Chapter - VI

Findings, Discussions, Conclusions, Educational Implications and Suggestions for Further Research.

-We pass through research from subjective or personal experience to objective validity and universal applicability.

-Robert R. Rusk
6.00 INTRODUCTION

The ultimate purpose of research is to draw out valid conclusions which can be generalised, within limits, to other situations and to other sections of the population than the one studied. Such generalisations must not be hasty and far-fetched and must be compatible with the limitations of the research design. Thus this Chapter has been devoted to focus on the conclusions of the study which are drawn on the basis of results obtained and their discussion. The wide range of implications, emerging during the course of this discussion, will also be focused on. A research done opens many more areas to be searched out, Hence an effort has been made to provide some such areas for further research in the field related to this study.

The finding have to be considered strictly in relation with the objectives of the study. It is hoped that the results emerging from the present study may form a basis for formulating some valid conclusions in the area. However, in this context, it is important to note that the conclusions drawn on the basis of analysis and interpretation of data may be meaningful, though there have been some unavoidable limitations.

Needless to stress that the conclusions drawn here will appear relevant and tenable only when they are evaluated with reference to a population similar to the one employed in this investigation. Before pinpointing the conclusions associated with the present experiment, it will be in the fitness of things to take notice of the following things.

A conventional instructional system can be distinguished from Audio-Video instructional system and Multimedia instructional system, as they are based on certain principles of learning. The student is given immediate feedback which can not be possible with conventional instructional system. In Audio Video instructional system and Multimedia instructional system, student is always active and alert because of direct instruction.
between student and instructional system. The audio-video instructional system was prepared and evaluated by investigator himself. The instructional material was revised and evaluated with respect to individual try-out, group try-out and evaluation of whole instructional system. The reliability of Audio-Video instructional system in terms of criterion scores was found to be 0.84

The investigator developed a strategy in which multimedia in form of Computer C.D. was used to expose to the students individually. It is a combination of teaching having Audio-Video facility, text facility, forward and backward facility in which the students can do self learning and can do practice on computer after getting the instructions from the multimedia instructional system. The multimedia instructional system was prepared by investigator himself and it was revised and evaluated on the basis of try-outs, suggestions of educationists, media experts and subject experts. The reliability of multimedia instructional system was found to be 0.88.

A criterion test is one that tests whether the student has attained behaviour goals. Criterion test was prepared and evaluated by the investigator himself. The reliability coefficient of the criterion test was found to 0.86 by application of KR-21 Formula. The reliability coefficient increased to 0.94, when Spearman - Brown Prophecy Formula was applied. It may be stated that the criterion test was found to be highly reliable.

The validity of the test was also established by applying a chi-square test for the observed difference between the instructional items and the criterion test items. The value of chi-square was found to 0.18 for unit I, 0.02 for unit II & 0.08 for unit III for 2 degrees of freedom. The value was found to be sufficiently below the table value which is 5.99 at 0.05 level of significance. It may be concluded that the criterion test has high content validity. Thus, the criterion test may be used to measure the terminal behaviours.

In the previous chapter results, interpretation, and discussions of the results have been presented. This chapter includes the findings, discussions, conclusions drawn, educational implications of the present investigation and suggestions for further research.
OBJECTIVES RESTATED:

(1) To compare the effectiveness of Audio-Video Instructional System, Multimedia Instructional System and Conventional Instructional System in terms of achievement in 'Information Technology'.

(2) To study the relative retention in "Information Technology" in learning through Audio-Video Instructional System, Multimedia Instructional System and Conventional Instructional System.

(3) To study the Interaction effects in terms of achievement in "Information Technology" having three instructional system and two levels of intelligence.

(4) To study the Interaction effects in terms of achievement in "Information Technology" having three instructional system and two levels of sex.

(5) To study the Interaction effects in terms of achievement in "Information Technology" having different levels of intelligence and sex factor.

(6) To study the Interaction effects in terms of achievement in "Information Technology" having three instructional system, two levels of intelligence and two levels of sex.

(7) To develop Audio-video instructional system on selected content of "Information Technology".

