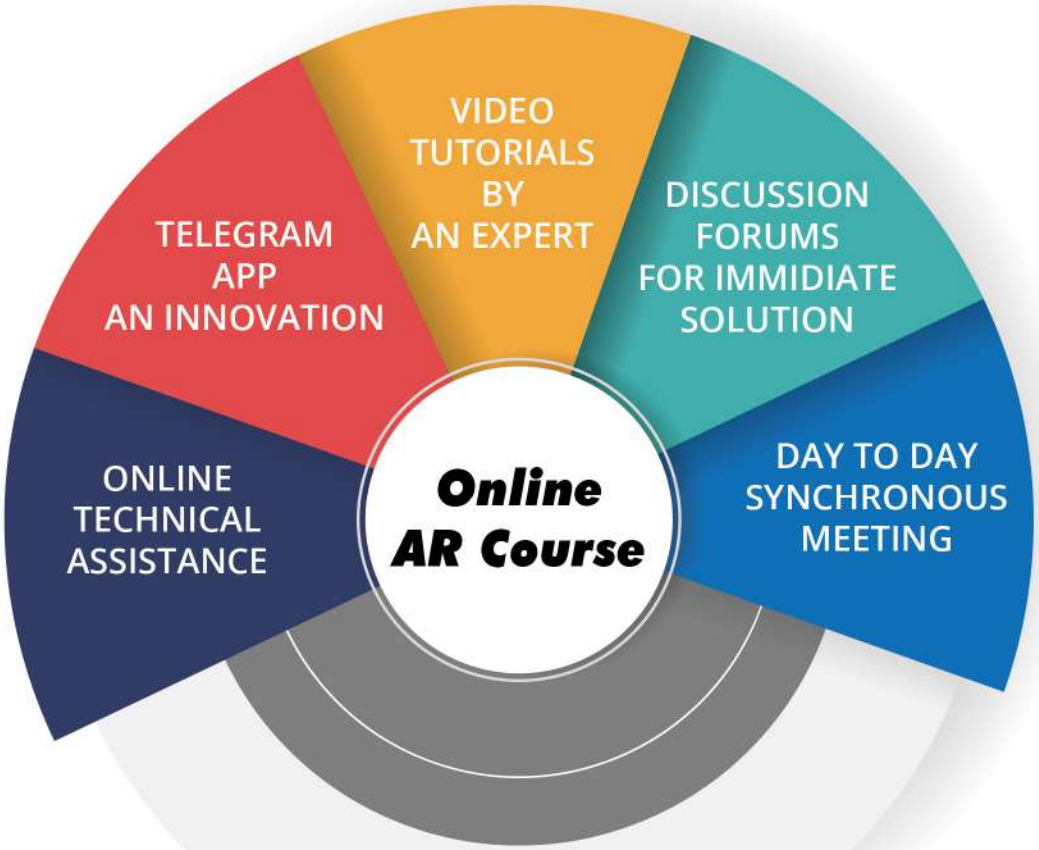
ONLINE COURSE ON ACTION RESEARCH IN EDUCATION

RAJENDRA PAL



REPORT

2018-19

Media Production Division
Central Institute of Educational Technology
National Council of Educational Research and Training
Sri Aurobindo Marg, New Delhi-110016

Action Research in Education

An Online Course – 2018 - 19

Report

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FOREWORD

Action Research in Education is basically a research-oriented activity undertaken by educational practitioners to solve their real/practical problems faced during day-to-day teaching through a systematic and scientific process. The Online Course on Action Research was initially started in NCERT by Central Institute of Educational Technology (CIET) in the year 2010. The course is currently being offered with the nomenclature *Online Course on Action Research in Education.*

The present document is an outcome of this online course conducted during 2017-18, comprised of three main sections namely, Outline of the Course, Modules of the Course with Video Support and Feedback received from Participants through Rating Scale and Open Remarks. Some exemplar action research proposals developed by the participants have been given in annexure – "A" along with the list of participants.

Since action research in education aims at bringing out improvement in the professional competency of the practitioners, NCERT will continue its endeavor to attract more and more educational practitioners to offer this course in future so that a large pool of professional is benefitted. I am glad to add that this course is also available free of cost to all through MOOC on SWAYAM platform through https://swayam.gov.in

Prof. Rajendra Pal and his team have taken utmost care and personal pains in conducting this course. Their efforts in bringing out a comprehensive report, deserve special appreciation. It is assumed that this report will encourage practicing teachers to get attracted towards this online course and improve their practices through systematic research.

June, 2019

Amarendra P. Behera
Joint Director

PREFACE

The Online Course on Action Research was initially started at Central Institute of Educational Technology (CIET) in NCERT in the year 2010. The two online courses were conducted at CIET with the nomenclature *"Online Course on Action Research in Educational Technology".* The course is currently being offered with certain modifications with the nomenclature *"Online Course on Action Research in Education".* The media inputs in the form of video programs are added to enhance understanding of various aspects of action research.

After the approval of the fee structure by the competent authority the second paid course for 2017-18 was announced through the website of NCERT. As the course was basically designed for the elementary teacher educators, hence teacher educators of DIETs and SCERTs were given preference along with the faculty from Regional Institutes of Education, CTEs, IASEs, KVs, etc. There were 400 applications received. Out of 400 applications, 167 suitable applicants were selected for registration and 33 were selected as waitlisted candidates. In all, 159 participants submitted the prescribed fees, thus 165 participants were enrolled for the course including 8 NCERT applicants without fee. Two applicants could not join the course. Finally, 139 participants have successfully completed the course and remaining 26 participants dropped out in between due to various reasons.

One module was made available to the participants every week and assignments were also given after every module apart from online tests to assess their understanding during the course. Starting from registration to the final test and feedback, every aspect of the course was conducted online.

As the action research aims at bringing out improvement in the professional competency of the practitioners, NCERT will continue to offer this course in future so that large numbers of teachers are benefited.

(Rajendra Pal)
Professor & Head
June, 2019 Media Production Division

ACKNOWLEDGEMENT

The online course on Action Research was organized for the teacher educators at elementary level especially for DIETs and SCERTs. However, some teacher educators of NCERT (NIE, RIE, CIET), and CTEs, IASEs, KVs JNVs were also enrolled on demand. The course was fully depended on the Internet Network through synchronous and asynchronous mode of communication.

In successful organization of this course, various persons were directly or indirectly involved and helped the undersigned in various capacities. Being coordinator of the course, I would like to express my sincere thanks to all.

First of all, I would like to thank Prof. Amarendra Behera, Joint Director at CIET for providing his valuable academic suggestions and administrative support as and when required.

I recognize the contributions of Dr. Pratima Pallai, Assistant Professor, Department of Education, Tezpur Central University, Assam, as honorary mentor of the course and providing online guidance to the participants inspite of her busy teaching schedule.

I would also like to thanks Mrs. Sarojini Rout for her technical assistance in maintaining the online website of the course and Ms. Sangeeta Dey, Project Fellow, who was continuously associated with all the activities of the course and maintained the data and information related to the participants also help in developing the course report. Dr. Alka Singh also provided the support during the course as and when required.

(Rajendra Pal)
June, 2019 Program Coordinator

Outline of the Course

Outline of the Course

The online course on Action Research in Education was designed for the teacher educators of State Council of Educational Research and Training (SCERTs) and District Institute of Education and Training (DIETs). The purpose of this course was to provide teachers with the knowledge and skills to integrate Action Research as a teaching and problem-solving methodology.

Action Research is a process for problem solving and problem verification. The process can be used by an individual, teacher or a Principal, but studies indicate that the process works best through cooperation and collaboration. This course was completed by employing the attributes of the Action Research process:

- Problem definition/identification of the research questions
- A process of Action Research
- Collection of data
- Data recording and interpretation
- Reporting

After presenting the elements of Action Research and also introducing field of Education and having participants demonstrate competency in their use, the participants were employed the process to answer prescribed questions, and discover solutions to educational/classroom related problems. The participants were required to prepare a plan of Action Research on the real problem in the field of Education.

a) Focus of the Course

According to focus of the course, the participants are expected to:

- Establish a conceptual framework for Action Research
- Differentiate between "Formal" Research and “Action” Research
- Understand basic concepts of Action Research
- Design Action Research projects in the field of Education.
- Select assumptions that can be verified by Action Research
- Organize data for verification (Theoretical aspect only)
- Analyze and interpret data (Theoretical aspect only)
- Prepare Report (Theoretical aspect only)

b) Curriculum Design and Duration of the Course

Action Research in Education was eight weeks, a two-credit course conducted through online. It took two months and few days to complete the course. The primary teaching methodology is to present a conceptual framework within which participants may define operationally the knowledge and skills to successfully use action research in the classroom. Participants will plan an Action Research project and submit report. Most modules take one week to complete (about two hours per week). Each week a new Module will be uploaded. There will be one-hour synchronous communication as well.

c) Technical Requirements

Participants may use a PC with Windows 2000 or higher or Linux. Participants should have basic word processing skills and have internet access with an active Gmail account. Participants are also expected to have a basic knowledge of how to use a Web browser, such as Internet Explorer, Google Chrome, and Mozilla Firefox etc. They also must have Video conferencing skills by using Skype or Google Hangout etc. They must possess Webcam and headphone for participating in the conferencing once in a week. During first week, participants will be expected to explore how to use various facilities offered by Module (which is the Learning Management System for the course).

d) Course Material and Outline of Sessions

There are 4 modules specially developed for the course. In addition, online readings and web site reviews (including journal articles and online books) will be assigned during the course to enhance learning. Participants are expected to read the part recommended for that module.

