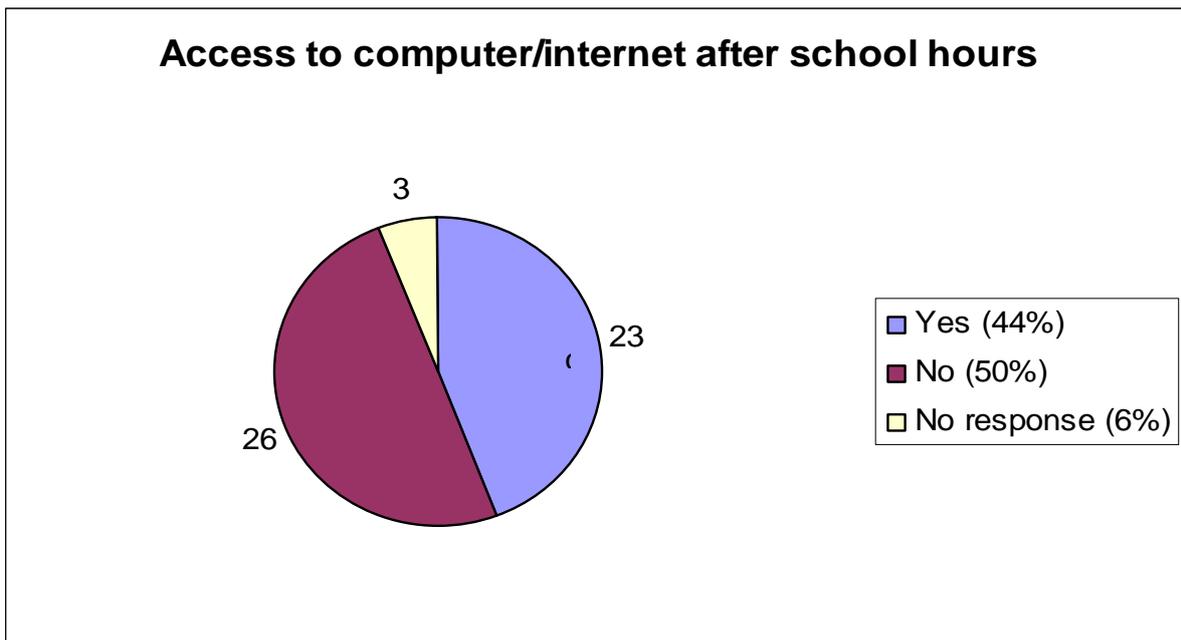
To ensure effective use of e-classrooms, it is pertinent to develop ICT curriculum and accommodate periods in day to day teaching. But the data reveals that in 24 (46%) schools have separate periods for e-class, 48% said that they are not aware about specific periods allotted for using e-class. Also about 3 (6%) did not respond on this question. Therefore, necessary instructions to Principals may be given to allot periods for different classes and ensure use of e-class for teaching-learning process.

Figure 3.2.5 Access to computer/internet during school hours



The data further reveals that 88% Principals use their computer and internet during school hours and 6% do not use these during school hours, followed by 6% of them did not respond to the query. Adequate facilities may be provided along with training support to use internet for teaching-learning process.

Figure 3.2.6 Access to computer/internet after school hours



While talking about computer and internet use beyond school hours, it has been observed that 44% Principals use computer and internet beyond school hours and 50% Principals responded about not using computers and internet after school hours. Further 6% Principals did not respond to the question. Certainly, such habits will help the principals learn and use various tools.

3.3. Analysis of feedback from the ICT / computer teachers (N=87)

In all 87 ICT/Computer teachers were included in the sample and direct interactions were done with them during school visits. It may be observed from Figure 3.3.1 that about 67 (77%) ICT teachers had a working experience of 4 years and above. However 5% were found as newly recruited, 6% with about one year experience, 3% with two years, 7% with three-years of experience respectively. Only 2% ICT teacher could not respond to this query. With more experienced ICT teachers there is always possibility of getting better results from the students.

Figure 3.3.1 Experience of ICT Teachers

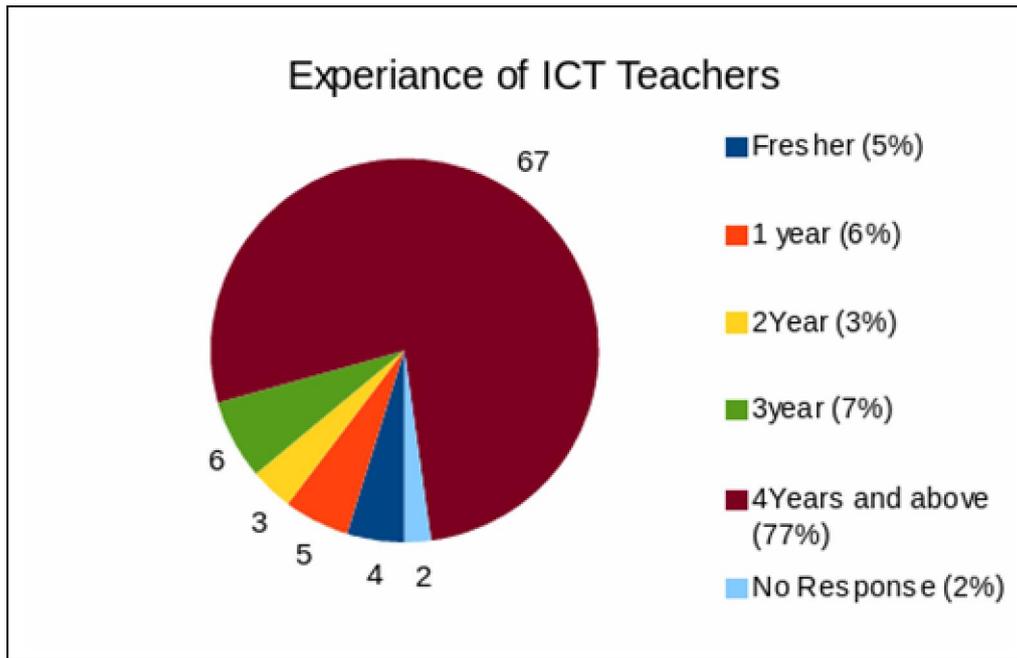
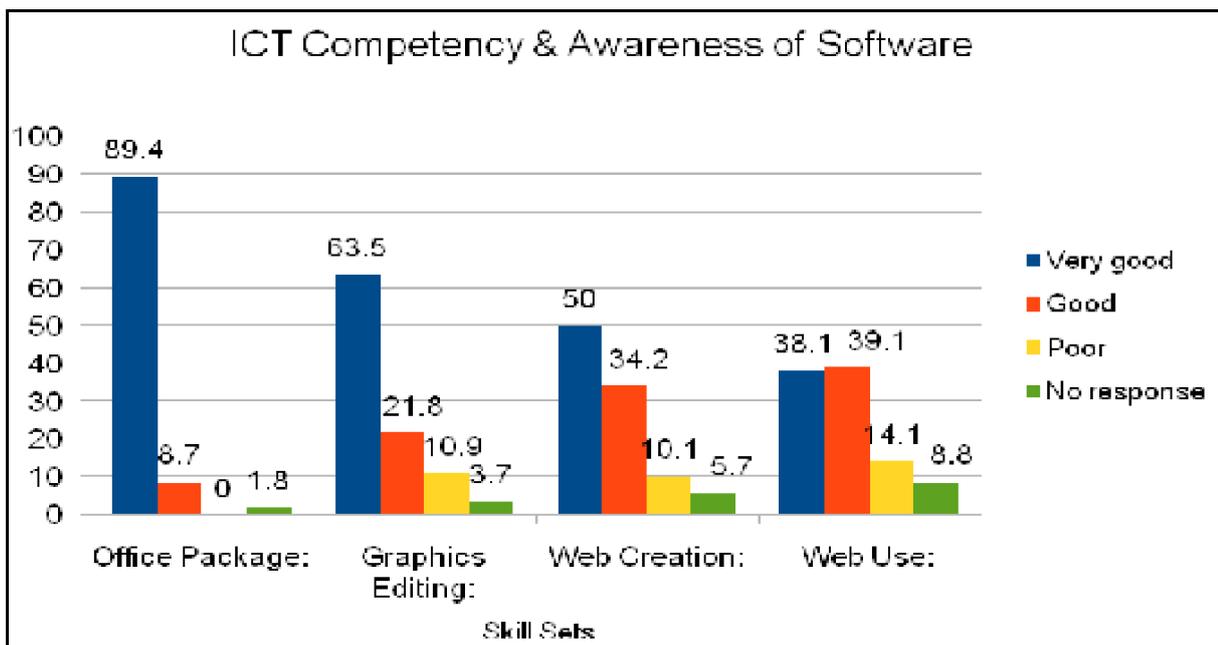
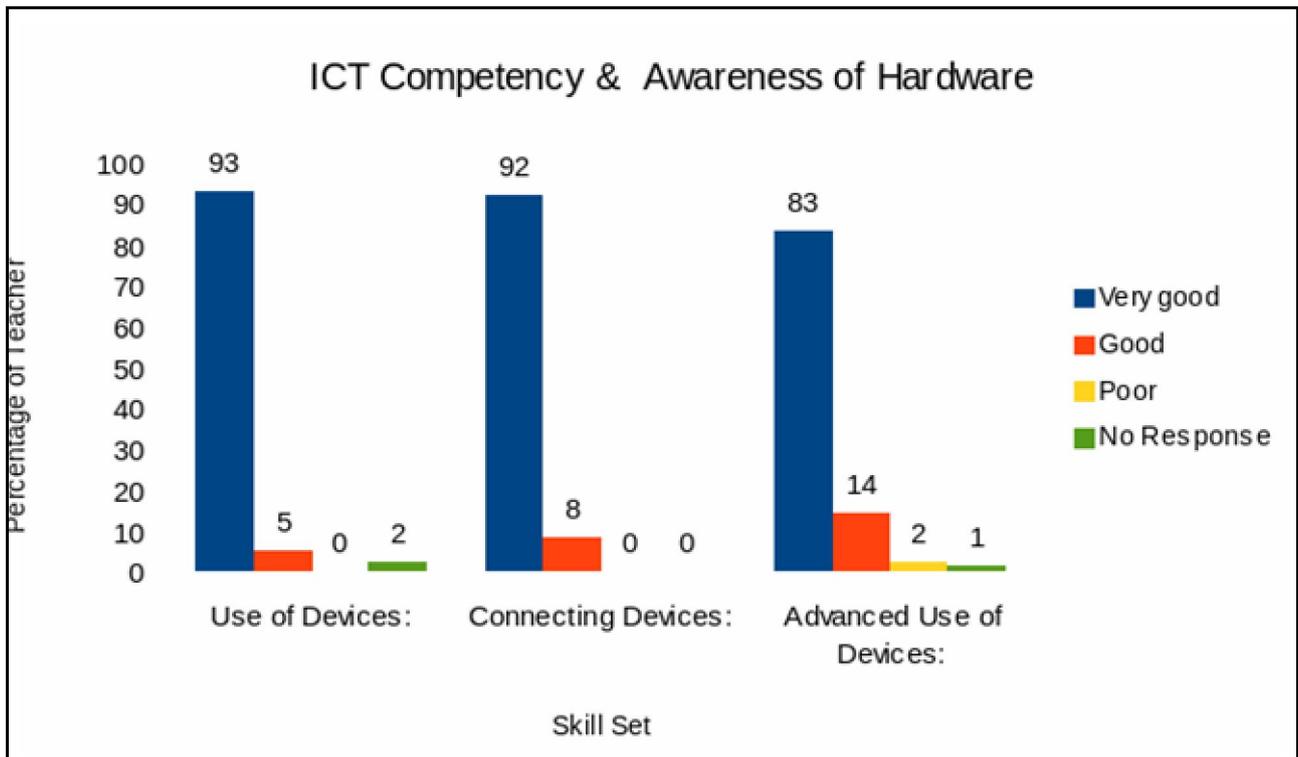


