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Exploration of Opinionnaire of Subject Experts for Effectiveness of IT- Enabled Instructional Package in Science for X Class Students

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Abstract

ICT endows with a wide range of aids to solve problems and accomplishing tasks. ICT is now a significant element of the basic content of each of the disciplines that students study at the school level. In addition, ICT provides generic "productivity tools" that cut across all of the disciplines that students study. It is a dynamic field, growing rapidly in breadth and depth. Basic hardware capabilities of ICT, such as computer speed, computer storage capacity, telecommunications bandwidth, and the installed base are all growing rapidly. The next 15-20 years will likely bring us increases in computer speed, memory capacity, and telecommunications bandwidth by a factor of 1,000 or more. These hardware improvements, along with continued progress in software, will have aprofound impact on the societies of our world.While moving on the same trail, the investigators have developed anIT-Enabled Instructional Package in science for class X. In this context, an effort has been made to assess the opinion of subject experts for effectiveness of IT-Enabled Instructional Package (ITEIP) in science (Biology) for X class students. In the present study, an opinion scale wasdeveloped to obtain the ratings of subject experts on various statements regarding validity of IT-Enabled Instructional Package. The opinion scale was given to subject experts individually from various educational institutions of North India. The results of the study revealed that most of the experts favored the effectiveness of IT-Enabled Instructional Package (ITEIP).The analysis disclosedthe fact that it is highly useful for teachers as well as studentsand modify of the role of teachers as facilitator. It is determined that the inclusion of ITEIP in routine classroom teachingishelpful in increasing the achievement level of students at own pace in motivating and fascinating way in today competitive education system.

Keywords: IT-enabled instructional package (ITEIP), opinion, subject experts, X Class students

A new technology such as ICT is developed as an aid to helping to solve certain types of problems that people seem to be important. Education was not the driving problem that led to the development of ICT. However, ICT has proven to be a powerful aid in addressing a wide range of problems in education and in many other fields (Moursund, 2005). A new technology creates problems. First, there are the problems of change, as old ways of addressing certain problems give way to new ways to address the same problems. Second, the new technology facilitates the identification of old and new problems that can make effective use of the technology. Many of these are problems that could not and cannot be effectively addressed by older technologies. In terms of our educational system, ICT is the basis of many problems in curriculum content, teaching processes, assessment, and teacher education. There is a large and rapidly growing body of knowledge called the Science of Teaching and Learning (Bransford *et al.,* 1999). This analysis and practice-based knowledge provides a foundation for extensiveimprovements in teaching learning process by using ICT to enhance the achievement level of students. ICT is going to help in substantially improving education through aspects of curriculum content, instructional processes, and assessment that can be mass-produced and/or mass-reproduced, and mass-distributed.Technologies available in classroom today range from simple tool based applications to internet based multimedia, e-mail communication, blogs, wikis and podcasts. Research into the use of technology in classrooms demonstrates that technology plays a critical role in student learning (Russel, Lucas, and McRobbie, 2003). Schroeder *et al.,* (2007) showed the positive influence of the use of instructional technologies on student learning. The authors found that the most effective teaching strategy on student learning is "enhanced context strategies" such as making the content relevant to students' everyday life experiences. As the authors suggested, real world experiences can be easily brought to students through technology since the technology facilitates authentic science activities in the classroom. In the recent uses of ICT in the field of education, the multimedia encompasses a wide range of applications and technology in the field of education and entertainment. Technologically, Multimedia refers to electronic products that include (or at least can include) the full range of visual and auditory elements-images, audio clips, video clips. Multimedia provides a technology based constructivist learning environment where students are able to solve a problem by means of self explorations, collaboration and active participation (Neo and Neo, 2009). Jyothi (2007) indicated that that the self-instructional module prepared by a teacher through simple power point presentation could show immense impact on learning of chemistry. Serin (2011) revealed that there is statistically significant increase in the achievement and problem solving skills of the students in the experimental group that received the Computer-Based Science and Technology instruction. It increased motivation through learning that stimulates stretches and takes into account prior and concurrent experiences in and out of school. Sharma (2012) indicatedthat multimedia is helpful in strengthening the achievement of students inenvironmental scienceto bring environmental awarenesswhich is positively accepted by the teachers. The analysis of the opinionnaireclearly points towards one and only one direction that software package is effectivefor teaching of EVS**.** Chaudhari (2013) investigated that CAI is very useful for the achievement of students in biology subject. CAI can be used as the supplementary tool by the teachers to overcome the problems of Science like lack of visualization and it may minimize constraint of education.Gupta and Nagpal, 2013) revealed that most of the experts favored the effectiveness of Multimedia Teaching Package (MMTP). It is also