Session Outline

Session 1: Understanding Action Research

Objective: To provide an orientation to action research and identify the stages of action research.

Session 2: Beginning Action Research

Objective: Improve problem selection for the action research process; to name problems specifically related to teaching and learning in the classroom.

Session 3: Data Collection and Data analysis in Action Research

Objective: To define the concept of research design and to identify various approaches to action research.

Session 4: Report Writing

Objective: To understand the process of documenting action research.

Session 5: Action Research Project

Objective: Plan an Action Research project (Proposal).

e) Assessment Scheme of the Course

Table 1: Assessment Scheme and Grading Scale of the Course.

Assignment	Points	Grading Scale	
Written Assignments	40	100 – 91	O
Objective test (Multiple choice) at the end of the course	20	90 – 76	A
Forum Discussions/Synchronous Meetings	10	75 – 60	B
Final Project (Action Research Proposal)	30	59- 35	C
		< 35	D
Total	**100**		

f) Announcement for the Course

Online Course on Action Research in Education

Media Production Division (MPD) in collaboration with Central Institute of Educational Technology (CIET), NCERT announces its Online Course on Action Research in Education. This Two-Credit online course is specially developed for the teacher educators at elementary level working in District Institutes of Education and Training (DIETs), different State Councils of Educational Research and Training (SCERTs) and State Institutes of Education (SIEs). In case sufficient applications are not received from DIET/SCERT the participants may be taken from CTEs/IASEs and KVs.

The Online Course is first of its kind with a purpose to help teacher educators in conducting Action Research to address their educational problems. The course also aims at assisting them in conducting In-service Teacher Professional Development (ITPD) in Action Research. The course shall provide conceptual understanding into the processes of Action Research. The participants shall be required to prepare a proposal on Action Research in their respective areas of work.

This is a 2 credit Online Course of eight weeks duration. There will be five modules. One module will be discussed per week (first week of getting started and last week of evaluation and assessment.) with one hour per week of net meeting (synchronous communication). Participants are expected to study for two hours per week.

Who can join?

- Teacher educators working in the field of Education having background of research.
- The persons should have working knowledge of computer or familiarity with the simple operations of working with computer.

No of participants

167 Participants were selected and 33 were categorized as waitlisted from a total of 400 participants. The number of participants who enrolled for the course were 165.

Table 2: Grading obtained by the participants for the year 2017-18.

Grading Scale	Range	Number of Participants
O	100 – 91	-
A	90 – 76	57
B	75 – 60	60
C	59- 35	11
D	< 35	11

Course Fee

This online course was free of cost up to 2013-14. But from the year 2014-15 the fee structure was developed and got approved from the competent authority through proper channel and the following fee structure was fixed for the participants:

Rs. 1000/- for the Government organizations/institutions

Rs. 3000/- for the non-government organizations/institutions

No fee for the internal staff of the NCERT that is NIE, RIEs, CIET, CIVE.

Requirements

The participants should have access to the computer system with internet facility to participate in the day-to-day activities. In addition, the participants should also be skilled for accessing the webcam along with the headphone so that the chat and other features can be utilized fully.

Course Dates

Course was commenced from December 1st, 2018. Successful participants will be awarded certificate by NCERT.

g) Ways of Synchronous and Asynchronous Communication with Participants

The communication with the participants for the online course was established through Synchronous as well as Asynchronous Modes. This includes E-mails, Free SMSs services, website of the course for action research, synchronous communication, and forum discussions and also through telephonic communications. These ways of communications were used for various purposes. These are described below:

Through NCERT Website-The first of all, course announcements were made through NCERT website {**ncert**.nic.in/}. That was a sort of advertisement for the teachers and teachers' educators. An online registration Proforma was created on the website to gather the information of applicants.

E- Mails – Initially E-mails were used as a medium of communication. Login credentials (Password, URL and login ID), updates and reminders of assignments were sent through Emails. All the participants were asked to create Gmail id to participate in synchronous meeting through Google Hangout.

Through Course Website- The course website is developed with required modules and other features. The URL for the course is *http://ictcurriculum.gov.in/course/view.php?id=121*. The selected participants were provided login ID and password. The website was updated on regular basis and all the necessary notices and information were being added in weekly outlines. Every week a new module was given to the participants. Coursework were also provided through website and participants had to upload their assignments on the website through their (student) account.

SMS – A free SMS service was used to contact the participants for immediate information. Sometimes it was observed that the participants are not able to access the website due to various reasons and they are not aware about the updates provided by the administration of the course. In such situations free SMS service was utilized, so that they can continuously receive updates in an easy manner and update themselves easily.

Telegram – Telegram is a mobile application that allows users to communicate among them using mobile gadget and computer. For the first time in online AR course, Telegram App was used to make better communication between the course participants as well as mentors.

Use of Telegram App in Online Action Research courses for the following reasons:

- Multiple platforms: Smartphone (OS, Android), PC, Laptop, iPad, Tab, Web
- Compatible file format: jpg, audio, movie, Pdf, excel, word, PowerPoint, Large files transfer
- Grouping facilities: 1000 members, access to old/past messages, members add members
- Better storage capacity and management
- Better memory system and management
- Better security with the encryption

Synchronous Meetings – Synchronous discussion meeting were organized at weekends. The participants find some initial problems in connecting during online discussion. However, majority of them were able to connect it and discussed with the mentors. The problems of the participants in understanding the concepts and their queries on various aspects of course were discussed.

मॉड्यूल

MODULES

मॉड्यूल &1

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iLrkouk

किसी भी देश की प्रगति बहुत हद तक शोध एवं विकास पर निर्भर करती है । विभिन्न क्षेत्रों में हो रहें शोधो के कारण सूचना (जानकारी) का विस्फोट हो रहा है । शोध की बदौलत ही तकनीकी के क्षेत्र में विकास हो रहा है । अतः किसी भी देश की उन्नति एवं विकास का मुख्य आधार शोध ही है इसलिए सभी विषयों एवं क्षेत्रों में शोध करना जरूरी है । परंतु देखा गया है कि समाज द्वारा विज्ञान , चिकित्सा एवं तकनीकी के विभिन्न क्षेत्रों में हुए शोधों का अधिकतम लाभ लिया जा रहा है । शोध निष्कर्षो का उपयोग जितना विज्ञान , चिकित्सा एवं तकनीकी में किया जा रहा है उतना सामाजिक विज्ञानों में नहीं हो रहा है । इसके अतिरिक्त , भारत में कई विषयों में शोध विधियॉ नहीं पढाई जाती है फिर भी लोग शोध कर रहे हैं जिसकी वजह से शोध की गुणवत्ता निम्न है । इस अध्याय में, शोध की संकल्पना , शोध के प्रकार एवं शोध के सोपानो के बारे में जानकारी दी गई है जिसे किसी भी विषय में शोध करने में अनुसरण किया जा सकता है । इस अध्याय को पढ़ने के पश्चात् आप इस योग्य होगें कि आप –

1. शोध को परिभाषित कर सकेंगे।
2. शोध की विशेषताओं की सूची बना सकेंगे।
3. खोज एवं अविष्कार के बीच अंतर कर सकेंगे।
4. शोध के विभिन्न प्रकारों के बीच भेद कर सकेंगे।
5. शोध के सोपानों की सूची बना सकेगें।

शोध का संकल्प एवं परिभाषा

हम सब जानते हैं कि आवश्यकता आविष्कार की जननी होती है और आवश्यकता हमारे सामने समस्या के रूप में आती है यही समस्या शोध का आधार होती है । जहाँ समस्या होती है वहाँ उसके समाधान भी होते है, लेकिन लोग समस्या के उपलब्ध समाधानों से पूर्णतः संतुष्ट नहीं होते हैं । इस असंतोष के कारण लोग उसी समस्या के अन्य समाधान निकालने के लिए अभिप्रेरित होते हैं । यह भी सच है कि समस्या का कोई निरपेक्ष या निश्चित समाधान नहीं होता है । अतः समस्या का प्रत्येक समाधान नई समस्या पैदा कर देता है। जैसा कि मोबाईल फोन , लोग चाहते थे कि अपनी या़त्रा के दौरान वे