Figure 3.3.2 Awareness of software and ICT competency of ICT Teachers



It may be seen from the figure 3.3.2 that most of the ICT teachers (89.4% as very good and 8.7% as good) were well versed with office packages (word, excel, access and presentations). But in case of Graphics and editing only 63.5% for web creation only 50% teachers were found to be having very good skills. Therefore, continuous professional development programmes may be conducted for ICT teacher on regular. As far as use of Web tools and resources are concerned only 38.1% were found to be very good in handling.

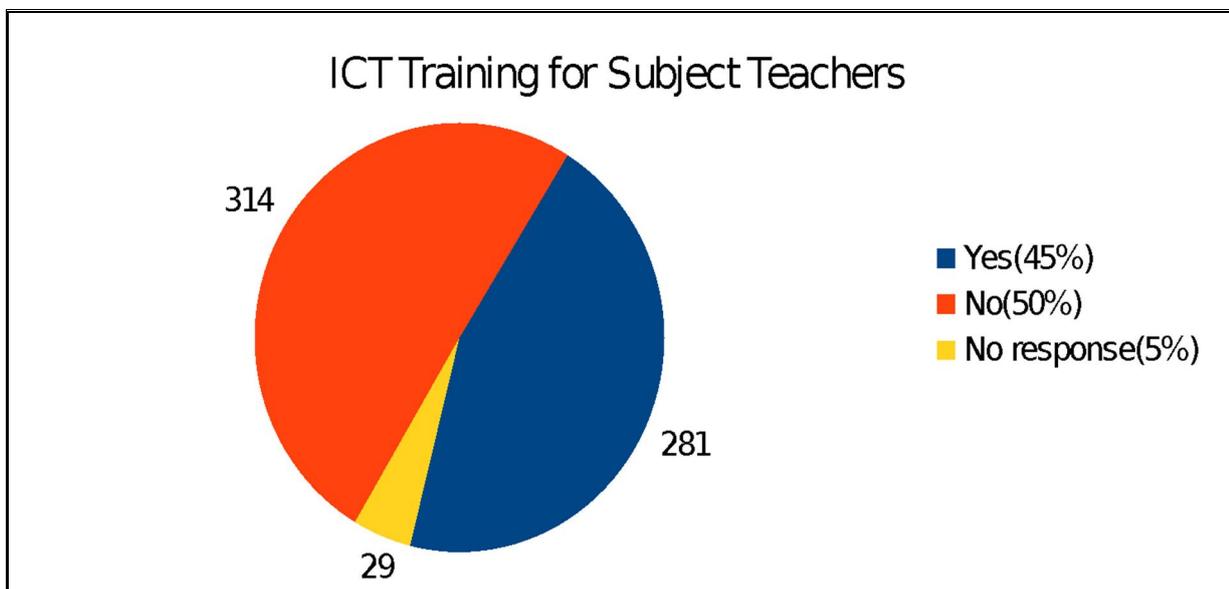
Figure 3.3.3 Awareness of hardware and ICT competency of Teachers



From figure 3.3.3, it is evident that the hardware related competency of ICT teacher were found to be very good (93% in use of devices 92% in connecting the devices and 83% in advanced use of devices respectively). Still advanced level of ICT teachers of all KVs may be arranged.

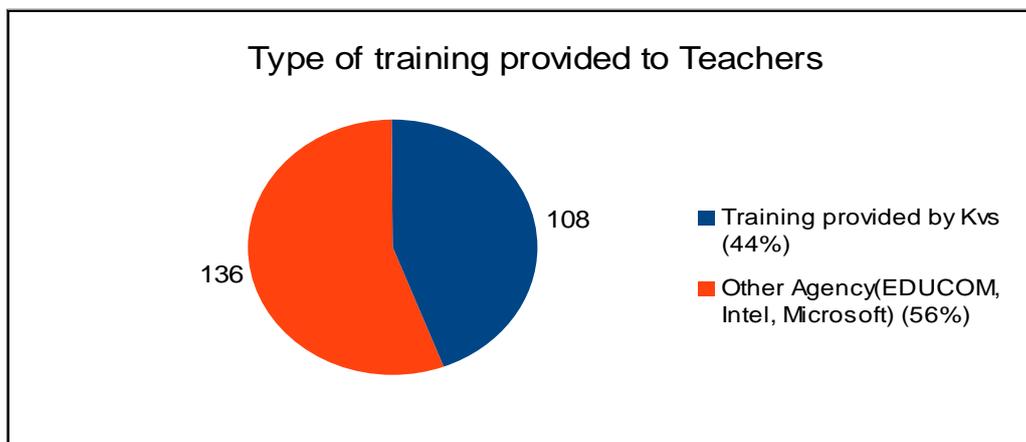
3.4. Analysis of feedback from the subject teachers (N=624)

Figure 3.4.1 Status of ICT Training for subject teacher



In all 624 subject teachers were included in the sample and the research team interacted with all these teachers. It may be seen from figure 3.4.1 that only 281 (45%) of the subject teachers are trained in use of subject specific software's and ICT training in general. In a way 314 (50%) subject teachers are not trained in use of ICTs in classrooms. Also a negligible 29 (05%) subject teachers have not responded to the question. Further, it was noticed that teachers were mostly using their PPTs and video's during their classes. But very few teachers were using subject specific softwares i.e. Geogebra, PhET, Stellarium etc. Therefore, more intensive training on how to use e-class and teach with subject tools needs to be designed for all subject teachers of KVs.

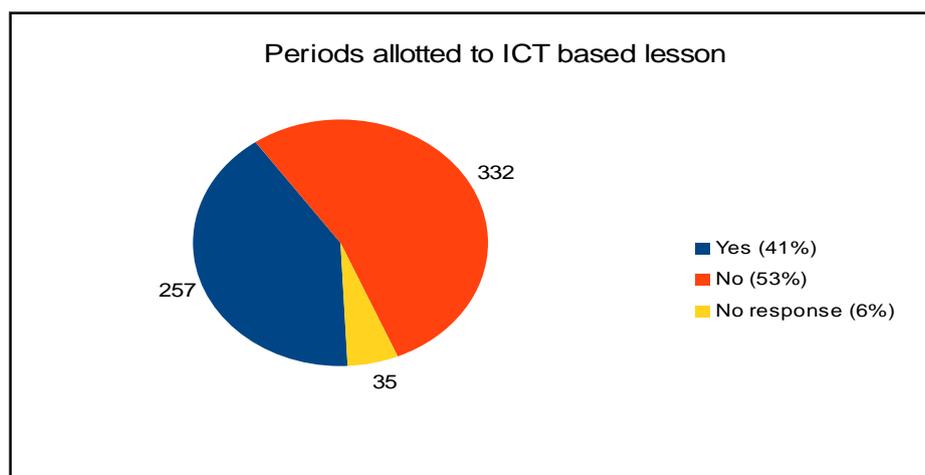
Figure 3.4.2 Type of training provided to subject teacher



It is evident from the figure 3.4.2 that only 44% subject teachers were provided generic training by KVS and 56% teachers were provided training through EDUCOM, Intel and Microsoft. But sustenance, of such training was not visible. But for better impact and to enhance quality of classroom interaction, intensive training for subject teacher may be designed and executed at local/zonal level.