revealed that MMTP is helpful in strengthening the achievement of students as well as in maintaining the decorum in overcrowded classrooms as is the case of today's education system. Khirwadkar (1999) findings also shown that developed software package was effective in terms of academic achievement of the students and the students and teachers were found to have favorable opinion towards the software package. Sritaratorn and Sombunsukho (2011) revealed that the analysisof questionnaire for learners'satisfaction has shown that efficiency of computerinstructional package was higher than a set criterion (80/80). Tyagi (2012) also revealedthat experts possessed a favorable assessment result for different aspects of CAI module.Further, the coefficient of variation was quite low. It shows coherence on assessment ofdifferent aspects of CAI module by the experts. Review of studies showing the opinion of experts and towards IT-enabled instructional package by Kuzu (2007), Davis and Preston (2007), Joy and Shaiju (2004),Vekaria (2002), and Ranade (2001) found precedents in support of developed software for different subjects. All the studies given above revealed thatmost of the subject experts have positive attitude towards IT-enabledprogrammes. Hence, the investigators make an effort to undertake the current study to look for theopinion of subject experts for effectiveness of ITEIP inscience for tenthclass students.

Objwctives of the study

The present study is designed to realize following objectives:

1 To develop IT-Enabled Instructional Package (ITEIP) in Science for students of class X.

2 To develop an Opinionnairefor Effectiveness of IT-Enabled Instructional Package (ITEIP) in Science(Biology).

3 To analyze the opinions of subject experts for the effectiveness of IT-Enabled Instructional Package (ITEIP) in Science

Design of the study

Method Used: Descriptive method was used in the present investigation.

Sample: In order to obtain the ratings of subject experts on various statements regarding validity of IT-Enabled Instructional Package, the opinion scale was given to 30 subject experts individually from various educational institution of North India. Opinion on various aspects like content, presentation and relevance of IT-Enabled Instructional Package in Science (Biology) were elicited. These subject experts include subject teachers from theschools, teachers working in Department of Education and Colleges of Education andteacher educators working in the field of ICT from various educational institutions ofNorth India.

Tools Used

- **Opinionnaire for Effectiveness of IT-Enabled Instructional Package (ITEIP)**developedby the investigators themselves was used to seek the opinions of subject expertsabout the

effectiveness of ITEIP. It was consists of the three parts according to different weight age given to each: **Presentation of Content** contains ten statements, second part i.e. **Utility for Students** contains 15 statements and third part **Utility for Teachers** contains 10 statements. The method of assessment of each parameter is based on three points scale i.e. A: stands for Agree; DA: stands for Disagree; UD: stands for Undecided. Content validity of the scale was established after having opinionsfrom the subject experts. Items are given a score of 1, 0 and none for Agree, Disagree and Undecided. The sum of these values gives the effectiveness of developed multimedia teaching package in mathematics. The total score variesfrom 0 to 35 showing least effectiveness to highest effectiveness of IT-Enabled Instructional Package (ITEIP).

- **IT-Enabled Instructional Package (ITEIP) in Science for X class students**was developed byinvestigators themselves by using software such as AdobePhotoshop, Adobe After Effects, Adobe Illustrator, Adobe Sound Booth, Frutiloop and Swish 2.0. The package was prepared as perthe syllabus of CBSE board for tenth class.

