Perception of teachers and students towards computer-based tests: An analysis in terms of gender, subject background and computer efficiency level

Ananya Singh* and Mayank K. Singh**

Guest Faculty, Department of Education, University of Allahabad, Prayagraj
**Senior Program Associate, India Action Health Trust, UP-TSU, Lucknow
Corresponding Author: Ananya Singh, Email: sananya31@gmail.com

Abstract

This paper concerns about the perception of government intermediate teachers and Biology intermediate students regarding the mode of examination as computer-based test (CBT) verses paper-pencil test (PPT). Perception is very close to attitude and easy to measure by the intended behavior. The survey analysis highlighted the significant difference between the perception of intermediate teachers and intermediate students towards modes of examination with reference to their gender, subject background and computer efficiency level. It has been suggested that male teachers and male students perceived more positively about computer-based test and same with the science background and computer efficient participants. The effectiveness of computer-based test was also studied based on 16 parameters of effectiveness as perceived by the stakeholders, which supported that computer-based tests is more effective than paper-pencil tests.

Keywords: Academic achievement, Computer-based test, Paper-pencil tests, Perception, Computer efficiency level

Introduction

In the mid twentieth century, Frederic Mather Lord, who contributed significantly to the theory and applications of educational measurement, postulated computer-based and computerized adaptive testing (Wainer, H., & Stocking, M., 2000). According to Frederic Mather Lord, computer-based tests are defined as tests or assessments that are administered by a computer in either a stand-alone or networked configuration or by other technology devices linked to the World Wide Web via the Internet. There are strong interests in computer-based test and earlier researchers have identified many positive merits of this approach of assessment, including: efficient administration, students preference, self-selection options for students, improved writing performance, built in accommodation, immediate results, efficient items development, increased authenticity, etc. (Noyes & Garland, 2008). However, with computer-based tests (CBT), there are also potential negative unintended consequences. These may include the possibility of additional training for students with disabilities to interact successfully with computers and the challenges of determining the best way to present and accommodate

accessories like screen readers for visually impaired and other assistive technologies for students with other disabilities (Ozden, M.Y., Erturk, I., & Sanli, R. (2004).

Despite its popularity, computer-based tests face accessibility challenges also, which reduces the validity of the assessment results and exclude some groups of student from assessment participation. Studies also reported the disadvantage of computer-based tests as students' anxiety increases among those who are unfamiliar with use of computers (Lim, et al., 2006) and such students agreed that they are "technophobic". The challenge to test examinees by means of microcomputers demands appropriate software design but it also confirms that computer-based tests are not a cost effective and fully secured as compared to the paper-pencil test method but studies of Choi and Tinkler, 2002; Kim and Huynh, 2007 reported that computer-based tests are fully secured and cost effective. A study conducted by Peter, et al. (2004) advised that teachers with many years of traditional teaching experience do not want and support computer-based tests. They are more comfortable to facilitate traditional mode (paper-pencil test) of test over computer-based test.

In contrast, a paper-pencil test (PPT) is a test where the problems or queries are penned, printed, or drawn and the answers are penned on paper. Paper-pencil test refer to a general group of assessment tools in which candidates read questions and responded on paper. In India, it has been the norm since the establishment of formal education and all the stakeholders are very well adapted with paper-pencil tests.

Many earlier studies strongly supported that computer-based tests are more effective compared to paper-pencil test in terms of flexibility, lesser chances of double answering, mock practices, immense set of question papers, lesser clerical mistakes, easy accessibility, immediate feedback, disable student friendly, cost effective, fully secured, time saver, user adaptive and curbs impersonations (Lim, E. C., Ong, B. K., Wilder-Smith, E. P., & Seet, R. C., 2006). As computer-based tests began to be used for summative assessment in several examinations, it is important to establish whether computer-based testing is perceived equally to paper-pencil test (Powers, D.E. & O'neill, K., 1993; (Anakwe, 2008).

Advancement in technology is forcing educational institutions to update and use educational technologies within its education system. Several entrance tests and other annual test are now conducted as computer-based test therefore it becomes critical to ascertain teachers' and students' perception towards computer-based test for its efficient usage and paper-pencil test. Many answers are still unanswerable especially the differences in perceptions to computer-based tests with respect to the gender, subject background and computer efficiency level of various stakeholders. Finally, it is also necessary to evaluate which mode of testing is more effective in terms of parameters like cost effectiveness, easy to use, time saving and others. It will be helpful for government to fill up, if such gaps are identified.