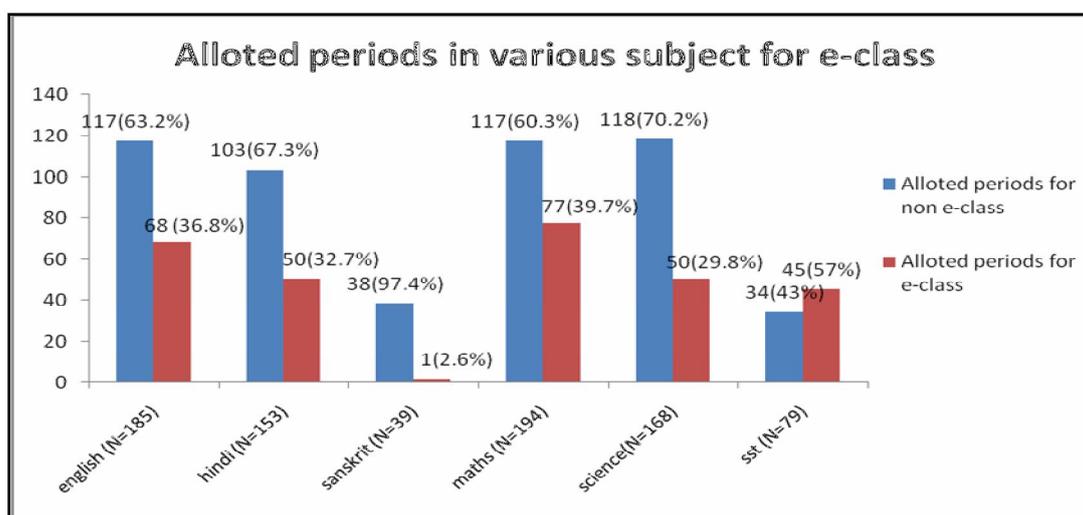
The data reveals that 257(41%) subject teachers have agreed to the fact that specific periods are allotted to implement ICT based lessons in teaching of different subjects. However, about 332 (53%) subject teachers are of the opinion that ICT periods are not allotted for teaching of different subjects.

Figure 3.4.3 Periods allotted to ICT based lesson in school



It may be noted that the research team of CIET during their field visited have collected sample copies of school time table reflecting allotment of at least 3 periods per class in a week for learning of ICT related tools and lesson plans in e-class and lab. But it is not implemented in proper spirit across all the KVs. So a more comprehensive plan to use e-class and other labs may be designed and executed across all KVs. Since there are limited e-classroom in KVs, efforts should be made for students of different classes to come in rotation to e-class and create e-resources, learn new concepts and ideas using ICTs.

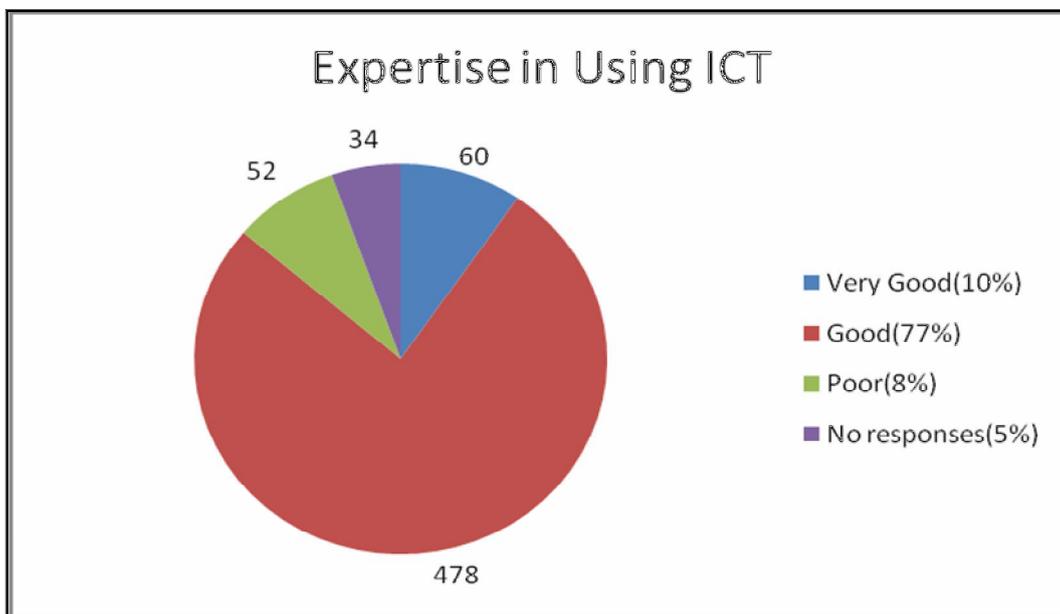
Figure 3.4.4 ICT used in various subjects in schools



It may be noted that seven different subject teachers were included in the sample. The figure 3.4.4. shows that 68 (36.8%) on English 50 (32.7%) of Hindi, 1 (2.6%) of Sanskrit, 77(39.7%) of Maths, 50 (29.8%) Science, and 34 (43%) of SST teachers respectively have informed about allotment of separate periods in e-classroom to facilitate teaching learning process. A common plan be designed

and circulated among all schools to follow the time table and provide more hands-on experience to young students to learn subjects using ICT.

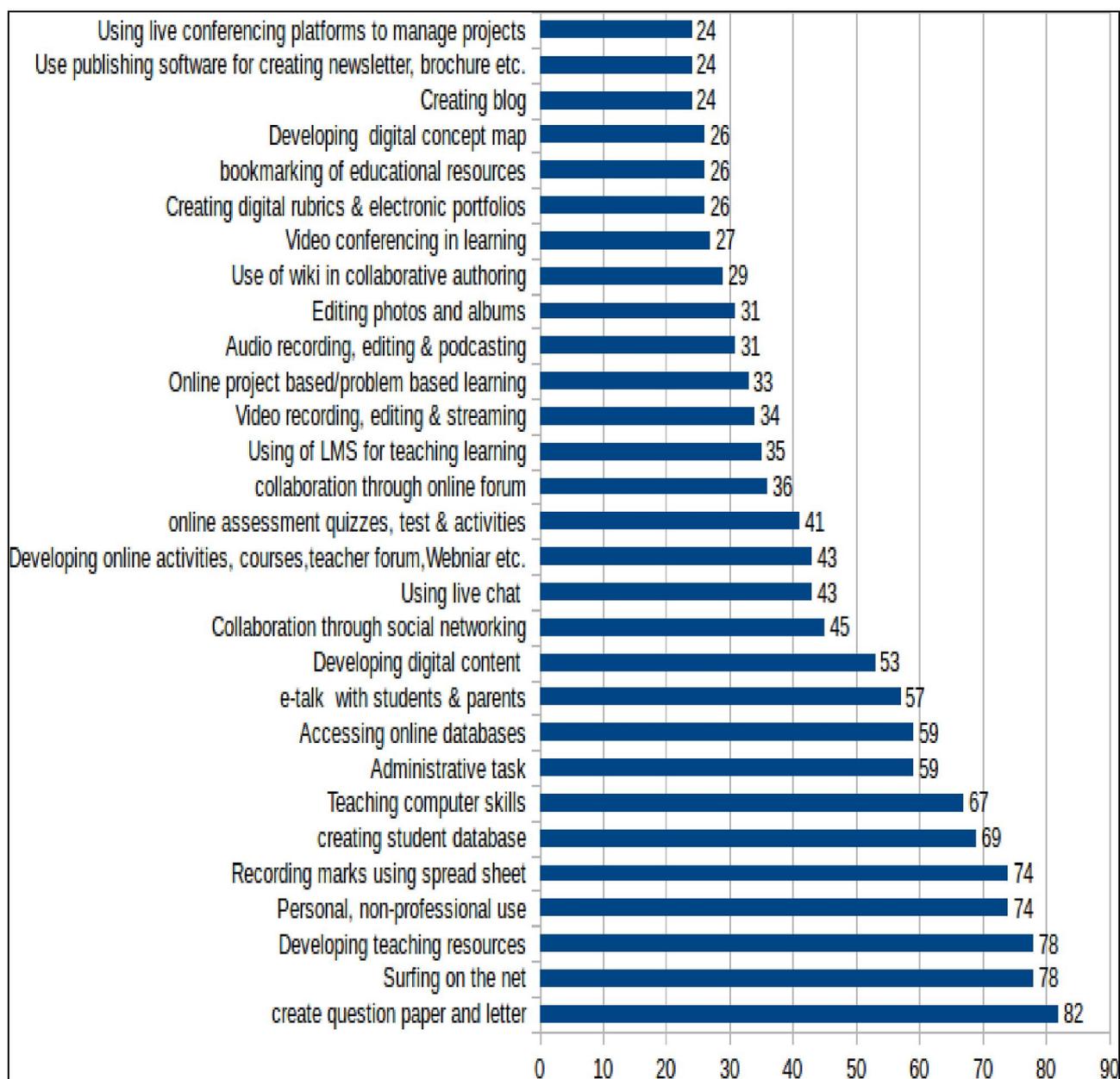
Figure 3.4.5 Expertisation in using ICT



When the subject teachers were asked about their expertise of using ICT in teaching, the analysis of data in figure 3.4.5 reveals that about 60 (10%) reported as very good, 77% as good and 8% teachers reported having poor expertise in use of ICT in teaching of subjects. Also about 34 (5%) teachers did not respond to this question. More training on subject specific tools (Geogebra, PhET, Stellarium, and Google Map/Earth etc) need to be designed and organized on priority.