(8) To develop Multimedia instructional system on selected content of "Information Technology".

(9) To develop the conventional Instructional System on selected content of 'Information Technology'.

(10) To construct achievement test on selected content to study the effectiveness.

6.1.0 FINDINGS

The statistical data of the present study reveals the following findings:-

The first Hypothesis is below mentioned :-

$H_1$ - There is no significant difference in the mean achievement scores of secondary school students in Information Technology receiving instructions through Audio-Video instructional system, Multimedia instructional system and Conventional instructional system.
From the analysis variance Table No. 5.2 on gain achievement scores, the obtained F value is 28.39 which is significant at 0.01 level. The null hypothesis is rejected and there is a significant difference among three instructional systems. When 'F' test was significant, then 't' test was applied on it.

(a) Further, 't' value between Audio-Video instructional system and multimedia instructional system was found to be 4.10 with df = 78 was significant at 0.01 level indicating thereby that these two methods differ significantly. Further it is also evident that the 'Information Technology' taught to secondary School Students through Multimedia instructional system got mean score of 50.55, which was greater than the mean score 47.5, when they were taught 'Information Technology' through Audio-Video instructional system. Hence it can be interpreted that the students learn better by Multimedia Instructional system than Audio-Video instructional system.

This result is also supported by Kumar, who developed a lesson for science students and taught them through three methods. The result of the study revealed that Multimedia method was found to be more effective than programmed learning method.

The result is further supported by Basu who evolved the multimedia programmed material in the teaching of physics. The findings of his study was the strategy of Multimedia programmed instruction was better than strategy of programmed teaching.

Further, result is supported by Ravindernath who undertook the study to develop a duly validated multimedia instructional strategy teaching biology at standard VIII. The result indicated that Multimedia instructional strategy was found to be effective in terms of achievement.

(b) Further, 't' value between Audio-Video Instructional system and Conventional Instructional system was found to be 4.12 with df = 78 which was greater value than table value i.e. 2.375 at 0.01 level indicating thereby that these two methods differ significantly. Further, it is also evident that Information Technology taught to secondary school students through Audio-Video instructional system got means score 47.5, which is greater than the means score i.e. 44.55, when they were taught Information Technology through Conventional Instructional system. From this discussion, it may be interpreted that the students learn
better by Audio-Video instructional system as compared to Conventional instructional system. Hence the former is more effective than the later.

This result is also supported by Dhamija, who made an investigation to see the comparative effectiveness of three approaches of instructions - conventional, radio-vision and modular approach for achievement of students in social studies. The study revealed that the student achieved the high knowledge achievement scores in Geography when taught through radio-vision approach & student achieve the high scores in history when taught through conventional approach.

This result is further supported by Kothari, who developed to investigate the efficacy of visual projection over traditional method of teaching.

This result is further supported by Sharma, who developed to teach the science students through four presentation modes i.e. Demonstration Mode (DM), Video Instructions Mode (VM), Video Instructions followed by Teacher's Discussion Mode (VDM) and Students Learning through Self Experimentation under the guidance of Teacher's Mode (SLM).

(c) Further, 't' value 6.52 between Multimedia instructional system and Conventional instructional system was also found to be greater than table value with df = 78, which is 2.374 at 0.01 level indicating thereby that these two methods differ significantly. Further, it is also evident that Information Technology taught to secondary school students through Multimedia instructional system got mean score 50.55, which is far greater than the students taught Information Technology through conventional instructional system, whose mean score was 44.55. Hence, it can be interpreted that the students learn better by Multimedia instructional system than conventional instructional system. Hence, the former is more effective than the later.

This result is also supported by R.D. Singh, S.P. Ahluwalia, S.K. Verma, who studied the problem of "effectiveness of computer-assisted instruction and of the conventional method of instructions in teaching mathematics and direction of change in attitude towards mathematics of male and female students.

Further, the result is also supported by P. Kaswekar, who attempted to study the effectiveness of multimedia package developed to enhance population awareness among
teacher trainees of primary teacher training instructions, who developed that multimedia package was more effective in changing the attitude of teacher trainees towards population education as compared to lecture method.