Review of the related literature

Earlier studies have been done to develop the relationship between the impact of ICT and academic performance. Evidence based relationship were seen between the use of computer in assessment and attitude of teachers and students. Although, many participants knew as they were part of an experiment, which affected their responses towards computer-based tests (Elsaadani, 2013; Varol, 2013; Lal, 2014; Nugroho, et al., 2018). Perception is also very close to attitude and easy to measure by the intended behaviour. It is a process by which organisms interpret and organize sensations to produce a meaningful experience of the world (Jimoh, R. G., Shittu, A. J. K., & Kawu, Y. K., 2012). Receptivity of the stimuli is usually decided by the person's awareness and acceptability for the stimuli, a person's existing beliefs, attitude, motivation, and personality, which are helpful to perceive (Assael, 1995). Attitude and perception towards the use of computers needs to be evaluated for effective implement of technological advancement in the classroom (Stevens, 1982). Elliott (2008) believed that computers, especially in teaching, are already playing a big role in achieving its target but the test is also an important part of teaching which should be conducted accurately and in a formative manner according to the latest instructions.

Drent and Meelissen (2008) provided a broad discussion of those teachers and students having positive attitudes towards computer and ICT uses in the classroom leading to purposeful and innovative practices in the teaching-learning process. If teachers' attitudes are positive toward the use of educational technology, then, they can easily provide useful insights about the adoption and integration of ICT into teaching-learning processes as supported by the study of Keengwe, et al. (2008).

Cavas, et al. (2009) revealed that relationship between teachers' attitude and factors which are related to teachers' characteristics (gender, age, and computer efficiency) indicated that science teachers have a positive attitude towards ICT uses although teachers' attitude towards ICT uses do not differ regarding gender, it differs regarding age and computer efficiency.

A study of Flowers, et al. (2011) reported that students perceived more to prefer the CBT to the PPT, and students believed they performed better using the computer. Additional research that controls extraneous factors such as instructional time and familiarity with the testing environment is recommended to better evaluate the relationship between testing modes and academic performance.

Jamil et al. (2012) reported that teachers' attitudes were positive towards computer-based tests but in some situations they preferred paper-pencil tests. Female and teachers who have computer training certificate and experiences were more positive towards computer-based test.

Jeong (2014) clarified that computer-based tests offer real-time scoring and immediate feedback, facilitate the use of individualised testing methods, improve test administration

and reduce test expenses. Thus, most previous studies have tended to focus on the technical advantages and effectiveness of computer-based tests and implementation issues.

There is a moderate and positive relationship between the age of participants and their attitude towards ICT has been found thus, when considering attitude towards ICT by teaching staff members, age is a significant factor (Elsaadani, 2013). Lal (2014) investigated that the vast majority of secondary school teachers have a positive attitude towards ICT about their school teaching subjects for many reasons.

Sern, et al. (2017) suggested in their study that video technology is plausible to be used in teaching practicum evaluation. Besides, their findings also reflect that the students possess a high level of flexibility and ability to adapt innovative technology in their works.

A study on the topic "Students Perception on the Use of computer-based Test" concluded that there was significance difference between the paper-pencil test and computer-based test. Practically, this result suggested that students with different test method prefer to have tests other than what they were having (Nugroho, et al., 2018).

Billions of examinations and assessments are administered every year across. By delivering a test, one is aiming to use the information provided by the test in making a decision about the individual taking the test. Tests have been traditionally administered through the paper-pencils tests methods but at advent of the twentieth

century, researchers sought to find a more or rather convenient means of administering tests. Thus with the introduction of the computer-based test, it continued to impress and has been seen by more and more institutions to adopt it as a reliable means of test administration (Jawaid, M., Moosa, F. A., Jaleel, F., & Ashraf, J., 2014).

Objectives of this study

The goal of this study is to identify the perception of stakeholders towards computer-based tests and paper-pencil tests as well as effectiveness of computer-based tests. In the current study the following research questions were addressed:

1. Does the teachers' perception differ towards computer-based tests in reference to their gender, subject background and computer efficiency level.