The figure 3.4.6 reveals that the subject teachers are using ICT applications for about 28 different ranges of tasks. Highest number of teachers i.e. 82% use these facilities to create question paper and write letter followed by 78% of them develop teaching resources and searching materials through surfing on net. Also a considerable percentage of teachers use such facilities for recording of marks using spreadsheet (74%) accessing online databases (59%), developing digital contents (53%), e-talk with students and parents (57%), collaboration through social networking (45%) , online assessment, queries, tests and activities (41%), developing online activities, courses, teacher form, Webinar (43%) etc.

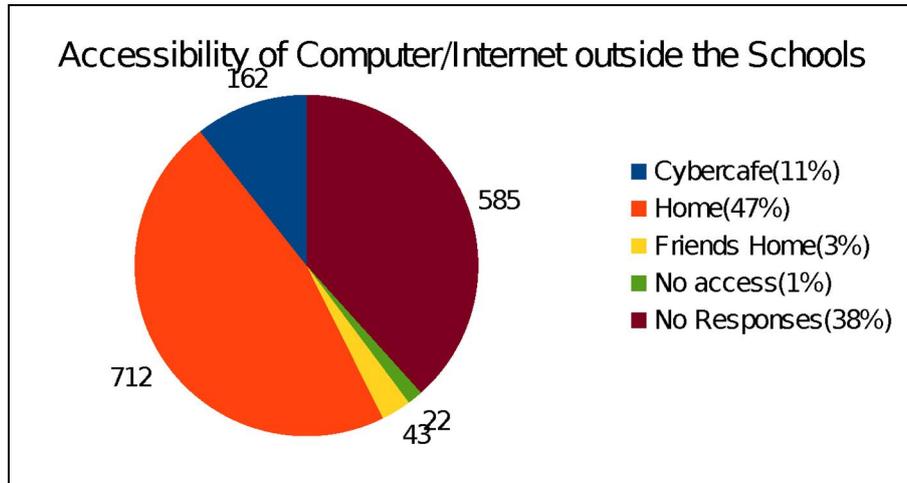
Figure 3.4.6 Range of ICT applications used by teachers (% of teachers)



The low scoring tasks includes creating news letters brochures, blogs, live conferencing etc (24%) book marking of educational resources, creating digital rubrics and e-portfolio (26%). A composite effort and demand on teachers may facilitate in better participation of teacher in use of ICTs for development of diverse skills among young students and their own professional development. But the teachers themselves need more training and exposure on various ICT tools for creating, collaborating and sharing of resources and ICT Pedagogy Integration. This will help them to use the e-class and computer labs in KVs in a better manner.

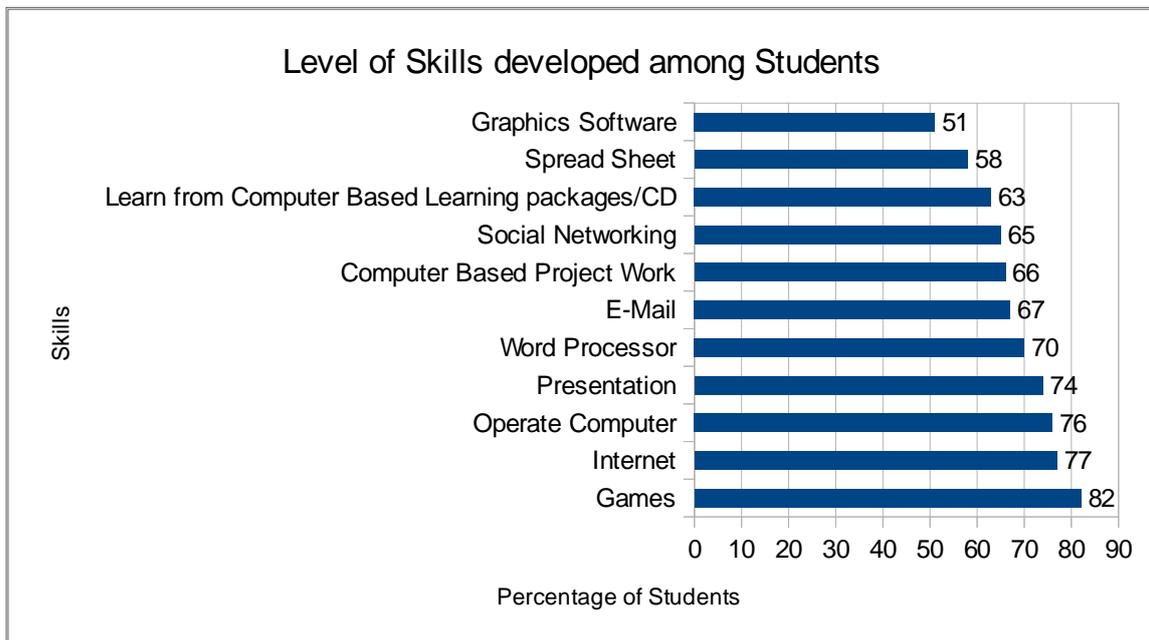
3.5 Analysis of feedback from students (N=2097)

Figure 3.5.1 Accessibility of computer/internet outside the school



In all 2097 students were involved in this study and the research staff had a detailed discussion on use of e-class. The data reveals that with basic exposure to ICT at school, students have reported access to computer and ICTs at other places as well i.e. 47% at home. Also a few percentage of students have access i.e. 11% at cyber café and 3% at the neighborhood (friend’s home). This shows that students have a lot of exposure to computer and internet outside school environment. The school system needs to harness it and provide learning opportunities for their all round development.

Figure 3.5.2 Impact of e-classroom project on development of ICT skills among students level of skills among student in using ICT

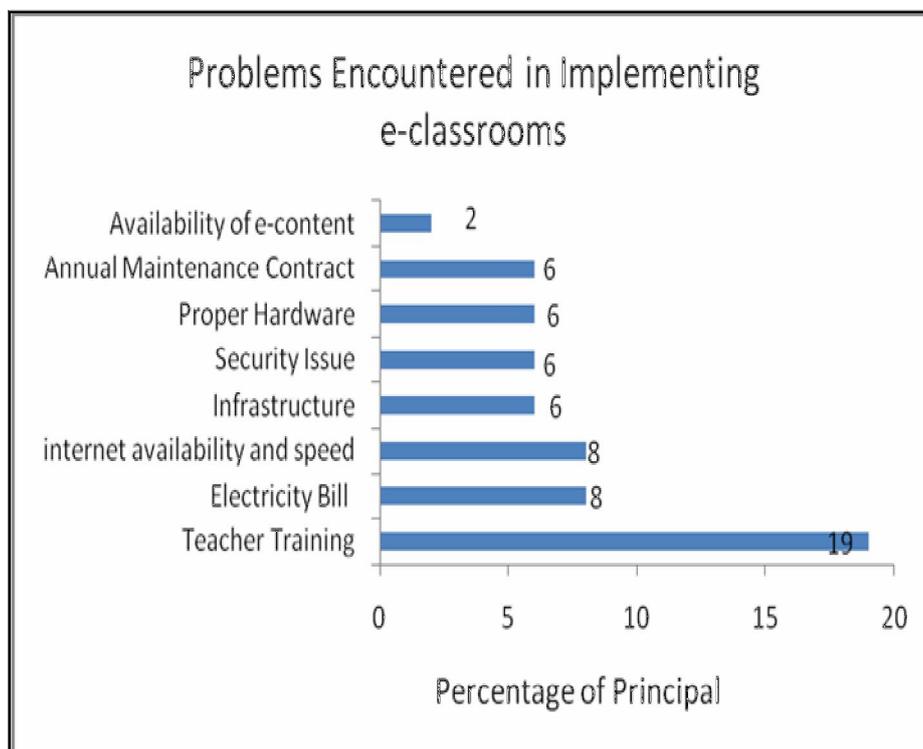


Students are considered as the ultimate user of e-classroom facilities and learn. In all 20 students were interviewed to assess the effect of this project. The figure 3.5.2 shows that the students have acquired a number of skills, though their level varies. The skill which has been mastered by majority of students include playing educational games (82%), internet surfing (77%), operation of computer (76%), creating presentations (74%) and using word processors (70%). The other skill sets acquired include Graphics software (51%) spreadsheet (58%), learn from computer based learning packages, social networking, developing computer based project work etc. (66%) and use of emails (67%). The impact of the resources provided under e-class project is encouraging but one-third of students seem to be deprived of such skills. Hence, urgent attention to the issue may be given at appropriate level, with provision for expansion of e-class project to every classroom and section and training of ICT and subject teachers for effective use of such gazettes.