Statistical Techniques Employed

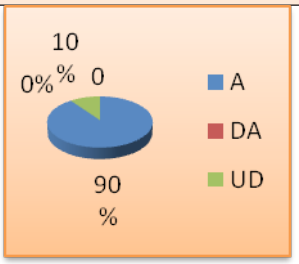
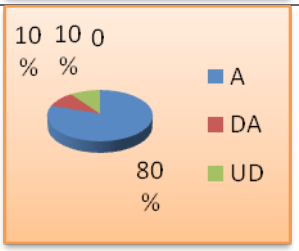
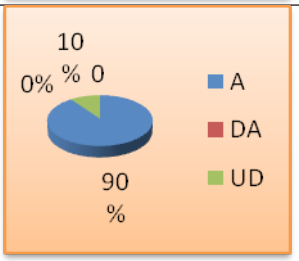
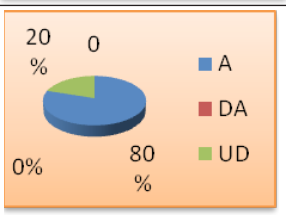
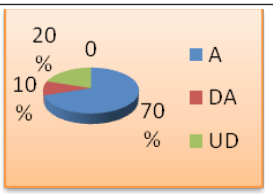
Percentage has been employed to show the responses of the subject experts.

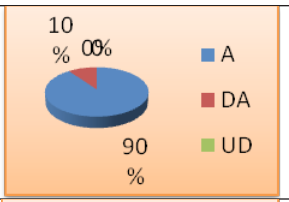
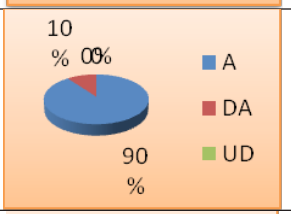
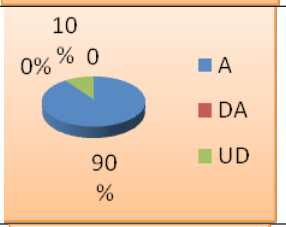
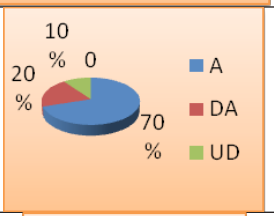
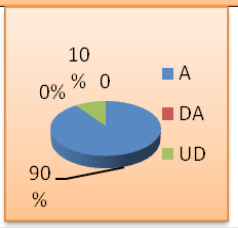
Analysis and Interpretation

The present section deals with the analysis of opinions of subject experts towards effectiveness of IT-Enabled Instructional Package in Science (Biology). Part wise deep analysis has also been done by the investigator to know the experts opinion about acceptance of IT-Enabled Instructional Package (ITEIP) in more explanatory way. The opinions of subject experts are presented in the form of percentage and pie chart in table 1, 3 and 5. Part-wise opinion has been presented in table 2, 4, 6 and also graphically shown as pie chart in fig.1, 2, and 3. The total opinion about effectiveness of IT-Enabled Instructional Package in Science (Biology) has also been presented in table 7 and also graphically shown as pie chart in Fig.4.

As far as the selection and presentation of the package is concerned, the table 1 revealed that 90% of subject experts have favorably acknowledged the content of package quite stimulating and interesting, well explained topics, logical sequencing and systematic structuring, quality of audio, color combination and use of relevant examples in learning material. Furthermore, 80% of subject experts have really appreciated the language and distribution, arrangement of main and sub-topics and beginning of the package. It can further be revealed from the Table that 70% subject experts have agreed with the number of slides and extent of animation and audio-visuals used in the package. It can be interpreted from the Table 2 and Fig.1 that 84% given their agreement, only 6% of experts disagreed and the rest 10% remain undecided about the statement given in the scale in part-A i.e. ‘Presentation of content’. The subject experts appreciated that the fact that ITEIP elaborate the complex concepts of science in a simple way. Overall the presentation of content was stated as the strong points of ITEIP highlight the acceptance of IT-Enabled Instructional Package.

Table 1 : Statement-wise Representation of Opinion of Subject Experts about Effectiveness of IT-Enabled Instructional Package in Science (Biology) with respect to 'Presentation of Content'

No.	Statement	A	DA	UD	Pie Chart
	Part -A: Presentation of content				
A.1	The IT-Enabled Instructional packageis quite stimulating and interesting.	**27** (90%)	**0** (00%)	**3** (10%)	
A.2	The language of the material is as per the level of the students.	**24** (80%)	**3** (10%)	**3** (10%)	
A.3	Topics chosen are well explained in the package.	**27** (90%)	**0** (00%)	**3** (10%)	
A.4	Main topics and sub-topics are being properly arranged.	**24** (80%)	**0** (00%)	**6** (20%)	
A.5	The slides in the presentation are sufficient to make the content understandable.	**21** (70%)	**3** (10%)	**6** (20%)	