परिवार के संपर्क में रहें , यह जरूरी भी था । इसके समाधान के लिए शोध किया और मोबाइल फोन समाधान के रूप में आया लेकिन उसके साथ कई समस्याएँ जुडी हुई हैं । शोध यह बताते है कि इसमें स्वास्थ्य सम्बंधित कई समस्याएँ उत्पन्न हो गई है , जो मोबाइल फोन के आने से पहले नहीं थी । इस प्रकार शोध हमें समाधान के साथ–साथ नई समस्या भी देते है । यह सच है कि विज्ञान एवं सामाजिक विज्ञान में एक समान समस्या के कई समाधान होते है या हो सकते हैं। इस कारण यह कहना उपयुक्त नहीं है कि इस शोध के प्रतिफल या परिणाम सही है या नहीं । जैसे ही समस्या के समाधान आए वैसे ही स्वीकारना होगा । समाधान ज्ञात करने के लिए कुछ गतिविधियाँ करनी होगी । कोई भी गतिविधि अव्यवस्थित या व्यवस्थित तरीके से कर सकते है । लेकिन यदि व्यवस्थित तरीके से गतिविधि की जाए तो सफलता की संभावनाएँ अधिक होती है ं इसे ऐसा भी कह सकते है कि जहाँ सफलता की संभावनाएँ अधिक नहीं है, वहाँ पर अव्यवस्थित तरीके से गतिविधि की गई हैं । इसलिए शोध में व्यवस्थित तरीके से गतिविधियाँ करना होगा। यहाँ पर व्यवस्थित शब्द यह बताता है कि पूर्व निर्धारित क्रम में अच्छी तरह से व्याख्या किए गए सोपानों के संगठन से है । जहाँ पर सोपान दिए गए है , वहाँ पर प्रक्रिया जरूर होगी । अतः उपरोक्त दी गई व्याख्या के आधार पर शोध को निम्न प्रकार से परिभाषित कर सकते हैं –

''शोध एक प्रक्रिया है, जिसमें व्यवस्थित तरीके से गतिविधियाँ करके समस्या का हल निकाला जाता है ''। यह शोध की सामान्य परिभाषा है । विभिन्न विषयों में शोध की परिभाषा निम्नलिखित होगी ।

1. ''भौतिक में शोध एक प्रक्रिया है जिसके अर्न्तगत विभिन्न गतिविधियाँ व्यवस्थित रूप से करके भौतिक के किसी पहलु से सम्बधित समस्या का हल निकालते है । ''
2. ''हिंदी में शोध एक प्रकिया है जिसके अर्न्तगत विभिन्न गतिविधियाँ व्यवस्थित रूप से करके हिंदी के किसी पहलु से सम्बंधित समस्या का हल निकाला जाता है । ''
3. '' शिक्षा में शोध एक प्रकिया है जिसके अर्न्तगत विभिन्न गतिविधियाँ व्यवस्थित रूप से करके शिक्षा के किसी पहलु से सम्बंधित समस्या का हल निकाला जाता है । ''
4. '' प्रबंधन में शोध एक प्रक्रिया है जिसके अर्न्तगत विभिन्न गतिविधियाँ व्यवस्थित रूप से करके प्रबंधन के किसी पहलु से सम्बंधित समस्या का हल निकाला जाता है । ''

शोध की विशेषताएँ ।

शोध की निम्नलिखित विशेषताएँ है :–

1. शोध व्यवस्थित है ।
2. शोध समस्या आधारित होता है ।
3. शोध एक प्रकिया है ।
4. शोध गतिविधियाँ आधारित होता है ।
5. शोध से समाधान प्राप्त होता है ।

खोज, अविष्कार एवं शkk/k d। e/; vUrj

यहाँ पर एक्सरे का उदाहरण लेते है – जर्मन वैज्ञानिक विल्हभ रोएंटगेंन द्वारा 1895 में अचानक ऐक्सरे की खोज की गई थी । इसके लिए कोई व्यवस्थित प्रयास नहीं किया गया था ।

भारत की खोज भी 1497 में वास्को–द–गामा द्वारा अचानक की गई थी । जिसके लिए कोई व्यवस्थित प्रयास नहीं किये गये थे । इस प्रकार, खोज व्यवस्थित तरीके से की गई गतिविधियों का प्रतिफल या परिणाम नहीं है । इस आधार पर यह कह सकते हैं कि लोगों को खोज के लिए प्रशिक्षित नहीं किया जा सकता अर्थात खोज एक अव्यवस्थित प्रक्रिया है ।

जेम्स वॉट द्वारा भाप के इंजन का अविष्कार किया गया था । अब हम भाप के इंजन के अविष्कार की प्रक्रिया को समझते है । जेम्स वॉट ने देखा कि उबलते पानी से भाप बाहर आने पर वह बर्तन के ढक्कन को ऊपर उठा देती थी । जो यह दर्शाता है कि भाप में ऊर्जा होती है जो ढक्कन को ऊपर उठा देती है । जेम्स वॉट ने इस विचार का उपयोग करते हुए तथा व्यवस्थित गतिविधियाँ करके भाप के इंजन का अविष्कार किया । इस प्रकार भाप का इंजन व्यवस्थित रूप से की गई गतिविधियों का परिणाम था । अतः अविष्कार प्रायोगिक शोध है । यदि कोई प्रायोगिक शोध करता है तो उसके दौरान अविष्कार हो सकता है जैसा कि पूर्व में कहा गया है कि शोध की प्रकृति व्यवस्थित होती है । अर्थात अविष्कार की प्रकृति भी व्यवस्थित होती है तथा यह प्रायोगिक शोध करने के दौरान हो सकता है । इस प्रकार खोज , अविष्कार एवं शोध के मध्य अंतर करना आसान है ।

शोध के प्रकार

शोध के विभिन्न प्रकार है । शोध का प्रकार उसके आधार पर निर्भर करता है शोधों के प्रकार एवं उनके आधार निम्नलिखित है –

1. गुणवत्तात्मक शोध एवं मात्रात्मक शोध :

कोई भी जानकारी गुणवत्तात्मक या मात्रात्मक हो सकती है । जैसे लिंग, विषय, व्यक्तियो के नाम, रंग इत्यादि गुणत्मक जानकारी है । लेकिन आयु, ऊचाई, वजन, किसी भी सब्जी की कीमत, फल के भाव, इत्यादि संख्यात्मक जानकारी है । जैसे भाषाओं, दर्शन, इतिहास आदि में अधिकतर गुणवत्तामक जानकारी होती है । गुणवत्तामक जानकारी को मात्रात्मक जानकारी में परिवर्तित किया जा सकता है , परंतु यह परिवर्तन नहीं करना चाहिए , क्योकि इससे जानकारी का नुकसान होता है । यह समझने के लिए एक उदाहरण लेते है । मानाकि 10 अंक का एक प्रश्न है, इस प्रश्न के गुणवत्तात्मक उत्तर की जांच के दौरान शिक्षक ने 10 अंक में से 6 अंक दिए । इस प्रकार गुणवत्तामक जानकारी को मात्रात्मक जानकारी में परिवर्तित किया जा सकता हैं । क्या, अब इस मात्रात्मक जानकारी को अपनी मूल गुणवत्तामक जानकारी में बदला जा सकता है ? उत्तर है नहीं । इसका मतलब यह है कि गुणवत्तामक जानकारी को मात्रात्मक जानकारी में बदलने पर जानकारी की क्षति हुई । अतः किसी को भी गुणवत्तामक जानकारी का विश्लेषण करते समय उसे मात्रात्मक आंकडें में नहीं बदलना चाहिए, अर्थात केवल गुणवत्तामक जानकारी का ही उपयोग करना चाहिए । इस प्रकार, गुणवत्तामक शोध एवं मात्रात्मक शोध का आधार जानकारी का प्रकार है।

2 दार्शनिक शोध, ऐतिहासिक शोध, सर्वेक्षण शोध , प्रयोगात्मक शोध एवं केस अध्ययन शोध:

शोध करने के दौरान शोधक कुछ सोपानो का अनुसरण करता है । अतः शोध करने की एक प्रक्रिया होती है। विभिन्न शोधों में अलग–अलग विधि या प्रक्रिया का अनुसरण किया जा सकता है । इस प्रकार , विधि या प्रक्रिया के आधार पर शोध के प्रकार होते हैं जैसे – दार्शनिक शोध, ऐतिहासिक शोध, सर्वेक्षण शोध, प्रयोगात्मक शोध तथा केस अध्ययन **शोध** । इसलिए दार्शनिक शोध, ऐतिहासिक शोध , सर्वेक्षण शोध, प्रयोगात्मक शोध तथा केस अध्ययन शोध के वर्गीकरण का आधार उनमें अपनाई गई विधि या प्रक्रिया है।

3 बुनियादी/आधार भूत/सैद्धांतिक शोध, व्यावहारिक (Applied)/प्रयोगिक शोध एवं कियात्मक शोध : एक शोध का प्रतिफल या परिणाम समस्या के समाधान के रूप में होता है इसे निष्कर्ष भी कहते है । यह अवलोकन किया गया कि कभी–कभी शोध के निष्कर्ष उपयोगी नहीं होते है । इस कारण सभी शोधों के निष्कर्षों से समाज को फायदा या लाभ नहीं हो सकता है । कुछ शोधों की न तो समाज को जरूरत होती है , और न ही उन्हें उनसे लाभ हो सकता है । यह वास्तविकता सब जानते हैं कि किसी व्यक्ति द्वारा विकसित किए गये सिद्धांत से केवल उसके देश के लोग ही नहीं अपितु पूरे विश्व के लोग लाभान्वित हो सकते हैं । इस प्रकार, विश्व के सभी लोगों के लिए बुनियादी/आधारभूत/ सैद्धांतिक शोध की उपयोगिता है ।