3.6 Problems & suggestions

3.6.1 Feedback of Principal (N=52)

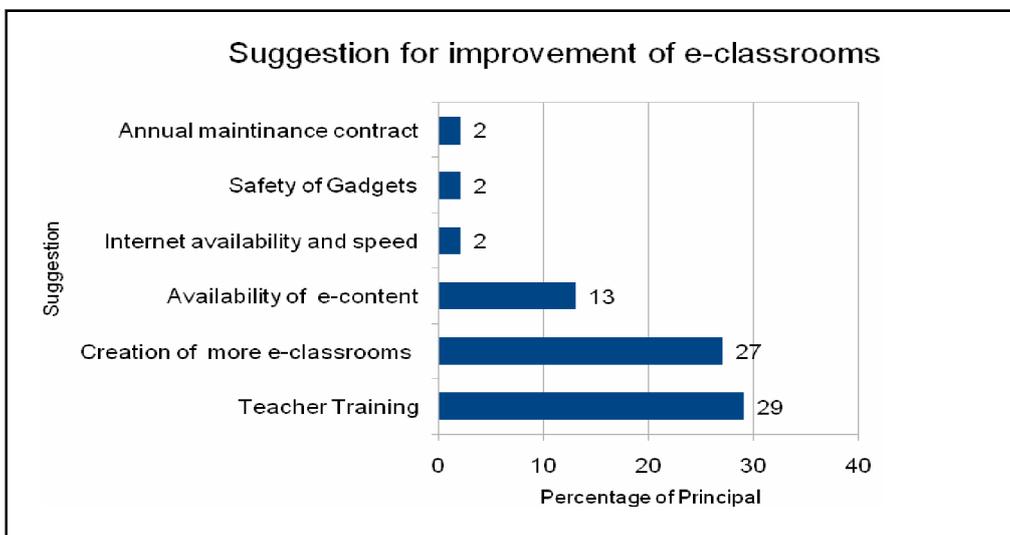
Figure 3.6.1.1 Problems encountered in implementing e-classroom



The principals have enlisted non-availability of basic infrastructure (Hardware, software, internet facility, e-contents etc.) as impediments to successful implementation of e-class room project in KVs. Besides, the principals have reported that a considerable number of untrained teachers are adding to problem and put major hurdle in smooth functioning of the project. These are also considered stumbling block for its impact on student's performance. Therefore, the e-classroom

project needs to be expanded in all KVs and all classrooms to facilitate use of ICTs in every class and for teaching of all subjects.

Figure 3.6.1.2 Suggestion of Principals on e-classroom project.



The principals are of the opinion that more e-classrooms can increase the ratio of students and corresponding infrastructure and will have better impact in enhancing students learning. Besides, the principals have demanded (29%) for supply of e-contents and continuous professional development of teachers through in service training.

3.6.2 Feedback of Subject Teacher & ICT Teacher (N=711)

The subject teachers and ICT teachers have enlisted a number of problems encountered in successful implementation of the project. The teachers have given high priority to slow internet (281) less time for delivery of e-lessons (177), power cuts during classes (140), workload on teachers (126) and large class size with more number of students (122). Besides, the teachers have rated low to the issues pertaining to low remuneration of contact teachers (10), lack of administrative support (15), delay in repairing of complaints (23) etc.

Figure 3.6.2.1 Problems encountered in implementing e-classroom

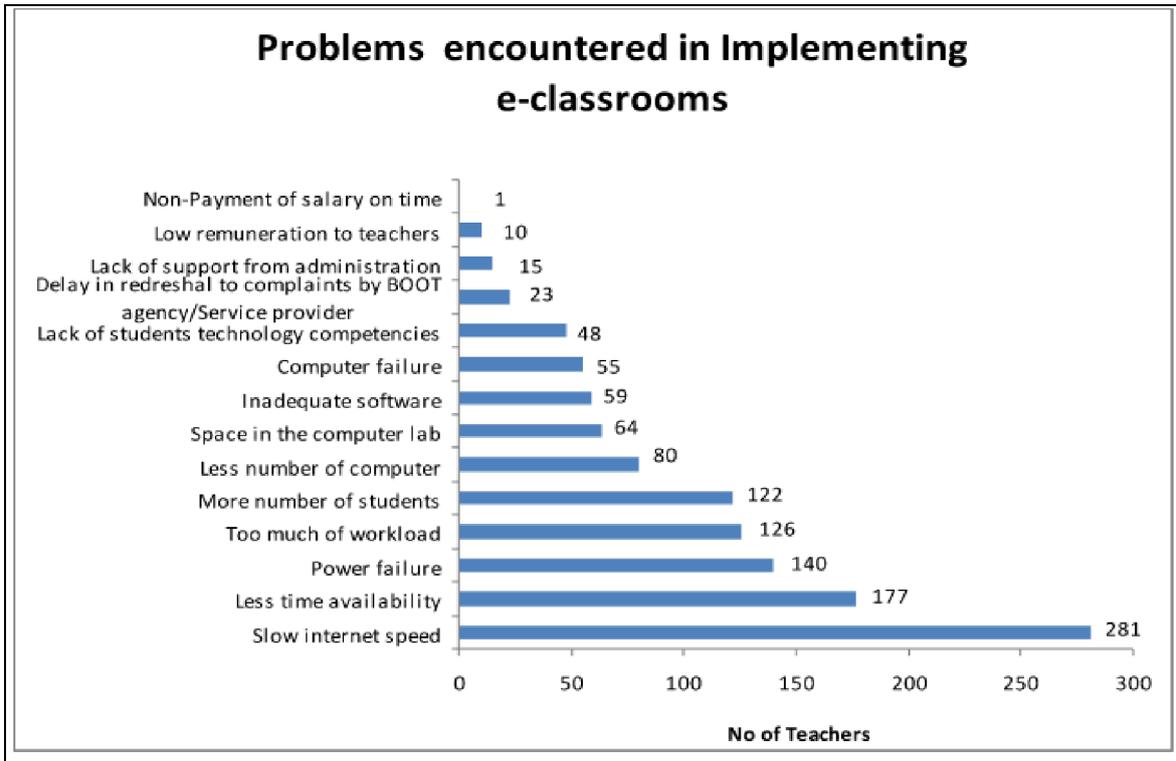
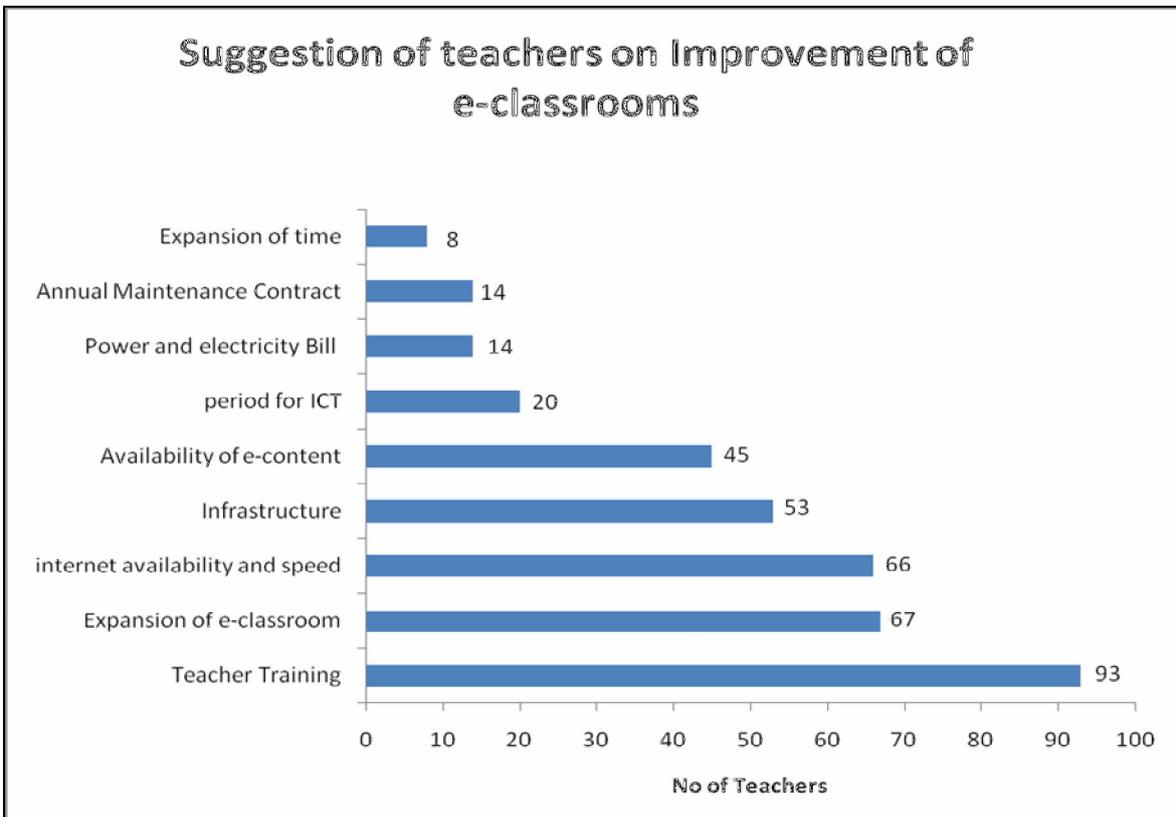


Figure 3.6.2.2 Suggestion of teachers on improvement of e-classroom



To successfully address the problems, the teachers have suggested for organization of teachers training to use e-class (Interactive, board, visualizer, input devices) and provide high speed internet connectivity, additional ICT infrastructure and expansion of e-class project to other classes. Also the teachers have suggested for making available quality e-contents to be used in e-classrooms. The teachers have further suggested streamlining AMC process and having compulsory ICT periods for all classes.