A.6	Sequencing and structuring of learning content is logical and systematic.	**27** (90%)	**3** (10%)	**0** (00%)	
A.7	The sound in the package is clearly audible.	**27** (90%)	**3** (10%)	**0** (00%)	
A.8	Color combination, foreground, background, resolution, and choice of format are well planned.	**27** (90%)	**0** (00%)	**3** (10%)	
A.9	Extent of animation, audio, visuals and other such material is being used in appropriate proportion and as per the need of content.	**21** (70%)	**6** (20%)	**3** (10%)	
A.10	Simple and relevant examples are being used to clarify the concept.	**27** (90%)	**0** (00%)	**3** (10%)	

A perusal of second part of opinionnaire from table 2 revealed that 90% subject experts opined that ITEIP is quite successful in capturing the attention of students, enhance their concentration level, self-pace learning, elaboration of complex concepts, recollect all the points easily and can use as and when required. Also 80% subject experts have acknowledged the accessibility of previous content, real-life element, motivates students learning, removal of fear from learners for science and virtual demonstration of activities with the help of package. It can further be interpreted that 70% of subject experts recognized the development of scientific outlook of the students and remove their difficulties with the help of package. It has been further shown in the table 4.3 that 82.66% given their agreement, only 6.67% of experts disagreed and the rest 10.67% remain undecided about the statement given in the scale in Part-B i.e 'Utility for Students'.

Table 2: Experts Overall Opinion about Effectiveness of IT-Enabled Instructional Package with respect to Presentation of Content

Opinion (In Percent)	Agree	Disagree	Undecided
Presentation of Content	84%	6%	10%

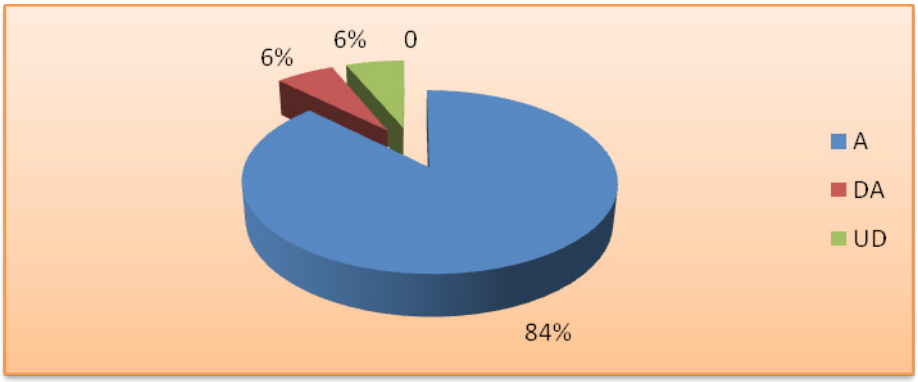
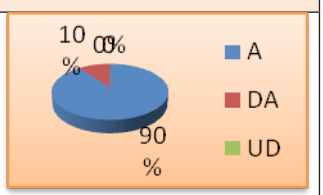
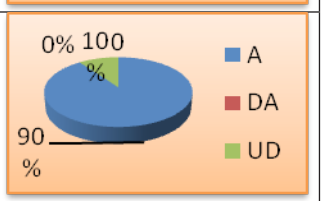
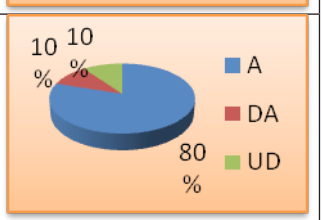
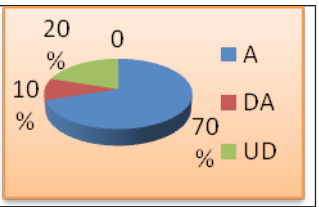
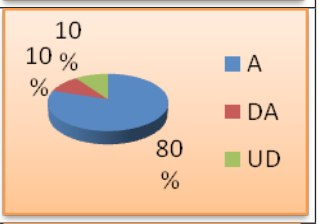
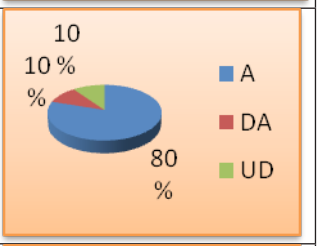
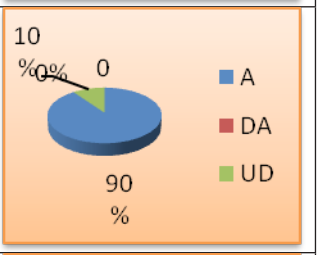
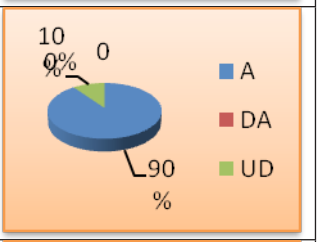
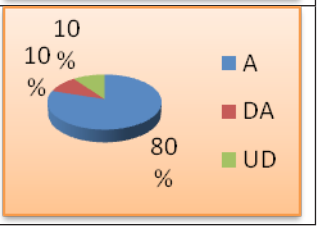