पंखा, टेलीज़िन, मोबाइल फोन आदि व्यावहारिक (Applied)/प्रायोगिक शोध का प्रतिफल या परिणाम है । भारत में पंखा चलाने के लिए 220 वोल्ट बिजली चाहिए जबकि कनाडा में 110 वोल्ट बिजली की आवश्यकता पड़ती है । इसका मतलब यह है कि भारत में बना पंखा कनाडा में नहीं चलेगा, वैसा ही कनाड़ा में बना पंखा भारत में नहीं चलेगा । अलग–अलग देशों के मोबाइल फोन में अलग–अलग सिम कार्ड की जरूरत होती है । इस कारण व्यावहारिक/ प्रायोगिक शोधों की सीमित उपयोगिता होती है अर्थात् उपयोगिता का स्तर कम हो जाता है ।

अंत में, आपने यह अवश्य देखा होगा कि यदि दो व्यक्तियों को बुखार है तो दोनों को एक समान दवाई नहीं दी जा सकती है क्योंकि इसके अनेक कारण हो सकते है और बुखार के लिए अनेक दवाइयाँ उपलब्ध हैं । फिर भी यदि एक व्यक्ति के लिए जो दवाई उपयुक्त हो जरूरी नहीं है कि वहीं दवाई दूसरे व्यक्ति के लिए भी उपयुक्त हो । इसी प्रकार यदि किसी '' अ '' महाविद्यालय के विद्यार्थी हड़ताल पर जाते है और महाविद्यालय प्रबंधन विद्यार्थियों के साथ बात करे समस्या का समाधान कर लेते हैं । जिससे विद्यार्थी पुनः उनकी कक्षाओं में चले जाते है । माना कि कुछ समय बाद अन्य महाविद्यालय ''ब'' के विद्यार्थी हड़ताल पर जाते है । महाविद्यालय ''अ'' विद्यार्थियों का हड़ताल पर जाने का कारण महाविद्यालय ''ब'' के विद्यार्थियों के समान हो भी सकते है या नहीं भी हो सकते है । अतः महाविद्यालय ''अ'' का समाधान महाविद्यालय ''ब'' पर लागू नहीं होगा । इसी प्रकार अगर एक स्कूल में कक्षा 8 वी. के विद्यार्थियों को गणित में लाभ हानि के प्रश्न हल करने में कठिनाई आ रही है जबकि अध्यापक ने उन्हें लाभ–हानि के प्रश्न हल करने सीखा दिये है । अध्यापक ने विद्यार्थियों से बात करके कारण का पता लगाया कि विद्यार्थियों के एक प्रकार के अनेक प्रश्न हल करवाने चाहिये । अध्यापक ने इस का प्रयोग 10 दिनों तक किया । इसके पश्चात् विद्यार्थियों को पाँच प्रश्न लाभ–हानि से सम्बंधित हल करने के लिए दियें । अध्यापक ने विद्यार्थियों के द्वारा हल किये गये । प्रश्नों का अवलोकन किया और पाया कि अधिकतर विद्यार्थियों के उत्तर सही थे । अगर इस उपचार को किसी और स्कूल के अध्यापक उपयोग में लाना चाहे तो हो सकता है यदि उपचार वहाँ उपयुक्त न हो । अध्यापक को कोई दूसरा उपचार सेचकर या इसी उपचार में कोई परिवर्तन करके उपयोग में लाना चाहिये । अतः इस प्रकार के शोध को क्रियात्मक शोध कहते है जिसके परिणामो का विस्तृत उपयोग नहीं हो सकता है । इसलिए अलग समाधान निकालने पर कार्य करना होगा । अतः उपयोगिता का स्तर बहुत ही सीमित है । इस प्रकार बुनियादी/आधारभूत/सैद्धांतिक शोध , व्यावहारिक (Applied)/प्रायोगिक शोध एवं क्रियात्मक शोध का आधार उपयोगिता का अंश है ।

शोध के सोपान

शोध एक प्रक्रिया है , जिसकी प्रकृति वैज्ञानिक या व्यवस्थित होती है । अतः इसके सोपान भी वैज्ञानिक प्रक्रिया से उत्पन्न होते हैं । जो निम्नलिखित हैं –

1. समस्या की पहचान ।
2. परिकल्पना बनाना ।
3. प्रदत्तो का संकलन ।
4. प्रदत्तो का विश्लेषण ।
5. निष्कर्ष ।

प्रत्येक सोपान का विवरण निम्नलिखित प्रकार से दिया गया है –

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समस्या की पहचान पहला सोपान है । यहाँ समझेगें कि शोध का पहला सोपान समस्या का चयन न होकर समस्या की पहचान क्यों है ? पहचान शब्द का उपयोग तब किया जाता है जब परिस्थितियों में असमानता हो और यदि परिस्थितियों में समानता हो तब चयन शब्द का उपयोग किया जाता है । यहॉ पर एक उदाहरण लेते हैं । यदि एक व्यक्ति बाजार में सब्जियाँ खरीदने जाता है तो वह सबसे पहले यह देखता है कि कितने प्रकार की सब्जियाँ उपलब्ध हैं । सामान्यतः बाजार में विभिन्न प्रकार की सब्जियाँ होती है । अतः परिस्थितियों में असमानता है । मानाकि यदि एक व्यक्ति ने यह निर्णय ले लिया कि उसे आलू खरीदना है । तो वह आलुओं में से लगभग समान आकार के आलू चयन करेगा । यहाँ पर चयन शब्द का उपयोग किया गया है , क्योंकि वह आलुओं के ढेर में से आलू लेता है । इस कारण जब परिस्थितियाँ समान हो तब चयन शब्द का उपयोग और अगर परिस्थितियों में भिन्नता हो तो पहचान शब्द का उपयोग करते है। यह इसलिए है क्योकि समान परिस्थितियों में चयन करना आसान होता है ।

चयन एवं पहचान के बीच अंतर को समझने के लिए एक अन्य उदाहरण लेते हैं । अर्थशास्त्र , राजनीति विज्ञान, हिंदी, अंग्रेजी, प्रबंधन, शिक्षा, मनोविज्ञान, सामाजिक कार्य, भौतिक, गणित, रसायन जैसे विभिन्न विषय है । यह विषयों की एक विषम स्थिति है । माना कि कोई शोधक प्रबंधन में शोध करना चाहता है , तो वह जिस विषय में शोध करना चाहता है उस विषय का चयन करेगा । प्रबंधन के भी विभिन्न क्षेत्र है, जैसे – बाजारीकरण , वित्त, विज्ञापन, मानव संसाधन आदि । इनमें से शोधक बाजारीकरण पर शोध करने का निर्णय लेता है । बाजारीकरण की भी अलग–अलग विधियाँ या कार्यनीतियाँ होती है । इन विधियों या कार्यनीतियों में से शोधक एक कार्यनीति ई–बाजारीकरण पर

शोध करने का निर्णय ले सकता है । यह चयन कहलाता है क्योंकि शोधक द्वारा विषय क्षेत्र को सीमित करते हुए प्रबंधन से बाजारीकरण एवं बाजारीकरण से ई – बाजारीकरण का चयन किया गया हैं ।

अब समस्या शब्द को समझेगें । आपके शरीर का तापमान सामान्य होने पर कोई समस्या नहीं है समस्या तब उत्पन्न होती है, जब शरीर का तापमान बदलता है । माना कि आप कार खरीदना चाहते हैं । जैसा कि बाजार में विभिन्न प्रकार की कारें उपलब्ध हैं , उनमें से एक कार को पसंद करना आप के लिए आसान कार्य नहीं हो सकता है । अर्थात कार के बारे में निर्णय लेना आसान कार्य नहीं है । इस कारण, अधिक विकल्प होने से समस्या और बढ जाती है , जिससे निर्णय लेने की प्रक्रिया में देर होती है । बदलाव या परिवर्तन की इस प्रवृत्ति की विशेषता को चर कहते हैं । इस प्रकार, चर को समस्या भी कहा जाता है । इस सोपान में शोधक अंतिम रूप से चर का चयन कर लेता है ।

इस सोपान में मानाकि शोधक, चर का चयन कर लेने के पश्चात् उसे शीर्षक लिखना होगा । शीर्षक न तो बहुत विस्तृत होना चाहिए और न ही बहुत निश्चित । यह सीमित होना चाहिए । शीर्षक ऐसा होना चाहिए जो अध्ययन किए जाने वाले चर या चरों की जानकारी देता हो । शीर्षक में शोध अध्ययन की जनसंख्या भी दर्शाना चाहिए । इस प्रकार, पाठक शोध का शीर्षक पढ़ने के पश्चात् शोध की प्रकृति या प्रकार का भी पता लगा लेगा । अतः एक उपयुक्त शोध शीर्षक निम्नलिखित जानकारी देता है –