4.0 Results of the evaluation study

4.1 Findings

- From 124 KVs covered under e-classroom project, all the KVs filled up the questionnaires and check list using online forms, but data provided by 12 KVs were incomplete. In all, the data provided by 112 KVs was complete and included in the phase-I data collection. Further fifty, KVs were selected for field visit and data collection in phase-II.
- A total no of 1220 e-classrooms were found in 112 KVs across the country. Of these 11 KVs were provided with below 10 e-classrooms, followed by 59 KVs with 10 e-classrooms and 42 KVs with more than 10 e-classrooms respectively. All these KVs are provided with a very good computer lab.
- There were 1363 projectors, 1286 interactive boards, 1209 visualisers and 1572 notepads in the 112 KVs. Of these 96% projectors, 98% Interactive boards, 99.01% notepads and 99.42% visualisers were found in functional condition. However, the visualisers and notepads were not found to be used in the classrooms.
- All the 112 KVs were provided with very good computer lab (5058 computers) and provided with less than 100 computers in 82.12% KVs and 16.96% KVs were with more than 100 computers and only one KV, was having more than 200 computers respectively.
- About 62% KV principals have received computer/ICT training and 46% of these principals are having very good ICT competency.
- About 88% Principals use their computer and internet during school hours and 44% of these use such facilities beyond school hours as well.
- About 94% schools have computer/ICT teachers, of these 77% teachers were having a working experience of more than four years of services. Besides, 89.4% are very good in

office applications, 63.5% very good in graphics and editing, 50% are very good on creation of web based resources and 38.1% are very good in use of web resources respectively. Also nearly 93% ICT teachers are well versed with hardwares and use of such devices.

- Out of the 624 subject teachers, only 45% have undergone ICT training. About 44% teachers have been provided training by KVs and nearly 56% have received such training from private vendors. Only 41% teachers have reported that ICT based lessons are imparted for teaching of different subjects. The highest of 43% allotment of separate periods in e-classroom was reported by SST teachers which were followed by 39% allotment of the same reported by Maths teachers.
- As far as the expertise of using e-classrooms and ICT use in subject teaching is concerned, only 10% teachers have very good expertise in use of such skills followed by 77% have good expertise in e-classrooms and ICT use.
- The subject teachers are using a range of 28 ICT applications using e-classrooms and computer labs provided in the KVs. A highest 82% teachers use ICT to create question papers and write mails followed by 78% of them develop teaching learning resources and searching of e-resources through surfing on net. Only 24% of them use for synchronous communication and 26% only use for assessment and evaluation purposes.
- In all 2097 students were included as sample of the study who access computer and e-class in KVs. Besides about 47% students use computer and internet at home followed by 11% in cybercafe and 3% at friends home respectively.
- The e-classroom project and computer labs in KVs have helped students and have a very good impact on development of various ICT skills by students. A majority of students i.e. use such facilities to play educational games, 77% for internet surfing data gathering and use, 74% for creating presentations, 70% use for word processing, 58% for spreadsheet and 51% for use of graphics softwares in creation and editing of contents respectively. Besides 66% student use such facilities in KVs for developing project work and 67% use for synchronous communication i.e. emails etc. Besides a considerable percentage of students i.e. (66%) use the ICT facilities in KVs for learning computer based learning packages.
- Non-availability of basic infrastructure (Hardware, software, internet facility, e-contents) in sync with number of the students and teachers (ratio of hardware and students/teachers) and large number of untrained teachers in use of e-classrooms and ICT are reported as the major impediments to successful implementation and integration of ICT in classroom teaching.

- Slow internet connection, less time for delivering e-content in classroom, power cuts etc are reported as main constrains for implementation by ICT teachers as well as sub subject teachers.

5.0. Recommendations

Based on the study the following recommendation is offered:

- Adequate ICT infrastructure to be created on the basis to strength of students and teachers in each KV.
- Class-wise periods available per week may be taken into consideration for preparation of yearly calendar for ICT integration.
- The ICT Curriculum for students developed by CIET-NCERT could be implemented/ adapted in all the KVs.
- E-contents available on NROER may be meaningfully used and integrated with subject teaching and planning in e-classrooms.
- Training Module may be developed and used for large scale training of computer/ICT and subject teachers on regular intervals. Training on subject specific tools i.e. Geogebra, Ph-ET, Stellarium, and Google Earth/Map etc. needs to be organized for teachers.
- The Principals need a more intensive training on Management/Monitoring and up keeping of the ICT infrastructure.
- AMC/service level agreements should be done with vendors/agencies for speedy redressal of repair and maintenance work.
- A mechanism to systematic and regular monitoring of e-classroom programme should be established and tracked online to save time and energy. This should include hardware, software, internet connectivity, school time table, training of functionaries, actual use of the system and its effect on students through an E-MIS.
- The Sangathan may draw up a policy guideline articulating the expectations from the e-classroom project in specific and ICT and Pedagogy integration in general. The e-classroom project needs to be expanded to all classrooms across the KVs and ensure its full utilization on day-to-day basis.

Annexure 1

Tools used for study

The tools used for the study are annexed separately

1. Interview Schedule for Head Masters
2. Questionnaire for ICT Teachers
3. Questionnaire for Teachers
4. Questionnaire for Students

Checklist for School ICT Resources

Section A – Basic Information

- A. 1. What is your name?
- A. 2. What is your designation?
- A. 3. Gender?
- A. 4. How old are you?
- A. 5. What is your school name?
- A. 6. What is your Complete Mailing Address?
- A. 7. What is your Telephone (Landline) number?
- A. 8. What is your Mobile number?
- A. 9. What is your Email-ID?

Section B – Information about E-Classrooms in Kvs

- B. 1. Do you have E-classrooms in your KV

Section C – E-Classroom in Detail

- C. 1. How many number of E-classrooms do you have?

Section D – Detail Information for Multimedia Projector

- D. 1. How many units do you have?
- D. 2. What is its configuration?

D. 3. Company Name/Manufacturer?

D. 4. Is it functional?

D. 5. How many are functional?

D. 6. How many are non functional?

Section E – Detail Information for Interactive Board

E. 1. How many units do you have?

E. 2. What is its configuration?

E. 3. Company Name/Manufacturer?

E. 4. Is it functional?

E. 5. How many are functional?

E. 6. How many are non functional?

Section F – Detail Information for 02-Note Pad (Response Device)

F. 1. How many units do you have?

F. 2. What is its configuration?

F. 3. Company Name/Manufacturer?

F. 4. Is it functional?

F. 5. How many are functional?

F. 6. How many are non functional?

Section G – Detail Information for Computer

G. 1. How many units do you have?

G. 2. What is its configuration?

G. 3. Company Name/Manufacturer?

G. 4. Is it functional?

G. 5. How many are functional?

G. 6. How many are non functional?

Section H – Detail Information for Visualizer

H. 1. How many units do you have?

H. 2. What is its configuration?

H. 3. Company Name/Manufacturer?

H. 4. Is it functional?

H. 5. How many are functional?

H. 6. How many are non functional?

Questionnaire for Principal

Section A – Basic Information

- A. 1. What is your name?
- A. 2. What is your designation?
- A. 3. Gender?
- A. 4. How old are you?
- A. 5. What is your school name?
- A. 6. What is your Complete Mailing Address?
- A. 7. What is your Telephone (Landline) number?
- A. 8. What is your Mobile number?
- A. 9. What is your Email-ID?

QP_Section1- Basic Information

- QP.S1.1. Total years of service completed.
- QP.S1.2. Does your school have website? Please mention the Website link
- QP.S1.3. Have you received any computer related training?

Name of the Training programme

Training content (Main focus)

Year and duration of the training

Name of Institute/Agency provided Training

QP_Section2- About Computer Education

- QP.S2.1. Do you have computer instructor?
 - Whether he/she is regular or contract teacher?
 - What is the salary paid to them per month?
- QP.S2.2. Who repair and maintains the computer and network in the e-Classroom?
- QP.S2.3. Are there any problems related to the hardware, software and its repair and maintenance?
- QP.S2.4. Are you satisfied with the computer software provided?
- QP.S2.5. Are you satisfied with the educational programmes (CD/DVD) provided?
- QP.S2.6. Do you have specific periods allotted in timetable(class-wise) for the e-Classroom.
 - Which Class

Which Subjects

No. of Periods

Please provide/attach a copy of the timetable.

QP_Section3- Additional Information for e Classroom

QP.S3.1. Do the students have access to the computer and internet during the school hours

In addition to the scheduled periods

QP.S3.2. Do the students have access to the computer and internet after the school hours

QP.S3.3. Please rate you own ICT competency?

QP_Section4

Extent of effectiveness after E-classroom facilities being used Which of the following activities for which the e Classroom facilities in your school are being used? If used rate the extent of its effectiveness.

QP_Section5- Please indicates the extent to which e Classrooms being used in various subjects.

QP_Section6- More Information for E-Classroom

1. Have you ever faced security issues (theft) of ICT equipments and materials in the lab?
2. Are you satisfied with the service rendered by the service provider having Annual Maintenance Contract (AMC)?
3. What problems do you face with respect to use of e Classrooms in your K.V.?
4. What is your suggestion for enhancing the use of e Classroom in your school?

Questionnaire for Teachers

Section A – Basic Information

- A. 1. What is your name?
- A. 2. Gender?
- A. 3. How old are you?
- A. 4. What is your school name?
- A. 5. What is your Complete Mailing Address?
- A. 6. What is your Telephone (Landline) number?
- A. 7. What is your Mobile number?
- A. 8. What is your Email-ID

QT_Section1- Basic Information

QT.S1.1. What is your designation?

- Computer Teacher Subject Teacher

QT.S1.2. Total years of service completed?

QP.S1.3. Have you received any computer related training?