2. Does the students' perception differ towards computer-based tests in reference to their gender, subject background and computer efficiency level.

3. To measure the perception of teachers and students towards computer-based test based on several effectiveness parameters.

Method

Procedure

To assess the perception difference regarding two modes of tests, a planned "Perception rating scale for computer-based test" was constructed with high 0.71 reliability and validated by experts. This scale had consent letter

in front followed by two other sections. In the first section, participants were requested to fill about gender, subject background (science or non-science) and their computer efficiency level, ranging from very poor, poor, medium, good and excellent. Second section had 26 perception-based statements for computer-based and paper-pencil tests. Participants noted their responses as agreed; undecided and disagreed and recorded as +1, 0 and -1 respectively. Quantitatively data was collected and analysed by its distribution (percentage) and using chi-square. Out of the total 26 statements, 16 different statements were selected based on the previous studies for effectiveness parameter of computer-based tests.

Participants

A list was prepared by purposive sampling method from target population followed by random selection from enlisted purposefully selected sample. Random selection was made possible by lottery method. Samples were chosen from the CBSE board schools, Kendriya Vidyalaya, a central government regulated premiere school in Uttar Pradesh, India for the survey. 150 intermediate teachers were selected from Kendriya Vidyalaya Schools of Prayagraj and Varanasi where 60 intermediate students were selected from Kendriya Vidyalaya (KV) School of Prayajraj district in Uttar Pradesh (09 KVs from Prayaraj and 03 KVs from Varanasi for teacher sample). Data was collected durng the end session of 2017-2018 (Appendices A & B). The reason for selecting only Kendriya Vidyalaya was that these schools are supposed to be fully equipped with working computers with good internet facilities. Therefore, it was supposed that the participant in the present study would be very much familiar with the use of computer and also have some experiences of computer-based test along with paper-pencil test.

Result and discussion

Table-1 shows the results of intermediate teachers' perception towards computer-based and paper-pencil tests at an intermediate level in reference to their gender, subject background, and computer efficiency level.

Gender-wise comparison: Significant differences were found between the perception among male and female teachers for the statement 3 ($\chi2$ = 6.6381 > 5.991, α = 0.05, df = 2) and 5 ($\chi2$ = 8.3672 > 5.991, α = 0.05, df = 2). The result showed that 74.4% male teachers and only 35percent female teachers agreed that students can practice mock test before final computer-based examinations (statement 3), while 62.2percent male and 41.7percent female teachers agreed that students waste their few minutes in redrawing any diagram on rough (statement 5). The probable reason for significant difference among male and female teachers regarding mock practices and wastage of time in redrawing the diagram in computer-based tests is that male teachers may be more exposed to ICT and technology as compared to female teachers. The same finding was suggested by Karamti, (2016); Jegede, (2009).

Comparison by subject background: Significant differences were found between the perception among science and non-science teachers or the statement 1st ($\chi2 = 6.0135 > 5.991$, $\alpha = 0.05$, df = 2), 2nd ($\chi2 = 6.9382 > 5.991$, $\alpha = 0.05$, df = 2), 6th ($\chi2 = 8.9679 > 5.991$, $\alpha = 0.05$, df = 2), 16th ($\chi2 = 9.3870 > 5.991$, $\alpha = 0.05$, df = 2), and 24th ($\chi2 = 7.3920 > 5.991$, $\alpha = 0.05$, df = 2). Results indicated that 89.9percent of non-science teachers and 76.1percent of science teachers agreed that students can choose their schedule of tests as per their convenience in computer-based test (statement 1), hence it offered the students to appear in the test, whenever they were well prepared. Flexibility in the test showed to motivate the students and resulted in their greater engagement in studies. This finding was strongly supported by the study of Jamil, et al., (2012). Similarly, significant differences were reported for statement 2, 6, 16 and 24. There are several possible explanations why teachers' perception differs with respect to their subject background, not gender and computer efficiency level. Science teachers largely agreed with these statements (1, 2, 6, 16 and 24) about computer-based tests because science teachers are more exposed to computer & ICT and also familiar by administering the test more frequently in contrary to the non-science teachers. The present study suggested that teachers with science background and non-science subject background have different perception towards computer-based test in choosing the test schedule by students' convenient (statement 1), making changes in answers before final submission (statement 2), preparing unlimited sets of question paper (statement 6), measuring psychological and biological changes during the computer-based test (statement 24) and CBT also needed very efficient teachers (statement 16), (Heisele, et al., 2007).