Fig.1: Experts Overall Opinion about Presentation of Content

Table 3: Statement-wise Representation of Opinion of Subject Experts about Effectiveness of IT-Enabled Instructional Package in Science (Biology) with respect to 'Utility for Students'

No.	Statement	A	DA	UD	Pie Chart
	Part-B: Utility for Students				
B.1	It helps in capturing the attention of students.	**27** (90%)	**3** (10%)	**0** (00%)	
B.2	It enhances their concentration level.	**27** (90%)	**0** (00%)	**3** (10%)	
B.3	It is possible for the students to access the previous content with their ease.	**24** (80%)	**3** (10%)	**3** (10%)	

B.4	It develops the scientific outlook of the students.	**21** (70%)	**3** (10%)	**6** (20%)	
B.5	Students would be able to apply the knowledge of science concepts to real life situation.	**24** (80%)	**3** (10%)	**3** (10%)	
B.6	It helps the students in removing their phobia toward science.	**24** (80%)	**3** (10%)	**3** (10%)	
B.7	It is helpful in clarifying the basic concepts of science.	**27** (90%)	**0** (00%)	**3** (10%)	
B.8	By usingIT- Enabled Instructional Package, students can learn at own pace.	**27** (90%)	**0** (00%)	**3** (10%)	
B.9	The package motivates students learning effectively.	**24** (80%)	**3** (10%)	**3** (10%)	

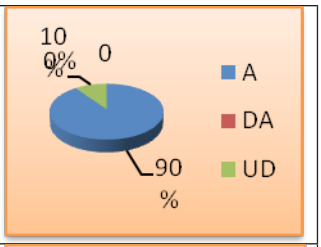
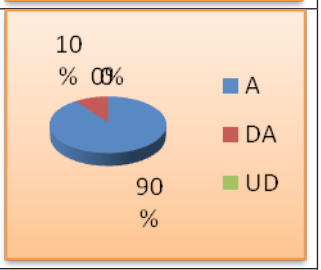
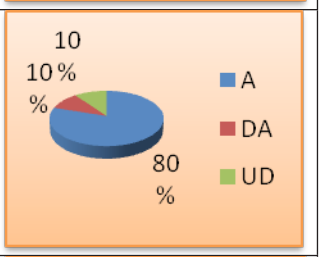
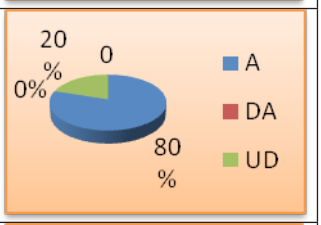
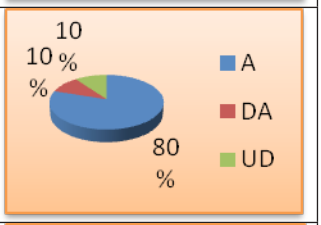
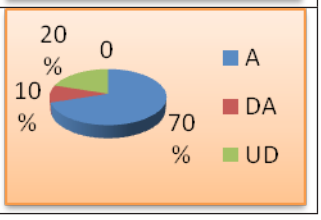
B.10	The package can enable the students to grasp and recollect all the points easily.	**27** (90%)	**0** (00%)	**3** (10%)	
B.11	Students can use the package as and when required.	**27** (90%)	**3** (10%)	**0** (00%)	
B.12	It is quite interesting for them to have virtual demonstration of activities.	**24** (80%)	**3** (10%)	**3** (10%)	
B.13	It engages the students in activities that allow them to imagine.	**24** (80%)	**0** (00%)	**6** (20%)	
B.14	It helps the students to make their academic performance better.	**24** (80%)	**3** (10%)	**3** (10%)	
B.15	It would enable the students to remove their difficulties as and when required.	**21** (70%)	**3** (10%)	**6** (20%)	