Further, this result is also supported by Jayachandran who studied the efficacy of programmed film strips as a method of teaching history in the secondary school. The major findings of the study revealed that programmed filmstrips with teacher method was more effective than programmed filmstrips without teacher.

In summing up the interpretation, we may conclude that the mean score of the students taught Information Technology through Multimedia instructional system was 50.55, which was greater than mean score of students taught through Audio-Video instructional system, which was 47.5. The mean score of students taught information technology through conventional instructional system which was 44.55. Hence, it can be interpreted that the students learn best by Multimedia instructional system compared to Audio-Video instructional system, moreover the Audio-Video instructional system was better than conventional instructional system.


(II) The Second Hypothesis is mentioned as under

$H_2$ - There is no significant difference in the mean achievements of secondary school students in "Information Technology" in the relative retention of students learning through Audio-Video instructional system, Multimedia instructional system and Conventional instructional system.

In the above research, it was found that there is a significant difference in the mean
achievement of students receiving instructions through Multimedia instructional system, Audio-Video instructional system and Conventional instructional system on retention.

The obtained F values from table No. 5.5 is 25.31 with df (2, 117) is more than the table values 4.80 at 0.01 level of significance with df (2, 117). The null Hypothesis is rejected and it may be stated that there is a significant difference between the three methods on retention.

The retention in learning to three instructional system was also tested by administering the achievement test again after a gap of one month from the experiment.

Retention refers to the amount of material remaining over a period of time. The total learning equals to the amount of material retained plus the amount of forgetting. Statistical analysis was carried out on difference score obtained by subtracting second post-test from first post-test. The purpose was to test the effectiveness of three methods on retention using the assumption that a method lower on mean scores i.e. mean score of Multimedia instructional system i.e. M=4.00 would be termed as more effective on retention as compared to a method having higher mean scores i.e. Audio-Video instructional system having M=6.25 and Conventional system having M=8.5, which would be termed as less effective on retention. If F test was significant then 't' test was applied on it.

(a) Further, 't' value between Audio-Video instructional system and Multimedia instructional system was found to 5.09 with df = 78, which was greater than table value i.e. 2.374 at 0.01 level indicating that these methods differ significantly. Further, it is also evident that Information Technology taught to secondary school students through Multimedia instructional system got mean score i.e. M = 4.00 which is less than the mean score 6.25, when Information Technology is taught through Audio-Video instructional system on retention. Hence, it can be interpreted that the students learn better by multimedia instructional system than Audio-Video instructional system on retention.

This result is supported by llangovan, who studied the effectiveness of Audio-Video Intervention in developing listening comprehension in English at higher secondary stage. It was found that AVPSS(Audio-Video Presentation as a support system was more effective as compared to MNGI (Media based non interactive group method) in enhancing
retention of the micro skills namely the ability to detect attitude of speaker towards subject matter to identify relationship among units within discourse and the ability to make use of facial, paralinguistic and other clues to arrive at meaning.

(b) On retention, further 't' value between Audio-Video instructional system and Conventional instructional system was found to be 3.06 with df = 78 was greater than table value which is 2.374 at 0.01 level indicating thereby that these methods differ significantly. Further, it is also evident that Information Technology taught to secondary school students through Audio-Video instructional system got mean score 6.25, which is less than the mean score 8.50, when Information Technology taught to secondary school students through Conventional instructional system on retention.

From this discussion, it may be interpreted that the students have better retention by Audio-Video instructional system than Conventional instructional system. Hence, the former is more effective than the later.

This result is also supported by Kumar, who compared the expository method and programmed learning method on the basis of their effectiveness in the retention of material learnt.

(c) On retention, further 't' value between Multimedia instructional system and Conventional instructional system was found to be 6.62 with df = 78 was greater than table value which is 1.66 at 0.05 level and 2.37 at 0.01 level indicating thereby that these methods differ significantly. Further it is also evident that Information Technology taught to secondary school students through Multimedia instructional system got mean score i.e. M=4.0, which is less than the mean score i.e. M=8.50 when Information Technology taught to secondary school students through Conventional instructional system on retention. From this discussion, it may be interpreted that the students have better retention by Multimedia instructional system. Hence, the former is more effective than later.