Computer efficiency level-wise comparison: Significant differences were found in the perception of computer-based tests among the different level of computer efficient teachers for the statement 6th ($\chi2 = 8.0818 > 5.991$, $\alpha = 0.05$, df = 2), 17th ($\chi2 = 7.1540 > 5.991$, $\alpha = 0.05$, df = 2), 20th ($\chi2 = 6.0903 > 5.991$, $\alpha = 0.05$, df = 2) and 23rd ($\chi2 = 6.9001 > 5.991$, $\alpha = 0.05$, df = 2). Results showed that the majority of computer non-efficient teachers (65percent) agreed that unlimited number of question sets can be prepared in computer-based tests (statement 6). Statements 17th, 20th and 23rd also indicated the significant differences among the both groups of teacher. These statements are as followed, students are prejudiced about computer-based tests (statement 17), students can access the question in a set order (statement 20) and screen resolution is also one of the major problems of computer-based tests (statement 23). Johnson and Green (2004) also mentioned the above listed disadvantages of computer-based tests as perceived by students. Many statement of disagreement are higher among computer efficient teachers compared to their counterparts. It may be possible due to the more familiar with the advantages and disadvantages of utilization of computer among the computer efficient teachers.

The perception of teachers does

not differ significantly for the rest of the statement in the questionnaire with respect to their gender, subject background and computer efficiency level.

Table –1: Calculated χ2 value regarding teachers' perception

S. No.	Statements	Gender (χ2value)	Subject background (χ2 value)	Computer efficiency level (χ2 value)
1	Students can choose their day and time of the computer-based test according to the slots available based on their convenience.	0.8741	6.0135*	0.7355
2	The correct answers marked can be changed before final submission with no error of double answering.	1.6755	6.9382*	0.5230
3	Students can practice mock test before final computer-based examinations.	6.6381*	1.9842	2.5067
4	Proper training is not provided for the computer-based approach of the exam.	2.3913	0.6260	5.6755
5	For several questions in Maths and Physics accompanying certain diagrams, students have to redraw in rough, this opportunity leading to a waste of 2 crucial minutes.	8.3672*	0.2170	1.6026
6	In computer-based examination, an unlimited number of question sets can be prepared.	0.6190	8.9679*	8.0818*
7	Computer-based tests are easily accessible for students and teachers also.	2.0810	5.0151	3.5525
8	A computer-based test gives complete feedback about student performance immediately.	0.4489	0.5206	0.6723
9	Disabled students can access the computer-based question paper easily.	0.5789	3.1580	0.7440
10	A computer-based test reduces the chances of leakage of question paper with full security of the question paper.	0.1270	0.5946	2.8881

11	Students with varying exposure towards technology perform differently in computer-based examination.	0.7739	2.2115	2.0372
12	A computer-based test is very economical.	0.3637	2.9480	4.7598
13	A computer-based test requires a lesser number of support staff during test time.	0.3231	0.8452	4.5328
14	Once a computer-based question paper is prepared, it can be saved in the question bank for future concern.	0.1837	5.8449	1.9933
15	A computer-based test always needs good internet connectivity and an efficient power supply.	0.1837	1.8767	0.6577
16	A computer-based test needs very efficient and competent teachers.	4.2225	9.3870*	0.0969
17	Students are prejudiced about computer-based examination.	0.0829	1.0487	7.1540*
18	A computer-based test is not very useful for lower classes.	0.5435	4.9614	4.0613
19	It is difficult to measure the creative writing skills through computer-based examination.	0.3169	4.2444	1.8042
20	In computer-based examination, students can access questions in a set order only.	6.0315	0.4749	6.0903*
21	A computer-based test allows more time to think on each question.	1.3445	0.8060	5.6631
22	A computer-based test is a time saver on the part of students as well as teachers.	0.9172	1.9327	0.4349
23	In computer-based tests computer screen resolution may create concentration problem.	4.7727	1.8974	6.9001*
24	In computer-based examination, students psychological & biological monitoring and their each movement can also be checked.	3.4003	7.3920*	0.8165
25	A computer-based test needs extra trained staff as administrator prior to test hours.	2.8347	4.3486	0.2074
26	Only genuine students can appear in computer-based test without any fake identity.	5.9547	0.5390	1.1232

Table – 2 indicates the results of the intermediate biology students' perception towards CBT & PPT at the intermediate level in reference to their gender and computer efficiency level.