Table 4: Experts Overall Opinion about Effectiveness of IT-Enabled Instructional Package with respect to 'Utility for Students'

Opinion (In Percent)	Agree	Disagree	Undecided
Utility for Students	82.66%	6.67%	10.67%

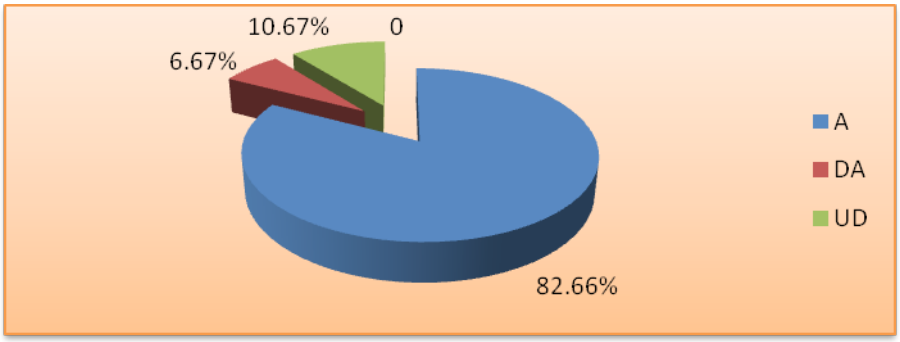
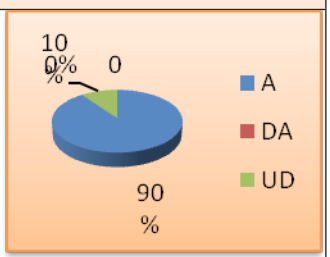
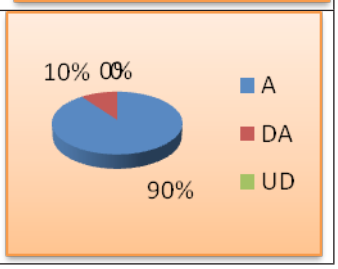
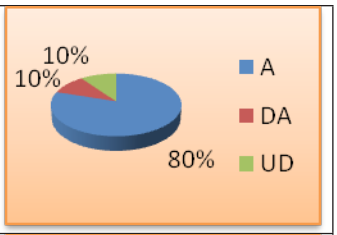
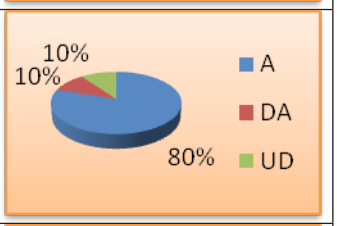
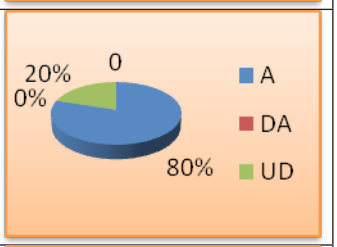
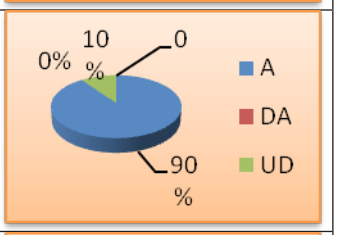
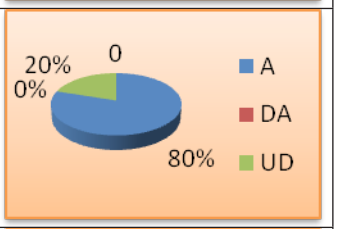
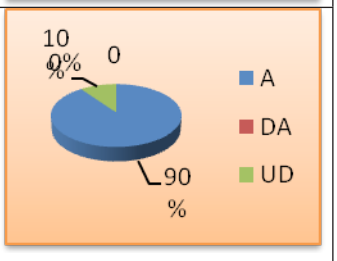