This result is supported by Samant, who studied the efficacy of communication media, a comparative evaluation. The results of the comprehension and retention of the programme contents indicated that the media programmes were moderately comprehended but retained well, and there was no effect of any remarkable merit of the duration of exposure
on the target audience.

In summing up the interpretation, we may conclude that the mean score of students taught 'Information Technology' through Multimedia instructional system on retention was 4.00, which is less than mean score of students taught Audio-Video instructional system which is 6.25 and mean score of students taught 'Information Technology' through Conventional instructional system which is 8.50. Hence it can be interpreted that the students learn best by Multimedia instructional system having low mean score i.e. M=4.00 because method is more effective on retention as compared to a method having higher mean score i.e. Audio-Video instructional system having M = 6.25 and Conventional instructional system having M=8.50.

III The third Hypothesis findings are mentioned as below

$H_3$: There is no significant interaction in terms of mean achievement of secondary school students learning through three instructional system at high and low level of intelligence.

The obtained $F_{AB}=45.37$ from table No. 5.9, is significant at 0.01 level. So hypothesis is rejected. Therefore it may be interpreted that the interaction of teaching methods and intelligence level is significant.

Further, 't' ratios for different combination of treatments and intelligence levels (AxB) were recorded in table No. 5.14 and reveals the following results.

- High intelligent students learning through Multimedia Instructional System learn better than high intelligent students learning through Conventional Instructional System.
- High intelligent students learning through Conventional Instructional System better than average intelligent students learning through Conventional Instructional System.
- Average intelligent students learning through Audio-Video Instructional System learn better than high intelligent students learning through Conventional Instructional System.
- High intelligent students learning through Multimedia Instructional System learn better than high intelligent students learning through Audio-Video Instructional System.
- High intelligent students learning through Audio-Video Instructional System learn better than average intelligent students learning through Conventional Instructional System.
- Average intelligent students learning through Audio-Video Instructional System learn better than high intelligent students learning through Audio-Video Instructional System.
- High intelligent students learning through Multimedia Instructional System learn better than average intelligent students learning through Conventional Instructional System.
- High intelligent students learning through Multimedia Instructional System learn better than average intelligent students learning through Audio-Video Instructional System.
- High intelligent students learning through Multimedia Instructional System learn better than average intelligent students learning through Multimedia Instructional System.
- Average intelligent students learning through Audio-Video Instructional System learn better than average intelligent students learning through Conventional Instructional System.
- Average intelligent students learning through Multimedia Instructional System learn better than average intelligent students learning through Conventional Instructional System.

The above study is supported by Kumar, who studied the factorial design of 3X2, in which he studied the two levels of intelligence, interacting with three methods of instruction.

This result is also supported by Ankleshwaria, who investigated into the relative effectiveness of three instructional strategies. He used three levels of intelligence to see the interaction with three instructional strategies. He used Latin square design and randomised group design.

IV) The fourth hypothesis findings are mentioned below:

\[ H_4: \text{There is no significant interaction in terms of mean achievement of secondary school students learning through three instructional systems at male and female secondary school students.} \]

As mentioned in the hypothesis, interaction effects between teaching methods and level of sex factor is insignificant.

The obtained \( F_{AC} = 0.08 \) from table No. 5.9 which is not significant at 0.01 level. So hypothesis is accepted. Therefore interaction of teaching methods with levels of sex is not significant. It may be concluded that there will be no any difference while learning Information...
technology by male and female secondary school students. When three instructional systems (A) and two levels of sex (C) are taken jointly, they do not effect the dependent variable i.e. achievement scores of students in 'Information Technology'.