Gender-wise comparison - Significant differences ($\chi2$ = 6.1973 > 5.991, α = 0.05, df = 2) were found in the perception between male and female biology students for the statement 8 i.e. computer-based test gives complete feedback about student performance immediately. 44.4percent male and only 25percent of female students agreed for the above statement. The study of Darrell, (2003) suggested that male students are getting more chances of exposure to ICT which they utilize in learning and academic performances. Similar results were concluded by the study of Peter, et al. (2004), Jimoh, et al. (2012).

Computer efficiency level-wise comparison - Results showed that 74.5percent computer efficient & 44.5percent computer non-efficient students agreed that their time gets wasted in redrawing the pictures from screen to paper in computer-based test, which is a drawback of computer-based test (Ayebi-Arthur, 2010). This perception between the different level of computer efficient students regarding the statement 5 is significantly different ($\chi2$ = 8.9305 > 5.991, α = 0.05, df = 2).

Perception of students do not differ significantly for the rest of the statement in the questionnaire with respect to their gender and computer efficiency level and giving a mixed response which showed that there is not much difference in the perception of students about computer-based test and paper-pencil tests.

Table –1: Calculated χ2 value regarding teachers' perception

S. No.	Statements	Gender (χ2 value)	Computer efficiency level (χ2 value)
1	Students can choose their day and time of the computer-based test according to the slots available based on their convenience.	0.3846	1.6290
2	The correct answers marked can be changed before final submission with no error of double answering.	0.2842	0.9637
3	Students can practice mock tests before final computer-based examinations.	0.0277	1.5608
4	Proper training is not provided for the computer-based approach of the exam.	0.1379	0.4614

5	For several questions in Maths and Physics accompanying certain diagrams, students have to redraw in rough, this opportunity leading to a waste of 2 crucial minutes.	1.3599	8.9305*
6	In computer-based examination, an unlimited number of question sets can be prepared.	0.3175	1.3445
7	Computer-based tests are easily accessible for students and teachers also.	0.2377	0.5977
8	Computer-based test give a complete feedback about student performance immediately.	6.1973*	4.3001
9	Disabled students can access the computer-based question paper easily.	0.9091	0.7130
10	A computer-based test reduces the chances of leakage of question paper with full security of the question paper.	0.4441	0.8285
11	Students with varying exposure towards technology perform differently in computer-based examination.	0.2303	0.1778
12	A computer-based test is very economical.	0.6699	0.6988
13	A computer-based test requires a lesser number of support staff during test time.	0.2568	1.3164
14	Once a computer-based question paper is prepared, it can be saved in question bank for future concern.	2.3243	1.9971
15	A computer-based test always needs good internet connectivity and efficient power supply.	1.6733	3.6770
16	A computer-based test needs very efficient and competent teachers.	2.500	2.3529
17	Students are prejudiced about computer-based examination.	0.1648	5.1454
18	A computer-based test is not very useful for lower classes.	0.0956	3.9722
19	It is difficult to measure the creative writing skills through computer-based examination.	3.0952	0.6981
20	In computer-based examination, students can access question in a set order only.	5.4340	0.2941
21	A computer-based test allows more time to think about each question.	1.1902	0.8669
22	A computer-based test is a time saver on the part of students as well as teachers.	0.9173	1.4611
23	In computer-based test computer screen resolution may create concentration problems.	1.7411	1.8725

24	In computer-based examination, students psychological & biological monitoring and their each movement can also be checked.	0.5258	2.3343
25	A computer-based test needs extra trained staff as administrator prior to test hours.	0.0608	1.5966
26	Only genuine students can appear in computer based test without any fake identity.	0.6250	0.4412

Effectiveness parameter for computer-based examination

Table-3 displays the perceived effectiveness for computer-based tests over paper-pencil tests among the teachers and students in different parameters.