Fig.2: Experts Overall Opinion about Utility for Students

Table 5: Statement-wise Representation of Opinion of Subject Experts about Effectiveness of IT-Enabled Instructional Package in Science (Biology) with respect to 'Utility for Teachers'

No.	Statement	A	DA	UD	Pie Chart
	Part-C: Utility for Teachers				
C.1	It introduces the teachers with the innovative techniques of teaching and learning.	27 (90%)	0 (00%)	3 (10%)	
C.2	Teacher can easily elaborate the complex concepts of science through this IT- Enabled Instructional Package**.**	**27** (90%)	**3** (10%)	**0** (00%)	

C.3	It is helpful in developing potential of teachers to discover learning together.	**24** (80%)	**3** (10%)	**3** (10%)	
C.4	It helps the teacher in maintaining the proper decorum, especially in overcrowded classrooms.	**24** (80%)	**3** (10%)	**3** (10%)	
C.5	Teacher can easily make the revision of important points as and when required.	**24** (80%)	**0** (00%)	**6** (20%)	
C.6	It saves time and energy of teachers to make the students understand the complex concepts.	**27** (90%)	**0** (00%)	**3** (10%)	
C.7	Teacher can effectively facilitate the students learning with the help of the package	**24** (80%)	**0** (00%)	**6** (20%)	
C.8	This package can be easily used in classroom teaching.	**27** (90%)	**0** (00%)	**3** (10%)	

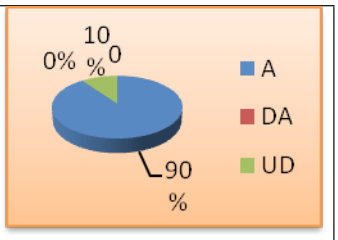
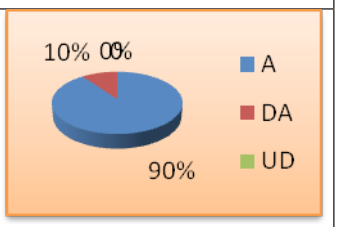
C.9	It is easy for the teacher to visualize scientific activities in the classroom instead of using laboratory.	**27** (90%)	**0** (00%)	**3** (10%)	
C.10	Teacher can easily monitor learning progress of students frequently and take feed-back effectively through MCQs in the package.	**27** (90%)	**3** (10%)	**0** (00%)	

Table 6: Experts Overall Opinion about Effectiveness of IT-Enabled Instructional Package with respect to 'Utility for Teachers'