Name of the Training programme

Training content (Main focus)

Year and duration of the training

Name of Institute/Agency provided Training

Subjects that you teach

QT.S1.4. Please check on the subjects that you teach

QT.S1.5. Indicate the classes you teach

QT.S1.6. Indicate since when you are using computers. Please check since when you are using computer. i. Before establishment of school lab/e-class. ii. After. iii Neither before nor after

QT_Section2

Please indicate your awareness of various tools of e-class project

- Software Skills BEFORE the implementation of e class project
- Hardware Skills BEFORE the implementation of e class project
- Software Skills AFTER the implementation of e class project
- Hardware Skills AFTER the implementation of e class project

QT_Section3

Please indicate your knowledge of using various tools of e-class project BEFORE the implementation of e class project

QT_Section4 Additional Information

QT.S4.1. Do you have specific periods allotted in the school timetable (class-wise) for the computer based lesson?

Which Class

Which Subjects

No. of Periods

QT.S4.2. Indicate the Expertise level of using ICT tools

QT.S4.3. Accessibility to computer use per week:

QT.S4.4. Access to Internet per week?

QT.S4.5. How do you resolve hardware & software related issues?

QT.S4.6. Have you received any incentive/award for the use of ICT?

QT.S4.7. Mention the kind of problem encountered by you in implementing computer programme:

QT.S4.8. Benefits of using E-classrooms: According to you what are the benefits of using information and communication technologies?

QT.S4.9. Mention the personal technology tools available with you

QT.S4.10. Do you see any improvement in the subject understanding of the students because of ICT usage

QT.S4.11. What kind of orientation you would like to undergo for effective ICT integration

QT.S4.12. What are your suggestions for better implementation of ICT programme in your school

QT.S4.13. Are you satisfied with the agency having AMC?

QT.S4.14. What are the various resources like books, manuals, Cds/DVDs etc. used by you?

Please specify:

QT.S4.15. Do you think that there is an improvement in the learning of students because of the e-class project implementation?

QT.S4.16. State challenges and problems that you have faced while working with various groups listed below: Your suggestions for the better Utilization of ICT Resources in the school

Questionnaire for Students

QS_Section1- Basic Information

QS.S1.1. Name

QS.S1.2. Name of the School

QS.S1.3. Gender

QS.S1.4. Age (in years)

QS.S1.5. Class

QS.S1.6. For how many years have you been using computers?

QS_Section2

Please indicate your level of skills in the use of the following tools & technologies

QS.S2.13. Any Other

QS_Section3

For what purpose and to what extent do you and your teachers use ICT in e Class of your school?

QS_Section4- Questions regarding E-classroom

QS.S4.1. Subject Name in which subjects do you use computers, internet and other technology?

QS.S4.2. Who taught you about computers? Tick mark all that apply to you Any Other (Please Specify)

QS.S4.3. What are your favourite activities using computers in class? QS.S4.4. How many hours per week do you use computers?

QS.S4.5. How many hours per week do you use the internet for surfing websites in school?

QS.S4.6. Do you have computer at home?

QS.S4.7. Do you use internet at home?

QS.S4.8. Do you have personal e-mail address?

Please mention email ID below.

QS.S4.9. Where else you access these facilities? If you do not have access to computer and internet facilities in your school

Any Other (Please Specify)

Annexure 2

List of schools included in the evaluation

| School Code | School Name | State |
|--------------------|--|-------------------|
| KV001 | Kendriya Vidyalaya No.1 uppal | Andhra Pradesh |
| KV002 | Kendriya Vidyalaya 23 BRD | Chandigarh |
| KV003 | Kendriya Vidyalaya AFS Digaru | Assam |
| KV004 | Kendriya Vidyalaya Aliganj, Lucknow | Uttar Pradesh |
| KV005 | Kendriya Vidyalaya ASC Center (S) | Karnataka |
| KV006 | Kendriya Vidyalaya B.E.G. Pune | Maharashtra |
| KV007 | Kendriya Vidyalaya Berhampore | West Bengal |
| KV008 | Kendriya Vidyalaya Bilaspur | Chhattisgarh |
| KV009 | Kendriya Vidyalaya Bolarum | Andhra Pradesh |
| KV010 | Kendriya Vidyalaya Damoh | Madhya Pradesh |
| KV011 | Kendriya Vidyalaya Dogra Lines, Meerut Cantt | Uttar Pradesh |
| KV012 | Kendriya Vidyalaya Durg | Chhattisgarh |
| KV013 | Kendriya Vidyalaya DVC Bokaro Thermal | Jharkhand |
| KV014 | Kendriya Vidyalaya Ernakulam | Kerala |
| KV015 | Kendriya Vidyalaya GomtiNagar | Uttar Pradesh |
| KV016 | Kendriya Vidyalaya Hebbal | Karnataka |
| KV017 | Kendriya Vidyalaya Hisar Cantt | Haryana |
| KV018 | Kendriya Vidyalaya IIT Chennai | Tamil Nadu |
| KV019 | Kendriya Vidyalaya Jagdalpur | Chhattisgarh |
| KV020 | Kendriya Vidyalaya Jutogh Cantt-Shimla | Himanchal Pradesh |
| KV021 | Kendriya Vidyalaya Lonavla | Maharashtra |
| KV022 | Kendriya Vidyalaya Malkapuram | Andhra Pradesh |
| KV023 | Kendriya Vidyalaya Malleswaram, Bangalore | Karnataka |
| KV024 | kendriya vidyalaya no-2 nausenabaugh | Andhra Pradesh |
| KV025 | Kendriya vidyalaya No. 1 AFS-Bhuj | Gujarat |
| KV026 | Kendriya Vidyalaya No. 1 Ambala Cantt | Haryana |
| KV027 | Kendriya Vidyalaya No. 1 JRC-Bareilly | Uttar Pradesh |
| KV028 | Kendriya Vidyalaya No. 1, Calicut | Kerala |
| KV029 | Kendriya Vidyalaya No. 1, Sector 30, Gandhinagar | Gujarat |
| KV030 | Kendriya Vidyalaya No.1 AFS Chakeri Kanpur | Uttar Pradesh |
| KV031 | Kendriya Vidyalaya No.1 AFS Jodhpur | Rajasthan |

| | | |
|-------|--|----------------|
| KV032 | Kendriya Vidyalaya No.1 AFS, Agra | Uttar Pradesh |
| KV033 | Kendriya Vidyalaya No.1 Amritsar | Punjab |
| KV034 | Kendriya Vidyalaya No.1 Bathinda | Punjab |
| KV035 | Kendriya Vidyalaya No.1 Bikaner | Rajasthan |
| KV036 | Kendriya Vidyalaya No.1 Raipur(C.G) | Chhattisgarh |
| KV037 | Kendriya Vidyalaya No.1 Sagar(M.P.) | Madhya Pradesh |
| KV038 | Kendriya Vidyalaya No.1-Ahmednagar | Maharashtra |
| KV039 | Kendriya Vidyalaya No.1, B.S.City | Jharkhand |
| KV040 | Kendriya Vidyalaya No.1, Jaipur | Rajasthan |
| KV041 | Kendriya Vidyalaya No.1, Kota | Rajasthan |
| KV042 | Kendriya Vidyalaya No.1, Vasco-da-Gama | Goa |
| KV043 | Kendriya Vidyalaya No.2 Ambala | Haryana |
| KV044 | Kendriya Vidyalaya No.2 Chandimandir Cantt, Panchkula | Haryana |
| KV045 | Kendriya Vidyalaya No.2, Belgaum | Andhra Pradesh |
| KV046 | Kendriya Vidyalaya Pattom Thiruvananthapuram | Kerala |
| KV047 | Kendriya Vidyalaya Picket | Andhra Pradesh |
| KV048 | Kendriya Vidyalaya Rourkela | Odisha |
| KV049 | Kendriya Vidyalaya SECL Kusmunda Korba | Chhattisgarh |
| KV050 | kENDRIYA VIDYALAYA SILCHAR | Assam |
| KV051 | Kendriya Vidyalaya Tirumalagiri | Andhra Pradesh |
| KV052 | Kendriya Vidyalaya, 39 G.T.C., Varanasi | Uttar Pradesh |
| KV053 | Kendriya Vidyalaya, Bailey Road, Patna | Bihar |
| KV054 | Kendriya Vidyalaya, BHU, Varanasi | Uttar Pradesh |
| KV055 | Kendriya Vidyalaya, Danapur Cantt, Patna | Bihar |
| KV056 | Kendriya Vidyalaya, Keltron Nagar, Kannur | Kerala |
| KV057 | Kendriya Vidyalaya, Khanapara, Gwahati, Assam | Assam |
| KV058 | Kendriya Vidyalaya, Maithon Dam | Jharkhand |
| KV059 | Kendriya Vidyalaya, Manauri, Allahabad | Uttar Pradesh |
| KV060 | Kendriya Vidyalaya AFS Jorhat | Assam |
| KV061 | Kendriya Vidyalaya Aizawl | Mizoram |
| KV062 | Kendriya Vidyalaya Ajni Nagpur | Maharashtra |
| KV063 | Kendriya Vidyalaya AMC-Lucknow | Uttar Pradesh |
| KV064 | Kendriya Vidyalaya Barrackpore (Army) | West Bengal |
| KV065 | Kendriya Vidyalaya Berhampur | Odisha |