1. चर या चरों के बारे में जानकारी
2. जनसंख्या
3. शोध का प्रकार या शोध की विधि

यदि कोई शीर्षक उक्त सभी जानकारी नहीं देता है, तो वह शीर्षक अपूर्ण है । इसके अलावा, शीर्षक कभी भी शब्द "To" शब्द (की दिशा में, की ओर, जहॉ तक) से प्रारंभ नहीं कर सकते क्योंकि शीर्षक एक दम सटीक स्थिति की जानकारी नहीं देता हैं । शीर्षक दिशा भी नहीं बता सकता है । शोध के उद्देश्य शब्द "To"(की दिशा में, की ओर, जहॉ तक) से प्रारंभ होना चाहिए अगर उद्देश्य अंग्रेजी में लिखा हो । क्योंकि उद्देश्य एक दम सटीक स्थिति की जानकारी देने के साथ–साथ दिशा भी बताते है । शोध का शीर्षक लिखने के पश्चात् शोधक को शोध के उद्देश्य लिखना चाहिए । यह उद्देश्य शोध प्रश्न होते हैं जिनका उत्तर शोधक शोध के माध्यम से जानने का प्रयास करता है । इन उद्देश्यों को वाक्यों के रूप में या प्रश्न के रूप में भी लिख सकते हैं । किसी एक शोध के अध्ययन में , उद्देश्य एवं शोध प्रश्न दोनों नहीं लिखना चाहिए । क्योंकि दोनों का मतलब एक ही होता है ।

2- ifjdYiuk cukuk

दूसरा सोपान परिकल्पना की रचना करना या बनाना है । परिकल्पना समस्या का संभावित या अनुमानित समाधान होता है । एक अन्य परिभाषा यह कि परिकल्पना समस्या के समाधान का बौद्धिक अनुमान है । चरों के बीच संबंध बताने वाले प्रमाण–रहित (बिना साक्ष्य के) कथन को भी परिकल्पना कहा जाता है । इन परिभाषाओं के आधार पर कह सकते हैं कि परिकल्पना समस्या का पूर्ण या अंतिम समाधान नहीं है । इस प्रकार पूर्ण या अंतिम समाधान ज्ञात करने के लिए परिकल्पना का परीक्षण करना होगा । अतः परिकल्पना का परीक्षण सांख्यिकी तकनीक की सहायता से किया जाता है । इन सांख्यिकी तकनीकी के लिए मात्रात्मक जानकारी की जरूरत होती है । इसका मतलब यह है कि यदि शोध अध्ययन में मात्रात्मक जानकारी संकलित नहीं की गई हैं , तो परिकल्पना का परीक्षण नहीं किया जा सकता है । इसलिए जिस शोध में गुणवत्तात्मक जानकारी संकलित की गई है, उसमें परिकल्पना की रचना नहीं करना या बनाना चाहिए । अतः कुछ शोधें में परिकल्पना की रचना करने या बनाने का सोपान नहीं हो सकता है । यह एक वैकल्पिक या ऐच्छिक सोपान है ।

शोधक को निम्नलिखित जरूर समझना होगा–

1. परिकल्पना कथन में कैसे शब्दों का उपयोग करना चाहिये ?
2. परिकल्पना में ''सार्थकता '' शब्द लिखना चाहिए या नहीं ।
3. यदि परिकल्पना में ''सार्थकता '' शब्द नहीं लिखते तो उनमें क्या अंतर आयेगा ?
4. परिकल्पना लिखने का क्या आधार या औचित्य है ?
5. किसी शोध में ''शून्य परिकल्पना ''या'' निर्देशात्मक परिकल्पना '' कब लिखना चाहिए ?
6. एक–मार्गीय या द्वि–मार्गीय परीक्षण का उपयोग कब करना ?
7. सार्थकता के स्तर एवं त्रुटि के प्रकार के बीच क्या सम्बन्ध है ?

3- inÙkk dk ldyu

शोध का तीसरा सोपान प्रदत्तो का संकलन है । शुरूआत में, शोधक को यह पता होना चाहिए कि प्रदत्त कहाँ से संकलित किये गए है । जैसा कि शोधक को व्यावहारिक/प्रायोगिक शोधों एवं सर्वेक्षण शोधों की जनसंख्या के बारे में जानकारी होना चाहिए तथा ऐतिहासिक शोधों एवं दार्शनिक शोधों के संदर्भ में जानकारी संकलित करने के स्रोत पता होना चाहिए । अकसर शोधक जनसंख्या के प्रत्येक सदस्य से जानकारी या आंकड़ें संकलित करने में सक्षम नहीं होता है ऐसी स्थिति में शोधक को जनसंख्या से न्यादर्श लेना पड़ेगा । जनसंख्या से न्यायदर्श चयन करने की प्रक्रिया न्यादर्शीकरण कहलाती है । न्यादर्श जनसंख्या के छोटे भाग का प्रतिनिधित्व करता है । इस प्रतिनिधित्व का सहसंबंध शोध अध्ययन में चयनित चरों से होगा । यह भी संभव नहीं है कि न्यादर्श सही रूप में

जनसंख्या का प्रतिनिधित्व करेगा, लेकिन न्यादर्श का चयन करते समय यह प्रयास जरूर करना कि अधिकतम सीमा या हद तक जनसंख्या का प्रतिनिधित्व हो । इसलिए न्यादर्श चयन की अनेक न्यादर्शीकरण तकनीकियाँ हैं । ये न्यादर्शीकरण तकनीकियाँ दो वर्गो में विभाजित की गई हैं –

1. अप्रायिकता न्यादर्शीकरण (Non –Probability Sampling)
2. प्रायिकता न्यादर्शीकरण (Probability Sampling)

शोधक को यह जानकारी जरूर हो कि उसके द्वारा किए जाने वाले शोध में कौन–सी न्यादर्शीकरण तकनीकी के प्रकार का उपयोग किया गया है । यह जानकारी शोध के उद्देश्यों में भी होती है । उद्देश्य में लिखे गए शब्दों से ही शोधक को मार्गदर्शन मिल सकता है कि कौन–सी न्यादर्शीकरण की तकनीक का उपयोग करना है । इसके अतिरिक्त शोधक को यह भी जरूर ज्ञात हो कि शोध के लिए कितना उपयुक्त न्यादर्श का आकार होना चाहिए । साथ ही, शोधक को न्यादर्शीकरण त्रुटि भी पता होना अनिवार्य है ।

न्यादर्श का चयन करने के पश्चात् शोधक को आंकड़ों का संकलन करने के लिए उपकरण का निर्धारण करना चाहिए । उपकरण विभिन्न प्रकार के होते है, जैसे – टेस्ट , मापनी , इन्वेन्ट्री (सूची), अवलोकन अनुसूची , साक्षात्कार अनुसूची एवं प्रश्नावली । उपकरण मानकीकृत एवं अमानकीकृत होते हैं । टेस्ट, मापनी एवं इन्वेन्ट्री (सूची) को मानकीकृत किया जा सकता है लेकिन साक्षात्कार अनुसूचित एवं प्रश्नावली को मानकीकृत नहीं किया जा सकता है । अवलोकन अनुसूची को भी मानकीकृत नहीं किया जा सकता, लेकिन उसकी आंतरिक अवलोकन विश्वसनीयता स्थापित की जा सकती है । शोधक को उपकरणों की विशेषताओं का ज्ञान अवश्य होना चाहिए । यह विशेषताएं है – विश्वसनीयता , वैधता , वस्तुनिष्ठता , संवेदनशीलता एवं उपयोगिता । उपकरण की यह विशेषताएं आंकड़ों में निहित होती है । इसलिए यदि उपकरण विश्वसनीय एवं वैध है तो ऑकड़ें भी विश्वसनीय एवं वैध होगें । जिसके परिणाम स्वरूप, निष्कर्ष भी विश्वसनीय होगें । इस कारण, शोधक को उपकरण का चयन सावधानी पूर्वक करना चाहिए ।

उपकरण के चयन के पश्चात् , शोधक को शोध करने के लिए शोध विधि का अवश्य निर्णय लेना होता है । शोध की विभिन्न विधियाँ हैं । जैसे –दार्शनिक विधि , ऐतिहासिक विधि , सर्वेक्षण विधि , प्रायोगिक विधि एवं केस अध्ययन विधि । प्रत्येक शोध विधि के पहले से सुनिश्चित सोपान होते है । अतः शोधक को उसके द्वारा उपयोग की जाने वाली शोध विधि के सोपानों का अनुसरण करना होगा ।