V) The fifth hypothesis findings are mentioned below:

\[ H-5: \text{There is no significant interaction in terms of mean achievement of secondary school students learning "Information Technology" through two levels of intelligence and two levels of sex.} \]

As mentioned in the hypothesis interaction effects between two levels of intelligence and two levels sex is significant. In factorial design (3x2x2), the obtained \( F_{BC} = 19.01 \) from table No. 5.9 which is significant at 0.01 level. So, hypothesis is rejected. Therefore the interaction of different levels of intelligence and different levels of sex is significant. When F test is significant then 't' test is applied on it.

Further, 't' ratios for different combinations of two levels of intelligence and two levels of sex (BxC) are recorded in table No. 5.17 and reveals the following results.

- High intelligent boy students learn better than average intelligent boy students.
- High intelligent boy students learn better than high intelligent girl students.
- High intelligent boy students learn better than average intelligent girl students.
- High intelligent girl students learn better than average intelligent girl students.

This result is supported by Neeru, who studied the comparative study of the effectiveness of inquiry training model and mastery learning model for teaching mathematics in the context of different cognitive styles. She used 3X2X2 factorial design to study the interaction effects.

VI) The sixth hypothesis findings are mentioned below:

\[ H-6: \text{There is no significant interaction in terms of mean achievement of secondary school students learning "Information Technology" through three instructional systems, two levels of intelligence and two levels of sex.} \]

The interaction between teaching methods, two levels of intelligence & two levels of sex is significant. In factorial design (3x2x2), the obtained \( F_{ABC} = 20.48 \) from table No. 5.9 is significant at 0.01 level. It may be concluded that there is significant interaction between three teaching methods, two levels of intelligence & two levels of sex. When F test is
significant then 't' test is applied on it.

Further, 't' ratios for different combinations of three treatments, two levels of intelligence and two levels of sex (AxBxC) were recorded in table No. 5.25 and reveals the following results.

- High intelligent boy students learning through Conventional Instructional System learn better than high intelligent boy students learning through Audio-Video Instructional System.
- High intelligent boy students learning through Multimedia Instructional System learn better than high intelligent boy students learning through Conventional Instructional System.
- High intelligent boy students learning through Conventional Instructional System learn better than high intelligent girl students learning through Conventional Instructional System.
- High intelligent boy students learning through Conventional Instructional System learn better than high intelligent girl students learning through Audio-Video Conventional Instructional System.
- High intelligent girl students learning through Multimedia Instructional System learn better than high intelligent boy students learning through Conventional Instructional System.
- High intelligent boy students learning through Conventional Instructional System learn better than average intelligent boy students learning through Conventional Instructional System.
- High intelligent boy students learning through Conventional Instructional System learn better than average intelligent girl students learning through Conventional Instructional System.
- High intelligent boy students learning through Conventional Instructional System learn better than average intelligent girl students learning through Audio-Video Instructional System.
- High intelligent boy students learning through Conventional Instructional System
learn better than average intelligent girl students learning through Multimedia Instructional System.

- High intelligent boy students learning through Multimedia Instructional System learn better than high intelligent boy students learning through Audio-Video Instructional System.

- High intelligent boy students learning through Audio-Video Instructional System learn better than high intelligent girl students learning through Conventional Instructional System.

- High intelligent boy students learning through Audio-Video Instructional System learn better than high intelligent girl students learning through Audio-Video Instructional System.

- High intelligent girl students learning through Multimedia Instructional System learn better than high intelligent boy students learning through Audio-Video Instructional System.

- High intelligent boy students learning through Audio-Video Instructional System learn better than average intelligent boy students learning through Conventional Instructional System.

- Average intelligent boy students learning through Audio-Video Instructional System learn better than high intelligent boy students learning through Audio-Video Instructional System.

- High intelligent boy students learning through Audio-Video Instructional System learn better than average intelligent girl students learning through Conventional Instructional System.

- High intelligent boy students learning through Audio-Video Instructional System learn better than average intelligent girl students learning through Multimedia Instructional System.

- High intelligent boy students learning through Multimedia Instructional System learn better than high intelligent girl students learning through Conventional Instructional System.
- High intelligent boy students learning through Multimedia Instructional System learn better than high intelligent girl students learning through Audio-Video Instructional System.