Opinion (In Percent)	Agree	Disagree	Undecided
Utility for Teachers	86%	4%	10%

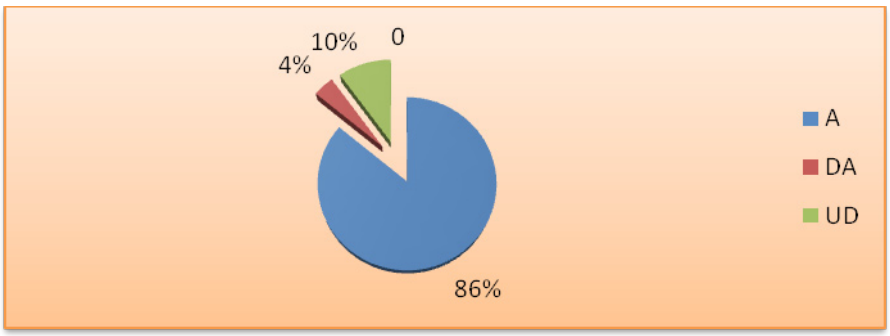


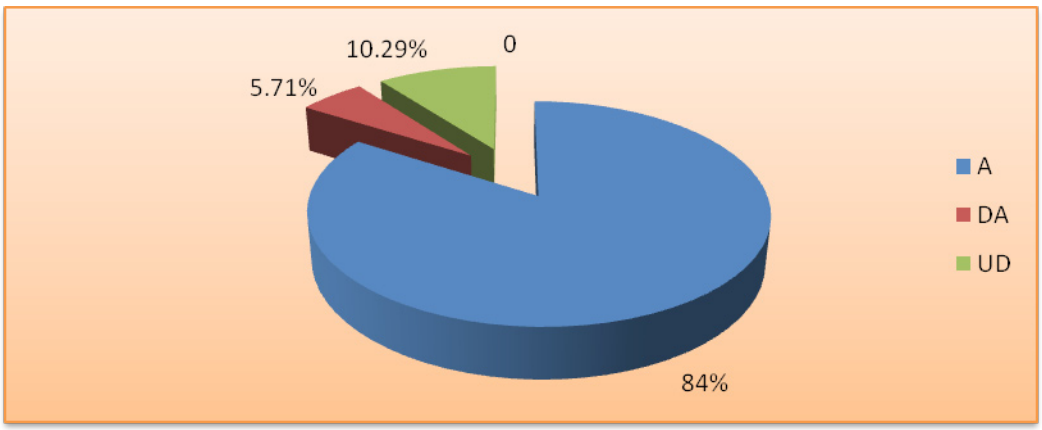
Fig.3: Experts Overall Opinion about Utility for Teachers

It has been further asserted from third part of opinionniare from table 5 that 90% of subject experts have positively acknowledged the provision of innovative techniques of teaching to the teachers, elaboration of complex concepts of science, saves time and energy, visualize scientific activities in classroom, monitor learning progress of students frequently and take feed-back effectively through MCQs at the end of each lesson given in the package. 80% experts have agreed that ITEIP is quit helpful in developing potential of teachers to discover learning together, in maintaining decorum and

providing revision of important points and effectively facilitate the students learning. It can be further revealed from table 6 that 86% experts in agreement, only 4% of experts disagreed and the rest 10% remain undecided about the statement given in this scale. Furthermore, the analysis revealed that it is highly useful for teachers and modify of the role of teachers as facilitator and its inclusion in routine classroom teaching.

Table 7: Total Opinion of Experts about Effectiveness of IT-Enabled Instructional Package

Opinion (In Percent)	Agree	Disagree	Undecided
Total Opinion	84%	6%	10%



A= AGREE DA = DISAGREE UD = UNDECIDED

Fig.4: Total Opinion of Experts about Effectiveness of IT-Enabled Instructional Package in Science (Biology)

Total opinion of experts regarding overall selection of content have been analyzed and presented in table 7 and in the form of pie chart in fig. 2. It can be interpreted from table 7 that 84% of the experts agreed for the effectiveness of IT-Enabled Instructional Package (ITEIP) in Science. Only 6% of experts disagreed and the rest 10% remain undecided about the statement given in the scale. The findings obtained from the opinion scale indicate that most of the experts favored for the effectiveness of IT-Enabled Instructional Package. It has been commented by them that it is convenient to use this package in the classroom. Furthermore, the analysis revealed that it is highly useful for teachers as well as students. Therefore, It can be concluded that it is helpful in increasing their achievement level at own pace in motivating and fascinating way in today competitive education system.

Conclusion

The current study was carried out to look for the opinion of subject experts towards theeffectiveness of ITEIP in science for tenth class students.After getting responses from various experts, the investigators found that most of thesubject experts were havingpositive attitude towards IT-Enabled Instructional Package in science. The experts suggested that ITEIP should be made an inseparable part of normal classroom teaching-learning process then only we can make maximum benefit from this approach. It is also determined that through using ITEIP, students would be able to apply the knowledge of science concepts to real life situation and helpful in developing their scientific outlook.The subject experts appreciated that the fact that ITEIP elaborates the complex concepts of science in a simple way and it is highly useful for teachers as well as students. Overall the presentation of content was stated as the strong points of ITEIP highlight the acceptance of IT-Enabled Instructional Package.In the current scenario of educational institutions, multimedia has overcome the barriers of time and space and provides evidence to be accepted as an anytime and anywhere tool for educating multi-disciplinary masses (Malik and Agarwal, 2012). The process of knowledge acquisition becomes more efficient when the learners experience an event through a multimedia simulation. Multimedia technology empowers the educational process by means of increased interaction between teachers and the students and can provide them with endless possibilities of quality teaching and learning.Given the importance of IT in interactive learning especially in science subject, it is most important that the teacher must be educated and trained more thoroughly about IT, its importance and how it can be infused in teaching. One word of caution though is that the undoubted tremendous potential of IT be harnessed in wise and conscious way (Varinder, Monicaand Parul, 2011).

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