From the given table-3, it was depicted that the majority of sampled teachers (83.3percent) and intermediate biology students (86.7percent) strongly agreed that computer-based tests provide flexibility to students in choosing their test schedule.

Table - 3 shows that nearly 74percent teachers as well as 71percent students agreed that double answering is not possible in computer-based test. It was further illustrated from the table that a chunk of stakeholders (68percent teachers and 72percent students) agreed that computer-based test provides mock practices to students before the test. Likewise high percentage of teachers and students agreed for rest of the effectiveness parameter towards computer-based test as it has lesser clerical mistakes, immense set of question paper, easy accessibility, real-time quick report, disabled-students friendly, fully secured, cost-effective, less support staff requirements, futuristic approach, time saver, user-adaptive and curbs impersonation. Study of De Witte, and Rogge, (2014); Hismanoglu, (2012) showed that fewer students were found confident about computer-based tests before completing the assessment, while more number of students stated a preference for computer-based tests over paper-pencil tests.

The benefits of computer-based tests are enormous over paper-pencil tests as corroborated by Tinio (2002) and Ommerborn, R & Schuemer, R (2001) in their survey on computer use by disable students in Germany, found that the cost of acquiring and using a computer in tests is the greatest barrier due to the lack of training opportunities which include lack of access to ICT infrastructure, affordable connectivity with sufficient bandwidth, and a reliable supply of electricity.

It may be inferred that computer-based test is certainly more effective as perceived by the teachers and students in providing more flexibility to the students, no chances of double answering issues, availed mock practices, saves time because majority of teachers and students agreed with these statements. In addition, computer-based tests free up the time of teachers which can be utilized in other constructive works or in-depth discussion (Anakwe, 2008). Moreover, computer-based tests easily provide the repeated testing opportunities for

practice purposes and multiple-choice, true or false, and matching items can be easily administered through it (Anakwe (2008).

In addition, the perception of teachers and students inferred that computer-based test to be more effective as compared to the paper-pencil test in enabling the immense set of question paper set, in its accessibility, giving real-time quick results, disabled-students friendly, needed less support staff, providing extra time during, efficient test and users adaptive (Hosseini, M., Abidin, M. J. Z., Kamarzarrin, H., & Khaledian, M., 2013). This was also proved earlier that feedback plays a key role in assessment processes and is an important element of the learning process (Anakwe, 2008; Marriott, 2009). Garland (2008), who also believed that the benefits of standardized computer-based tests, such as quick and objective results and the ease of comparing results with others make this method very popular. This result reflects the similarity with Hewson (2012).

Table –3: Effectiveness parameter towards computer-based examination

S. No.	Parameters (Statement No.)	Respondents (N)	Agree (N) %	Undecided (N) %	Disagree (N) %
1	Flexibility (1)	Teachers (150)	(125) 83.3%	(16) 10.7%	(9) 6%
		Students (60)	(52) 86.7%	(4) 6.6%	(4) 6.7%
2	No chance of double answering (2)	Teachers (150)	(110) 73.3%	(19) 12.7%	(21) 14%
		Students (60)	(43) 71.7%	(12) 20%	(5) 8.3%
3	Mock practices (3)	Teachers (150)	(102) 68%	(12) 8%	(36) 24%
		Students (60)	(43) 71.7%	(10) 16.7%	(7) 11.6%
4	Lesser clerical mistakes (4)	Teachers (150)	(69) 46%	(66) 44%	(15) 10%
		Students (60)	(34) 56.7%	(10) 16.6%	(16) 26%
5	Immense set of question paper (6)	Teachers (150)	(69) 46%	(36) 24%	(45) 30%
		Students (60)	(20) 33.3%	(28) 46.7%	(12) 20%
6	Easy accessibility (7)	Teachers (150)	(60) 40%	(47) 31.3%	(43) 28.7%
		Students (60)	(33) 55%	(17) 28.3%	(10) 16.7%
7	Real time quick report (8)	Teachers (150)	(61) 40.7%	(57) 38%	(32) 21.3%
		Students (60)	(22) 36.7%	(21) 35%	(17) 28.3%
8	Disabled students friendly (9)	Teachers (150)	(64) 42.7%	(53) 35.3%	(33) 22%
		Students (60)	(33) 55%	(12) 20%	(15) 25%