- High intelligent boy students learning through Multimedia Instructional System learn better than high intelligent girl students learning through Multimedia Instructional System.

- High intelligent boy students learning through Multimedia Instructional System is more effective than average intelligent boy students learning through Conventional Instructional System.

- High intelligent boy students learning through Multimedia Instructional System learn better than average intelligent boy students learning through Audio-Video Instructional System.

- High intelligent boy students learning through Multimedia Instructional System learn better than average intelligent boy students learning through Multimedia Instructional System.

- High intelligent boy students learning through Multimedia Instructional System learn better than average intelligent girl students learning through Conventional Instructional System.

- High intelligent boy students learning through Multimedia Instructional System learn better than average intelligent girl students learning through Audio-Video Instructional System.

- High intelligent boy students learning through Multimedia Instructional System learn better than average intelligent girl students learning through Multimedia Instructional System.

- High intelligent girl students learning through Audio-Video Instructional System learn better than high intelligent girl students learning through Conventional Instructional System.

- High intelligent girl students learning through Conventional Instructional System learn better than high intelligent girl students learning through Conventional Instructional System.
High intelligent girl students learning through Conventional Instructional System learn better than average intelligent boy students learning through Conventional Instructional System.

- Average intelligent boy students learning through Audio-Video Instructional System learn better than high intelligent girl students learning through Conventional Instructional System.

- Average intelligent boy students learning through Multimedia Instructional System learn better than high intelligent girl students learning through Conventional Instructional System.

- Average intelligent girl students learning through Audio-Video Instructional System learn better than high intelligent girl students learning through Conventional Instructional System.

- Average intelligent girl students learning through Multimedia Instructional System learn better than high intelligent girl students learning through Conventional Instructional System.

- High intelligent girl students learning through Multimedia Instructional System learn better than high intelligent girl students learning through Audio-Video Instructional System.

- High intelligent girl students learning through Audio-Video Instructional System learn better than average intelligent boy students learning through Conventional Instructional System.

- Average intelligent boy students learning through Audio-Video Instructional System learn better than high intelligent girl students learning through Audio-Video Instructional System.

- Average intelligent boy students learning through Multimedia Instructional System learn better than high intelligent girl students learning through Audio-Video Instructional System.

- High intelligent girl students learning through Audio-Video Instructional System learn better than average intelligent girl students learning through Conventional Instructional System.
Instructional System.

- Average intelligent girl students learning through Audio-Video Instructional System learn better than high intelligent girl students learning through Audio-Video Instructional System.

- High intelligent girl students learning through Multimedia Instructional System learn better than average intelligent boy students learning through Conventional Instructional System.

- High intelligent girl students learning through Multimedia Instructional System learn better than average intelligent boy students learning through Audio-Video Instructional System.

- High intelligent girl students learning through Multimedia Instructional System learn better than average intelligent boy students learning through Multimedia Instructional System.

- High intelligent girl students learning through Multimedia Instructional System learn better than average intelligent girl students learning through Conventional Instructional System.

- High intelligent girl students learning through Multimedia Instructional System learn better than average intelligent girl students learning through Audio-Video Instructional System.

- Average intelligent boy students learning through Audio-Video Instructional System learn better than average intelligent boy students learning through Conventional Instructional System.

- Average intelligent boy students learning through Multimedia Instructional System learn better than average intelligent boy students learning through Conventional Instructional System.

- Average intelligent girl students learning through Conventional Instructional System.
System learn better than average intelligent boy students learning through Conventional Instructional System.

- Average intelligent girl students learning through Audio-Video Instructional System learn better than average intelligent boy students learning through Conventional Instructional System.

- Average intelligent girl students learning through Multimedia Instructional System learn better than average intelligent boy students learning through Conventional Instructional System.

- Average intelligent boy students learning through Audio-Video Instructional System learn better than average intelligent girl students learning through Audio-Video Instructional System.

- Average intelligent boy students learning through Audio-Video Instructional System learn better than average intelligent girl students learning through Multimedia Instructional System.

- Average intelligent boy students learning through Multimedia Instructional System learn better than average intelligent girl students learning through Conventional Instructional System.