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| KV066 | Kendriya Vidyalaya Bhulandshahr | Uttar Pradesh |
| KV067 | Kendriya Vidyalaya C.M.M.Jabalpur | Madhya Pradesh |
| KV068 | Kendriya Vidyalaya Deeptinagar NTPC Kahalgaon | Bihar |
| KV069 | Kendriya Vidyalaya Duliajan | Assam |
| KV070 | Kendriya Vidyalaya Fortwilliam | West Bengal |
| KV071 | Kendriya Vidyalaya Happy Valley Shillong | Meghalaya |
| KV072 | Kendriya Vidyalaya Haridwar | Uttara Khand |
| KV073 | Kendriya Vidyalaya Hinoo | Jharkhand |
| KV074 | Kendriya Vidyalaya IIT Kharagpur Campus Kharagpur | West Bengal |
| KV075 | Kendriya Vidyalaya Janakpuri Delhi | Delhi |
| KV076 | Kendriya Vidyalaya Minamabakkam Chennai-27 | Tamil Nadu |
| KV077 | Kendriya Vidyalaya Moradabad | Uttar Pradesh |
| KV078 | Kendriya Vidyalaya Navlakha | Madhya Pradesh |
| KV079 | Kendriya Vidyalaya NDA Khadakwasala Pune | Maharashtra |
| KV080 | Kendriya Vidyalaya No. 1 AFS Jamnagar | Gujarat |
| KV081 | Kendriya Vidyalaya No. 1 Harni Road Vadodara | Gujarat |
| KV082 | Kendriya Vidyalaya No. 1 Ichhanath Surat | Gujarat |
| KV083 | Kendriya Vidyalaya No. 1 Tezpur | Assam |
| KV084 | Kendriya Vidyalaya No. 2 Bhopal | Madhya Pradesh |
| KV085 | Kendriya Vidyalaya No. 2 C.P.E Itarsi | Madhya Pradesh |
| KV086 | Kendriya Vidyalaya No.1 Akhnoor | Jammu Kashmir |
| KV087 | Kendriya Vidyalaya No.1 Binnaguri | West Bengal |
| KV088 | Kendriya Vidyalaya No.1 Colaba Mumbai | Maharashtra |
| KV089 | Kendriya Vidyalaya No.1 Faridabad | Haryana |
| KV090 | Kendriya Vidyalaya No.1 Ferozepur Cantt | Punjab |
| KV091 | Kendriya Vidyalaya No.1 Golconda Hyderabad | Andhra Pradesh |
| KV092 | Kendriya Vidyalaya No.1 HBK Dehradun | Uttara Khand |
| KV093 | Kendriya Vidyalaya No.1 Jalandhar | Jalandhar |
| KV094 | Kendriya Vidyalaya No.1 Kalpakkam | Tamil Nadu |
| KV095 | Kendriya Vidyalaya No.1 Kankarbagh | Bihar |
| KV096 | Kendriya Vidyalaya No.1 Narimedu Madurai | Tamil Nadu |
| KV097 | Kendriya Vidyalaya No.1 Naval Base Kochi | Kerala |
| KV098 | Kendriya Vidyalaya No.1 Pathankot | Punjab |

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| KV099 | Kendriya Vidyalaya No.1 STC Jabalpur | Madhya Pradesh |
| KV100 | Kendriya Vidyalaya No.2 (Army Area) Pathankot | Punjab |
| KV101 | Kendriya Vidyalaya No.2 Akhnoor | Jammu Kashmir |
| KV102 | Kendriya Vidyalaya No.2 Delhi Cantt Delhi-10 | Delhi |
| KV103 | Kendriya Vidyalaya No.2 Jaipur | Rajasthan |
| KV104 | Kendriya Vidyalaya No.2 Jalandhar Cantt | Punjab |
| KV105 | Kendriya Vidyalaya O.F. Khameria Jabalpur | Madhya Pradesh |
| KV106 | Kendriya Vidyalaya OCF Avadi | Tamil Nadu |
| KV107 | Kendriya Vidyalaya Sambalpur | Odisha |
| KV108 | Kendriya Vidyalaya Sector 8-RK Puram New Delhi | Delhi |
| KV109 | Kendriya Vidyalaya Sevoke Road | West Bengal |
| KV110 | Kendriya Vidyalaya Upper Camp Dehradun | Uttara Khand |
| KV111 | Kendriya Vidyalaya 1 Udaipur | Rajasthan |
| KV112 | KV AGCR COLONY Delhi - 110092 | Delhi |
| KV113 | Kendriya Vidyalaya No.2, Itanagar | Arunanchla Pradesh |
| KV114 | KV Kimin,27,Assam Rifles,Papumparare | Arunanchla Pradesh |
| KV115 | Kendriya Vidyalaya, Jhaphan | Bihar |
| KV116 | Kendriya Vidyalaya AFS Amla | Madhya Pradesh |
| KV117 | Kendriya Vidyalaya No.2 Gwalior | Madhya Pradesh |
| KV118 | Kendriya Vidyalaya No.1,Imphal | Manipur |
| KV119 | Kendriya Vidyalaya Cuttack | Odisha |
| KV120 | Kendriya Vidyalaya GC CRPF Agartala | Tripura |
| KV121 | Kendriya Vidyalaya No.1 AFS, Gorakhpur | Uttar Pradesh |
| KV122 | Kendriya Vidyalaya No.1 Jhansi | Uttar Pradesh |
| KV123 | Kendriya Vidyalaya, New Cantt, Allahabad | Uttar Pradesh |
| KV124 | Kendriya Vidyalaya Ballygunge | West Bengal |

List of Figures

| S.No. | Figures No. | Title of the Figures | Page No. |
|--------------|--------------------|--|-----------------|
| 1. | 3.1.1.1 | Availability of e-classroom in schools | 4 |
| 2. | 3.1.1.2 (a) | School-wise number of e-classroom | 4 |
| 3. | 3.1.1.2 (b) | School-wise number of e-classroom | 5 |
| 4. | 3.1.1.2 (c) | School-wise number of e-classroom | 5 |
| 5. | 3.1.1.2 (d) | School-wise number of e-classroom | 5 |
| 6. | 3.1.2.1 | No of functional & non-functional projectors in school | 6 |
| 7. | 3.1.2.2 (a) | School-wise functional status of projectors | 7 |
| 8. | 3.1.2.2 (b) | School-wise functional status of projectors | 7 |
| 9. | 3.1.2.2 (c) | School-wise functional status of projectors | 8 |
| 10. | 3.1.2.2 (d) | School-wise functional status of projectors | 8 |
| 11. | 3.1.3.1 | Functional status of interactive board | 9 |
| 12. | 3.1.3.2 (a) | School-wise functional status of interactive boards | 10 |
| 13. | 3.1.3.2 (b) | School-wise functional status of interactive boards | 10 |
| 14. | 3.1.3.2 (c) | School-wise functional status of interactive boards | 11 |
| 15. | 3.1.3.2 (d) | School-wise functional status of interactive boards | 11 |
| 16. | 3.1.4.1 | Status of availability of computers in schools | 12 |
| 17. | 3.1.4.2 | No of functional and non-functional computer in school | 12 |
| 18. | 3.1.4.3 (a) | School-wise functional status of computers | 13 |
| 19. | 3.1.4.3 (b) | School-wise functional status of computers | 13 |
| 20. | 3.1.4.3 (c) | School-wise functional status of computers | 14 |
| 21. | 3.1.4.3 (d) | School-wise functional status of computers | 14 |

| | | | |
|-----|---------|--|----|
| 22. | 3.1.5.1 | No of functional and non-functional notepads in school | 15 |
| 23. | 3.1.5.2 | School-wise functional and non-functional note pad | 15 |
| 24. | 3.1.6.1 | No of functional and non-functional visulizers in school | 16 |
| 25. | 3.1.6.2 | Status of functional and non-functional visulizers in school | 16 |
| 26. | 3.2.1 | Computer Training of Principals | 17 |
| 27. | 3.2.2 | ICT Competency of Principals | 18 |
| 28. | 3.2.3 | Availability of ICT Instructor in schools | 18 |
| 29. | 3.2.4 | Allotment of periods for e-classroom in schools | 19 |
| 30. | 3.2.5 | Access to computer/internet during school hours | 19 |
| 31. | 3.2.6 | Access to computer/internet after school hours | 20 |
| 32. | 3.3.1 | Experience of ICT Teachers | 21 |
| 33. | 3.3.2 | Awareness of software and ICT competency of ICT Teachers | 21 |
| 34. | 3.3.3 | Awareness of software and ICT competency of ICT Teachers | 22 |
| 35. | 3.4.1 | Status of ICT Training for subject teacher | 22 |
| 36. | 3.4.2 | Type of training provided to subject teacher | 23 |
| 37. | 3.4.3 | Periods allotted to ICT based lesson in school | 24 |
| 38. | 3.4.4 | ICT used in various subjects in schools | 24 |
| 39. | 3.4.5 | Expertization in using ICT | 25 |
| 40. | 3.4.6 | Range of ICT applications used by teachers | 26 |
| 41. | 3.5.1 | Accessibility of computer/internet outside the school | 27 |
| 42. | 3.5.2 | Impact of e-classroom project on development of skills among students level of skills among student in using ICT | 27 |
| 43. | 3.6.1.1 | Problems encountered in implementing e-classroom | 28 |

| | | | |
|-----|---------|--|----|
| 44. | 3.6.1.2 | Suggestion of Principals on e-classroom project | 29 |
| 45. | 3.6.2.1 | Problems encountered in implementing e-classroom | 30 |
| 46. | 3.6.2.2 | Suggestion of teachers on improvement of e-classroom | 30 |