9	Fully secured (10)	Teachers (150)	(50) 33.3%	(51) 34%	(49) 32.7%
		Students (60)	(23) 38.3%	(19) 31.7%	(18) 30%
10	Cost effectiveness (12)	Teachers (150)	(54) 36%	(55) 36.7%	(41) 27.3%
		Students (60)	(19)31.7%	(21) 35%	(20)33.3%
11	Less support staff requirement (13)	Teachers (150)	(62) 41.3%	(42) 28%	(46)30.7%
		Students (60)	(27) 45%	(16) 26.7%	(17) 28.3%
12	Futuristic approach (14)	Teachers (150)	(55) 36.7%	(58) 38.6%	(37) 24.7%
		Students (60)	(29) 48.3%)	(13) 21.7%	(18) 30%
13	Provision of extra time during the test (21)	Teachers (150)	(64) 42.7%	(34) 22.6%	(52) 34.7%
		Students (60)	(19) 31.7%	(16) 26.6%	(25) 41.7%
14	Time saving (22)	Teachers (150)	(92) 61.3%	(9) 6%	(49) 32.7%
		Students (60)	(24) 40%	(5) 8.3%	(31) 51.7%
15	User adaptive (24)	Teachers (150)	(65) 43.3%	(30) 20%	(55) 36.7%
		Students (60)	(35) 58.3%	(4) 6.7%	(21) 35%
16	Curbs impersonation (26)	Teachers (150)	(72) 48%	(17) 11.3%	(61) 40.7%
		Students (60)	(32) 53.3%	(4) 6.7%	(24) 40%

Conclusions

Research finding showed that most of the participant from teachers and students groups perceived that computer-based tests was more effective as compared with the paper-pencil tests in providing immediate feedback, use of archival databank of questions, flexibility to students, no double answering, availed mock practices and saves time, making immense set of question paper, accessibility, disables students friendly, giving real time quick results, needed lesser support staff, providing extra time in examination, users adaptive. Result suggested that acceptance of computer-based tests were higher among the male respondent compare to the female participants. Result also suggested that computer efficient participants and science background teachers accepted computer-based tests more.

Government should focus more on these groups of non-science female teachers and students who are not efficient in computer and arrange the training program for more exposure in computer-based tests. In addition, computer-based tests need more advanced technology for the ease of stakeholders such as screen problems, accessing the question in fixed pattern and lower classes applicability which limits its use.

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Appendices

A: Total number of Kendriya Vidyalayas in Uttar Pradesh

No. of Kendriya Vidyalayas in India	125
No. of Kendriya Vidyalayas in Uttar Pradesh	80
No. of Kendriya Vidyalayas in Prayagraj	975
No. of Kendriya Vidyalayas in Varanasi	3

B: List of PGTs in Kendriya Vidyalayas in Prayagraj and Varanasi

Districts	Name of Kendriya Vidyalaya	No. of Intermediate Teachers	No. of Intermediate Students
Prayagraj	KV Old Cantt	19	4
	KV New Cantt	29	62
	KV IIIT Jhalwa	7	12
	KV Naini	9	8
	KV Manauri	19	16
	KV Bamrauli	13	18
	KV Phulpur	10	10
	KV Chheoki	7	12
	KV Phaphamau	No Intermediate Classes	None
Varanasi	KV Cantt	12	10
	KV BHU	14	8
	KV DLW	14	12
		151	178

B: List of PGTs in Kendriya Vidyalayas in Prayagraj and Varanasi

Categories	Group (s)	(N) Percentage
Gender	Male / Female	(90) 60% / (60) 40%
Subject background	Science / Non-science	(71) 47.33% / (79) 52.67%
Computer efficiency level	Computer efficient / Computer non-efficient	(110) 73.33% / (40) 26.67%

D: Group-wise Percentages of Overall Sampled students

Categories	Group (s)	(N) Percentage
Gender	Male Female	(36) 60% (24) 40%
Computer efficiency level	Computer efficient / Computer non-efficient	(51) 85% (09) 15%