- Average intelligent girl students learning through Audio-Video Instructional System learn better than average intelligent girl students learning through Conventional Instructional System.

- Average intelligent girl students learning through Multimedia Instructional System learn better than average intelligent girl students learning through Conventional Instructional System.
Average intelligent girl students learning through Audio-Video Instructional System learn better than average intelligent girl students learning through Multimedia Instructional System.

6.2.0 Conclusions

On the basis of these findings, the following conclusions have been drawn:

1) Multimedia instructional system was found to be the best instructional system than two instructional systems i.e. Audio-Video instructional system and Conventional instructional system. Audio-Video instructional system was better than Conventional system.

2) The relative comparison of three instructional systems on retention by using the assumption that a method lower on mean score i.e. mean score of Multimedia instructional system would be termed as more effective on retention as compared to a method having higher mean scores i.e. Audio-Video instructional system and Conventional instructional system on retention.

3) In factorial design (3x2x2), the interaction of teaching methods and intelligence level is significant. There is an interaction between teaching methods and intelligence levels. The high and average level of intelligence learn differently interacting with three instructional systems. It may be concluded that when three instructional system (A) and two levels of intelligence (B) are taken jointly, they do effect the dependent variable i.e. Achievement scores of students in 'Information Technology'.

4) In factorial design (3x2x2), the interaction of teaching methods with sex levels is not significant. There is no any interaction between teaching methods and sex levels. The male and female secondary school students have no difference in learning through three different teaching methods. It may be concluded that when three instructional system (A) and two levels of sex (C) are taken jointly, they do not effect the dependent variable i.e. Achievement scores of students in 'Information Technology'.

5) In factorial design (3x2x2), the interaction of different levels of intelligence and levels of sex is significant. There is an interaction between two levels of intelligence and two levels of sex. It may be concluded that when two levels of intelligence (B) and two levels of sex (C) are taken jointly, they do effect the dependent variable i.e. Achievement scores of students in 'Information Technology'.


scores of students in 'Information Technology'.

6) In factorial design (3x2x2), the interaction of three instructional systems (A), two levels of intelligence (B) and two levels of sex (C) is significant. There is an interaction between three instructional systems, two levels of intelligence and two levels of sex. It may be concluded that when three instructional system (A), two levels of intelligence (B) and two levels of sex (C) are taken jointly, they do effect the dependent variable i.e. Achievement scores of students in 'Information Technology'.

6.3.0 EDUCATIONAL IMPLICATIONS

The present study undoubtedly enrich the existing stock of knowledge in the field of education. The study has important bearing on education in our country where several verbal method or 'chalk and talk' method is still most widely used. This study depicts that there are new instructional systems like Audio-Video instructional system, Multimedia instructional system and Conventional instructional system, which may be useful in teaching 'Information Technology' at secondary level.

The findings of the present investigation have their implications for students, teachers, teacher educators, curriculum planners, media persons, administrators and education policy makers. The study make it clear that Multimedia media instructional system is most useful for teaching 'Information Technology'. The students taught through this system can have new knowledge, lasting impact and better concept formation through these electronic media because knowledge can be properly and systematically stored, developed and transmitted according to the learner's need. Audio-Video instructional system is considered as a unique learning resource for the students which provide them access to knowledge and information in a more direct and concrete form. It provides the learning resources through the construction of physical model, professionally designed graphics and animation, newsreels, films prepared on various computer laboratories, interviews with computer experts. Audio-Video instructional system can present such material in the form of visuals which is otherwise difficult for the teacher to arrange in classroom. The implications for the learner lies in the conveniently availability of Audio-Video lessons.
when required, repetition of lesson due to rewind/fast forward facility which results in master learning, the segmented recording enables the learner to reflect, analyse and restructure the information according to their needs. The Audio-video instructional system has proved to be an intellectually stimulating medium of providing instructions.