4- प्रदत्तों का विश्लेषण

शोध का चौथा सोपान आंकड़ों का विश्लेषण है । यह आंकड़ें गुणवत्तात्मक या मात्रात्मक हो सकते हैं । गुणवत्तात्मक आंकड़ों का विश्लेषण करने के लिए उपलब्ध तकनीकियाँ हैं , जैसे – विषयवस्तु विश्लेषण, मेटा –विश्लेषण एवं एस. डब्ल्यू. ओ.टी (SWOT) विश्लेषण । मात्रात्मक आंकड़ों के विश्लेषण के लिए सांख्यिकी तकनीकियाँ हैं । शोधक को आंकड़ों के मापन की मापनी का भी ज्ञान हो ताकि उसके अनुसार वह उपयुक्त सांख्यिकी तकनीकी का चयन कर सकें । इन सांख्यिकी तकनीकों को प्राचलिक एवं अप्राचालिक सांख्यिकी तकनीक के रूप में वर्गीकृत किया गया है । सांख्यिकी तकनीकी का चयन उद्देश्य में लिखे गए शब्दों पर निर्भर करता है । इस कारण, उद्देश्यों में लिखे जाने वाले शब्द सटीक होना चाहिए ।

5- fu"d"k

निष्कर्ष शोध का अंतिम सोपान है । निष्कर्षो में शोधक द्वारा किए गए शोध के निष्कर्ष या परिणाम होते हैं जो शोध के उद्देश्यों के संगत अवश्य होना चाहिए । कभी–कभी शोधक निष्कर्ष को चार से पाँच या उससे अधिक प्रष्ठों में लिखते हैं । ऐसे में इन प्रष्ठों से निष्कर्ष के बारे में पता लगाना मुश्किल हो जाता है । जबकि कभी–कभी शोधक निष्कर्ष (Findings) लिखते हैं । इसलिए निष्कर्षो तथा उद्देश्यों के बीच सम्बन्ध होना चाहिए । यदि उद्देश्यों से जुड़ें निष्कर्ष नहीं है , तो वे निष्कर्ष नहीं हो सकते हैं ।

MODULE 1

RESEARCH: CONCEPT, TYPES & STEPS

INTRODUCTION

The progress of any Nation to a great extent depends on the Research and Development. The explosion of information is due to the researches in different areas. The technological development is also due to Research. In nutshell the Research is the backbone of any country progress and development. Thus, research is conducted in all disciplines. But it is observed that the society gets maximum benefit from researches conducted in different areas of Science, Medicine and Technology. The findings of researches in Social Sciences are not as useful as those of Science, Medicine and Technology. Further, in India Research Methods are not taught in many disciplines although people do research. Now people are becoming conscious about the importance of Research Method. In this chapter information is given related to Concept of Research, types and steps to be followed in conducting research in any discipline. After reading this article, you will be able to:

- Define Research
- List characteristics of Research
- Differentiate between Research, Discovery, and Invention
- Differentiate between different types of Research
- List the steps to be followed in conducting research

RESEARCH

It is a known fact that necessity is the mother of invention. The necessity comes in the form of a Problem. The Problem is the base of Research. There is a Problem and its' Solution also exists but the people may not be fully satisfied with the existing Solution of the Problem. It is this **dissatisfaction** that motivates people to find another Solution of the same Problem. It is also a fact that there is no absolute Solution of the Problem. Each Solution of the Problem leads to a new Problem. Take the case of mobile. People wanted to be in contact during their travel. It was the need. The research gave mobile as the Solution but there are many Problems associated with it. The researches have indicated that there are many health hazards which were not before the invention of mobile. Thus, research gives both the Solution and new Problem.

It is a fact that there are many Solutions of the same Problem Both in Sciences and Social Sciences. Due to this, it is not appropriate to say that the outcome of the research, that is, the Solution is correct or incorrect. The Solution of the Problem has to be accepted as it comes. For getting the Solution, some Activities have to be carried out. Any Activity can be carried out unsystematically or systematically. An activity is said to be carried out systematically when the probability of success is maximum. On the other hand, whenever the probability of success is not maximum, the activity is said to be done unsystematically. So in Research Activities have to be carried out systematically. The word Systematic reflects that there are well defined steps arranged in predefined order/sequence. Whenever there are steps, it must be a Process. On the basis of above explanation, the research can be defined as:

Research refers to a **Process** wherein **Activities** are carried out **Systematically** to find **Solution** of the **Problem.**

This is the general definition of Research. From this the definition of research in different disciplines can be coined. A few are given below:

Research in Physics refers to a **Process** wherein **Activities** are carried out **Systematically** to find **Solution** of the **Problem related to some aspect of Physics.**

Research in Hindi refers to a **Process** wherein **Activities** are carried out **Systematically** to find **Solution** of the **Problem related to some aspect of Hindi.**

Research in Education refers to a **Process** wherein **Activities** are carried out **Systematically** to find **Solution** of the **Problem related to some aspect of Education.**

Research in Management refers to a **Process** wherein **Activities** are carried out **Systematically** to find **Solution** of the **Problem related to some aspect of Management.**

CHARACTERISTICS OF RESEARCH

The following are the characteristics of any research.

- It is Systematic in nature.
- It is Problem oriented.
- It refers to a Process.
- It involves Activities.
- It leads to Solution.

DIFFERENCE among DISCOVERY, INVENTION and RESEARCH

Let us take the example of X – Ray. X – Ray was discovered incidentally in 1895 by German Scientist Wilhelm Roentgen. India was also discovered incidentally by Vasco da Gama in 1497. No Systematic efforts were made. Thus, Discovery is not the outcome of activities carried out systematically. It is due to this that people cannot be trained for Discovery. Thus, Discovery is unsystematic.

The steam engine was invented by James Watt. Let us understand the process of inventing Steam Engine. James Watt saw that the steam coming out of the boiling water was able to lift the lid put over the vessel. It reflected that the steam has energy to push the lid upward. James Watt thought of using this idea and the Steam Engine was invented through activities carried out systematically. Thus, Steam Engine was the outcome of activities carried out systematically. Inventions are Applied Researches. So, the Invention may take place while someone is doing Research. Research as pointed out earlier is Systematic in nature. So, Invention is systematic in nature and it may happen during conducting Research. Thus, it is easy to differentiate among Discovery, Invention & Research.

TYPES OF RESEARCH

There are different Types of Research. The Type of Research depends on its base. The types of Researches along with their bases are given below:

Qualitative Research & Quantitative Research

The data / information can be Qualitative or Quantitative. In Languages, Philosophy, History, etc. mostly the Qualitative data exist. The Qualitative data can be converted into Quantitative data but it should not be converted into Quantitative data because there is a loss of information or data. To understand this let us take one example. Suppose there is a 10 marks question while checking the answer of this question, the teacher reads the answer which is in Qualitative form and assigns say 6 marks out of 10 which is the maximum score for this question. So the Qualitative data/information has been converted into Quantitative data. Now from this Quantitative data can one get back the Original Qualitative data? The answer is no. It means there is a loss of information in transforming Qualitative data into Quantitative data. So while analyzing the Qualitative data one should not convert it into Quantitative data. It should be used as Qualitative data only. Thus, the basis for **Qualitative Research & Quantitative Research** is Types of data / information.

Philosophical Research, Historical Research, Survey Research, Experimental Research & Case Study Research

For conducting Research, the researcher has to follow some steps. So there is a Method or Procedure to be followed in conducting a Research. The Method / Procedure to be followed are different for different researches. Thus, on the basis of Method / Procedure followed, the types of Research are: Philosophical Research, Historical Research, Survey Research, Experimental Research, & Case Study Research. **Thus the basis of classifying researches into Philosophical Research, Historical Research, Survey Research, Experimental Research, & Case Study Research** is Method / Procedure followed.

Basic / Fundamental / Theoretical Research, Applied / Experimental Research, and Action Research

The outcome of a Research is in the form of Solutions of the Problem. It is also called findings. It is observed that sometime the findings of Research are not usable. That is, society cannot benefit from the findings of all Researches. Such researches are not required as the society cannot benefit from them. It is a well-known fact that the Theory developed by a person is not only used by the people of his country but the whole World can benefit from the Theory. Thus, the Basic/Fundamental/Theoretical Research has Utility or Applicability for all people of the world.

Fan, TV, Mobile, etc. are the outcomes of Applied/Experimental Research. Fan which is used in India requires 220 Volts but the Fan in Canada requires 110 Volts. It means that the Indian Fan will not work in Canada and similarly Canada Fan will not work in India. Mobile requires SIM card which differs from country to country. Thus Applied/ Experimental Researches have limited Utility/ Applicability. So the Degree of Utility or Applicability reduces.

Finally, you must have noticed that two people having fever may not get the same medicine. There are large numbers of medicine for fever. Whatever medicine suits to a person, the same medicine may not suit to another person. Similarly, if the students of College A go on strike and the College Authority negotiate with the students and find the solution of the problem. The students go back to their classes. Suppose after some time another College B students go on strike. The reason of going on strike by students of College A may or may not be the same

as that of College B. So, the solution of College A will not apply to College B. Separate solution has to be worked out. So, the Degree of Utility or Applicability is too limited.

Thus, the base of **Basic / Fundamental/ Theoretical Research; Applied/ Experimental Research and Action Research is the Degree of Utility or Applicability.**

STEPS OF RESEARCH

The Research refers to a Process which is Scientific or Systematic in nature. So its steps are also derived from the Scientific Process. These are as follows:

- **Identification of Problem**
- **Formulation of Hypothesis**
- **Data Collection**
- **Data Analysis**
- **Conclusion**

The details of each step are given below:

Identification of Problem is the first step. Let us understand why the first step of research is Identification of Problem but not Selection of Problem? Identification word is to be used when the situation is heterogeneous and in homogeneous situation Selection word is to be used. Take an example. Whenever one goes to the market to buy vegetable, one first find out which all types of vegetables are available. Naturally, there are different types of vegetables in the market. So it is heterogeneous situation. Suppose one decides to purchase potatoes. From potatoes one will select potatoes of nearly the same size. Here the word selection is used because one is taking potatoes from heap of potatoes which is homogeneous because all are potatoes. Thus, Selection word is used whenever the situation is homogeneous and in heterogeneous situation Identification word is to be used. This is because it is easy to select when the situation is homogeneous.

To understand the difference between Identification and Selection, let us take another example. There are subjects like, Economics, Political Science, Hindi, English, Management, Education, Psychology, Social works, Physics, Mathematics, Chemistry, etc. It is a heterogeneous situation. Suppose one wants to do research in Management. So the researcher has identified the subject in which he/she want to do research. There are different areas in Management, like, Marketing, Finance, Advertising, Human Resource, etc. From these the researcher decides to do research related to Marketing. There are different Marketing strategies. Among these one may decide to conduct research related to e-marketing. This is

Selection because the researcher started narrowing Management to Marketing than to e-marketing.

Now let us understand the word Problem. You have normal body temperature but it is not a Problem. It becomes Problem whenever body temperature changes. Suppose you want to buy Car. As there are varieties of cars, it may not be easy to choose one car. The decision about the car is not easy. Thus, more alternatives lead to Problem as it delays the decision-making process. A characteristic that has a tendency to change is called Variable. Thus, another name of Problem is Variable. In this step the researcher has to finally Select the Variable.

In this step, the researcher is supposed to select the Variable. After this, the title has to be written. The title should neither be too broad nor too specific. It should be narrow. The title should give information about the Variable(s) to be studied. The Population of the study should also be reflected in the title. After reading the title the reader should also know the Nature or Type of Research. Thus, an appropriate research title should give:

- Information about the Variable(s),
- Population, and
- Type of Research.

Any title that does not give all these information is not complete. Further the Title cannot start with the word "To" because the Title is not pinpointed. Also, the Title cannot indicate the direction. The Objectives have to start with the word "To" because Objectives are pinpointed and indicates the direction. After writing the Title of Research, the researcher should write the Objectives. The Objectives are research questions whose answer the researcher tries to get through the research. The Objectives can be written in Statement form or in Question form. In one research, both Objectives as well as Research Questions should not be written.

Formulation of Hypotheses is the second step. Hypothesis is the tentative solution of the Problem. Another definition is that Hypothesis is the Intelligent Guess about the solution of the Problem. Conjectural statement about the relationship between Variables is another definition of Hypothesis. From these definitions it is evident that Hypothesis is not the final Solution of the Problem. To get the final Solution, it has to be tested. The Testing of Hypothesis is to be done with the help of Statistical Technique. The Statistical Technique requires quantitative data. It means whenever in a research quantitative data are not collected,

the Hypothesis cannot be tested. Hence Hypothesis should not be formulated in a research where Qualitative data are collected. Thus, Formulation of Hypothesis step may not be there in some researches. Thus, it is an optional step.

The researcher must understand:

- How the Hypothesis is to be worded?
- Should "Significant" word be used or not in the Statement of Hypothesis?
- What difference will it make if Significant word is not used in the Statement of Hypothesis?
- What is the base or rational of stating the Hypothesis?
- When should one state Null Hypothesis or Directional Hypothesis?
- When to use One Tailed Test or Two Tailed Test?
- What is the relationship between level of Significance and Type of Error?

Data Collection is the third step of research. To start with, the researcher should know from where the data are to be collected. That is, the Population should be known in case of Survey and Experimental Type of Researches and Source of Data should be known in case of Philosophical and Historical Type of Researches. It may happen that the researcher is not able to collect information or data from each and every member of the Population. Under such circumstances, the Sample has to be taken from the Population. **The process of selecting Sample from the Population is called Sampling.** The Sample is the small representative portion of the Population. The representation has to be with respect to the correlates of the variable under study. It is not possible to have truly representative Sample of the Population but efforts must be made to select Sample that can represent the Population to the maximum extent. There are different Sampling Techniques. The Sampling Techniques have been classified into two categories:

- Non-Probability Sampling and
- Probability Sampling.

The researcher must know which type of Sampling Technique is to be used in the current research or research in hand. This information is known from the Objectives of Research. It is only the wording of the Objective that can guide researcher in deciding which Sampling Technique is to be used. Further, the researcher must know what Sample Size should be appropriate for the research. The Sampling Error must be known to the researcher.

After selecting the Sample, the researcher should decide the Tool or Instrument to be used for Collecting Data. The Tools are of various types, such as, Test, Scale, Inventory, Observation Schedule, Interview Schedule, and Questionnaire. Tools are Standardized and Unstandardized. Tests, Scales and Inventories can be standardized but Interview Schedule and Questionnaire cannot be standardized. On the other hand, Observation Schedule cannot be standardized but inter observer reliability can be established. The researcher must know that tools have characteristics. The characteristics are Reliability, Validity, Objectivity, Sensitivity, and Usability. The characteristics of the tool will be imbibed in the data. That is, if the tool is Reliability and Valid, then data will also be Reliable and Valid. Consequently, the finding will also be Reliable. Thus, the researcher has to select tools carefully.

After selecting the Tools/Instruments, the researcher must decide the Method of Research to be followed in conducting research. The different Methods of Research are: Philosophical Method, Historical Method, Survey Method, Experimental Method, and Case Study Method. Each Method of Research has well defined steps. The researcher has to follow the steps meant for the Method of Research which he/she is using.

Data Analysis is the fourth step of research. The data can be Qualitative or Quantitative. For analyzing the Qualitative data, the techniques available are: Content Analysis, Meta-Analysis and SWOT Analysis. Statistical Techniques are available for analyzing the Quantitative data. The researcher must know the Scale of Measurement underlying the data and accordingly select the appropriate Statistical Technique. The Statistical Techniques have been classified into Parametric Statistics and Non-parametric Statistics. The choice of statistic is guided by the wording of the Objective. It is due to this that the wording of Objectives should be pinpointed.

Conclusion is the last step of research. Conclusions are nothing but Findings of the Research undertaken by the Researcher. It must be consistent with the Objectives of research. Sometime researcher writes Conclusion in four to five pages and even more. From these pages, it is difficult to know the Conclusion. Sometime researcher writes Findings. There should be a linkage between Objectives and Findings. If there is no Objective corresponding to the finding, there cannot be a finding.

मॉड्यूल-2

क्रियात्मक शोध के सोपान

प्रस्तावना:

क्रियात्मक शोध का केंद्रण प्राय: कक्षा-कक्ष शिक्षण अधिगमन से संबंधित समस्याओं के हल निकालने पर होता है। कक्षा-कक्ष शिक्षक शिक्षण संबंधित समस्याओं को हल करने के लिए या अपने शिक्षण को बेहतर बनाने के लिए, अध्यापक स्वयं समस्या की पहचान करता है और अपने संसाधनों तथा निपुणता के आधार पर समस्या का हल निकालता है । क्रियात्मक शोध ऐसे अध्यापक के द्वारा किया जाता है जो कि समस्या का अभिन्न अंग होता है । किसी अन्य व्यक्ति के द्वारा क्रियात्मक शोध नहीं किया जा सकता। अतः क्रियात्मक शोध मुख्यत: कक्षा-कक्ष शिक्षण (Classroom Teaching) में सुधार लाने के लिए किया जाता है ताकि अधिकतम विद्यार्थियों को फायदा मिल सके।

उद्देश्य :

इस मॉड्यूल का अध्ययन करने के पश्चात् आप :

1. क्रियात्मक शोध का अर्थ एवं परिभाषा लिख सकेंगे ।
2. क्रियात्मक शोध के उदारहण लिख सकेंगे ।
3. क्रियात्मक शोध की विशेषताओं को सूचीबद्ध कर सकेंगे ।
4. क्रियात्मक शोध के शीर्षक लिख सकेंगे ।
5. क्रियात्मक शोध के सोपानों की क्रमबद्ध सूची बना सकेंगे ।