The implications for teachers and students also can be expressed in terms of specific purposes which it fulfils. The Audio-Video instructional educational programmes can be intended as a support to the existing basic educational practices as an additional resource for improving the quality of instructions. The educational Audio-Video programmes may contribute towards the development of the teachers and improvement of their subject teaching. The Audio-Video instructional system enriches the Conventional instructional system of teaching by increasing the motivation to learn and making the topic more interesting and relevant. The teachers can be well trained in effective handling of the software and hardware so that they can manipulate the message properly. There are various practical applications in the field of 'Information technology' which can not be learnt by Conventional instructional system. The teachers can take the advantage of Audio-Video instructional system to overcome these practical limitations, the teacher can support the verbal material with visual material so as to bring out facsimile of the topic. In teaching 'Information technology' the teacher can fully utilise the potentialities of Audio-Video instructional system and Multimedia instructional system in creating special effects in terms of time and space.

The teacher educators can arrange demonstration workshops for providing training to the teachers and pupil teachers about the nature of demonstrations which could be given through Audio-Video software to be prepared and exhibited. Seminars and extension lectures on Information technology could be arranged to provide new and up to date information to the learners.

Audio-Video instructional system and Multimedia instructional system may be treated as a catalyst for curriculum reform. With the advent of Audio-Video instructional system and Multimedia instructional system in 'Information technology', knowledge of computers have increased in the world and new researches are going on in computer technology
making life very fast, easy and saving time and money. Through the knowledge of Information technology the students can have access to the advanced and specialised information and knowledge in their lower classes which was up till now consider to be suitable only for higher classes. The knowledge of 'Information Technology' assist in various other fields of education also in making teaching learning effective, easy, fruitful and time and money saving.

The study has further implications for media persons also. The media persons and technicians could produce software in various educational fields by consulting the curriculum planners and teachers. They can produce the material keeping in view the age, motivation, need of pupils, nature of content, attitude of students and teachers, duration of lessons, selecting the topic which requires more visual experiences. The technician may produce such software package which provides scope for the development of skill, attitude and interest in the pupils. The media persons may also organise the workshops to train the teachers, pupil-teachers and teacher educators regarding film recording, use of video camera, transfer of material from one cassette to another cassette, editing the recorded material, colour mixing and sound etc. A thorough and adequate knowledge of the process helps the teacher in his teaching.

The study also has its limitations for administrators as it expands the range of school system. The administrators and government can provide education to those who unfortunately due to one reason or another have had no schooling. Also there are cases of remote low population density area where it is not possible to provide all the facilities which can be found in any large urban school. In certain cases a shortage of full, experienced and specialised staff has been found. Under these circumstances, the administrators can make the arrangement of Audio-Video instructional system and Multimedia instructional system by using the skills of specialist and professional teachers. The production of such programmes provides extra flexibility to the schools by making available scarce learning experiences to its pupils. The lessons or programmes based on standard curriculum can be distributed to the centres and areas which have no adequate conventional school provisions. The administrators can arrange the necessary equipment like television, video
cassette recorder, magnifying screen and the suitable place where the students can easily observe the Audio-Video instructions. The administrators can supervise the proper handling, maintenance and storage of these electronic gadgets to avoid any misuse at any level.

6.4.0 SUGGESTIONS FOR FURTHER RESEARCH

The present study, the effect of three instructional systems on the achievement of secondary school students in 'Information Technology' is an attempt to explore a new field. There is an immense scope for further work. The findings of the present study may serve as an anchor point for further research possibilities in the field. Some suggestions in this regard may be offered as follows:-

- A similar study may be conducted in various other disciplines like science, social science, mathematics, languages, arts, home science, music etc.
- This type of experiment can be conducted at primary or higher levels of education.
- This type of study may also be done in govt. and pvt. colleges and universities etc.
- A similar experimental study may be conducted for studying the various interaction effects having different factorial designs.
- A study may be undertaken to analyse the attitudes of students, teachers and parents towards various modes of instructional systems.
- This type of experimental study may be conducted to analyse the effects of interaction among various teaching methods with age, sex and intelligence, socio-economic status etc.
- This study may also be conducted for the target group of non-formal education comprising of women, farmers and employees of organised and unorganised sector.