क्रियात्मक शोध का अर्थ

प्रायः महसूस किया जाता है कि अध्यापक सम्पूर्ण कक्षा को एक ही विधि से पढ़ाता है फिर भी विद्यार्थियों को अलग-अलग समझ में आता है। इसके अनेक कारण हो सकते है। अतः क्रियात्मक शोध किसी विद्यालय की शैक्षिक समस्या के सन्दर्भ में किया जाता है । शिक्षा में क्रियात्मक शोध मुख्य रूप से शिक्षण की गतिविधियों में सुधार लाने के लिए किया जाता है। समस्या कक्षा-कक्ष अनुदेशन से सम्बंधित किसी भी आयाम पर हो सकती है। कक्षा में पढ़ाते समय आपको कई समस्याओं का सामना करना पड़ता है जिनसे शिक्षण-अधिगम प्रक्रिया प्रभावित होती है। ये समस्यायें समय, परिस्थिति, स्थान, विधि इत्यादि के सन्दर्भ में विशिष्ट प्रकार की होती हैं, जिनका समाधान प्राप्त करने के लिए क्रियात्मक शोध करना आवश्यक हो जाता है-जैसे, कक्षा में अनुशासन की

समस्या, विद्यार्थियों द्वारा भाषा विषय में वर्तनी की अशुद्धियाँ करने की समस्या आदि। इस प्रकार के शोध में समस्या का हल प्राप्त करने पर बल दिया जाता है। क्रियात्मक शोध के लिए अध्यापक के सामने कक्षा-कक्ष के किसी भी पहलु से सम्बन्धित समस्या हो सकती है। समस्या के समाधान के लिए उचित गतिविधियाँ व्यवस्थित रूप से करके समस्या का हल निकाला जाता है।

क्रियात्मक शोध की परिभाषा

क्रियात्मक शोध एक प्रक्रिया है जिसमे विभिन्न गतिविधियाँ व्यवस्थीत रूप से करके शिक्षण के किसी भी पहलु से सम्बन्धित समस्या का हल निकालते है।

क्रियात्मक शोध का उदाहरण

क्रियात्मक शोध के दो उदाहरण निम्न दिये है।

1. माध्यमिक कक्षा में गणित शिक्षण करते समय एक अध्यापक ने पाया कि कुछ विद्यार्थी गणित के सवाल हल नहीं कर पा रहे है । सवाल देने के उपरांत जिन विद्यार्थिओं से सवाल का हल नही निकल पाया उनको अन्य ऐसे विद्यार्थियों के साथ बैठाकर, जिन्होंने हल निकल लिया था, हल निकलने का मौका दिया। ऐसे विद्यार्थियों के साथ मिलकर उनको भी गणित के सवालों को हल करना आ गया। इस प्रकार प्रतिभागी उपगागम को काफी प्रभावपूर्ण पाया गया ।

2. इसी प्रकार कंप्यूटर शिक्षा कक्षा में कंप्यूटर प्रोग्राम बनाने में बहुत से विद्यार्थियों को बहुत कठिनाई आ रही थी । जिन जिन विद्यार्थियों ने प्रोग्राम सही बनाया उनसे अध्यापक ने कक्षा में प्रोग्राम की प्रस्तुति करवाई । इन प्रोग्रामों पर प्रस्तुतिवार चर्चा की गई । इस प्रकार पाया गया की धीरे धीरे कक्षा के अधिकतम विद्यार्थियों ने कम्प्यूटर प्रोग्राम बनाना सीख लिया । इस प्रकार प्रतिभागी उपागम को काफी प्रभावपूर्ण पाया गया ।

क्रियात्मक शोध की विशेषताएँ:

1. क्रियात्मक शोध एक प्रक्रिया है ।
2. क्रियात्मक शोध के अन्तर्गत विभिन्न गतिविधियाँ क़ी जाती है ।
3. क्रियात्मक शोध व्यवस्थित **(Systematic)** है ।
4. क्रियात्मक शोध के द्वारा समस्या का हल निकाला जाता है ।
5. क्रियात्मक शोध प्रतिभागी उन्मुख प्रक्रिया है।
6. क्रियात्मक शोध की प्रकृति सहयोगात्मक है।
7. क्रियात्मक शोध द्वारा परिस्थिति में सुधार होने की सम्भावना होती है ।

8. तात्कालिक परिस्थिति की समस्या के सम्बन्ध में क्रियात्मक शोध किया जाता है ।
9. क्रियात्मक शोध की क्रियाविधि लचीली होती है ।
10. क्रियात्मक शोध आत्म मूल्यांकनपरक होता है ।
11. सामान्यीकरण करना क्रियात्मक शोध का उददेश्य नहीं होता है ।
12. क्रियात्मक शोध एक रेखीये प्रक्रिया नहीं है बल्कि एक चक्रीय प्रक्रिया है।

क्रियात्मक शोध का शीर्षक (Title of Action Research)

आप जानते है कि किताब का शीर्षक बहुत व्यापक (vast) होता है। शोध पत्रिका में जो लेख प्रकाशित होते है उसका भी शीर्षक होता है जो कि पुस्तक के शीर्षक से शब्दो के आधार पर लम्बा होता है। इसी प्रकार शोध का शीर्षक भी पुस्तक के शीर्षक की तुलना में शब्दों के आधार पर लम्बा होता है। कई बार लेख के शीर्षक की लम्बाई और शोध के शीर्षक के लम्बाई शब्दो के आधार पर एक जैसी हो सकती है लेकिन कुछ शब्द केवल शोध के शीर्षक में ही उपयोग में लाये जाते है, जैसे "A Study of .....,.....Effectiveness of…..", “A Study of Effect of ……..” इत्यादि। इस प्रकार के शब्द अगर शीर्षक में हो तो वो शीर्षक शोध का होगा न कि किसी लेख का। एक उपयुक्त शोध के शीर्षक से शोधकर्त्ता को चर, जनसंख्या या समूह एवं शोध का प्रकार या शोध की विधि की जानकारीयाँ मिलनी चाहिये। अगर किसी शोध के शीर्षक में उपरोक्त तीन जानकरियों में से कोई जानकारी नहीं दी गई है तो उस शोध का शीर्षक ठीक नहीं है। अंत:क्रियात्मक शोध के शीर्षक में भी चर, समूह एवं शोध का प्रकार या शोध की विधि की जानकारीयाँ शोधकर्त्ता को मिलनी चाहिये। लीजिये निम्न दिये गये दो क्रियात्मक शोधों के शीर्षको का विश्लेषण करके देखे कि क्या शीर्षक उपयुक्त है ?

1. सरकारी माध्यमिक विद्यालय के कक्षा आठ के विद्यार्थिओं की अंग्रजी बोलने में निपुणता पर अंग्रजी भाषा में अन्तर क्रिया अभ्यास के प्रभाव का अध्ययन
2. क्षेत्रीय शिक्षा महाविद्यालय अजमेर के डेमॉन्ट्रेशन स्कूल के कक्षा 12 वी के विद्यार्थियों की विज्ञान में उपलब्धि पर स्वयं प्रभा किशोरमंच कार्यक्रम के प्रभाव का अध्ययन

क्रियात्मक शोध न. 1 से स्पष्ट है कि अंग्रेजीं बोलने में निपुणता एक चर है और यह शोध सरकारी माध्यमिक विद्यालय के कक्षा आठ के विद्यार्थियों पर किया जायेगा जो की उस समुह की विशेषता बताता है जिस पर क्रियात्मक शोध किया जायेगा। इस शीर्षक से विदित है कि अंग्रेजी भाषा में अन्तर क्रिया अभ्यास एक उपचार है जो कि शोध विधि या शोध के प्रकार का बोध कराता है। इस क्रियात्मक शोध के शीर्षक से चर, समूह एवं शोध विधि या शोध के प्रकार का बोध होता है इसलिए यह शीर्षक उपयुक्त है ।

क्रियात्मक शोध न. 2 से स्पष्ट है कि विज्ञान में उपलब्धि एक चर है। यह शोध कक्षा १२ वी के विद्यार्थियों पर किया जायेगा जो की क्षैत्रीय शिक्षा महाविद्यालय अजमेर के डेमोंस्ट्रेशन स्कूल में पढ़ते है। ये क्रियात्मक शोध के समूह की विशेषता बताता है। इस शीर्षक से विदित है कि स्वयं प्रभा किशोर मंच कार्यक्रम एक उपचार है जो कि शोध के प्रकार का बोध कराता है। इस क्रियात्मक शोध के शीर्षक से चर, समूह एवं शोध विधि का बोध होता है इसलिए यह शीर्षक उपयुक्त है ।

क्रियात्मक शोध के सोपान

क्रियात्मक शोध को क्रमबद्ध रूप से करने के लिए कुछ सोपानो के अनुसार कार्य करना होता है। ये सोपान निम्नलिखित है -

I. समस्या की पहचान
II. परिकल्पना बनाना
III. शोध प्रविधि
IV. प्रदत्तों का एकत्रीकरण
V. प्रदत्तों का विश्लेषण

उपरोक्त सोपानो कि जानकारी निम्नलिखित है।

(i) समस्या की पहचान करना

इस सोपान के अन्तर्गत तीन कार्य करने होते है । सबसे पहले अध्यापक या शोधकर्ता एक समस्या या चर का चयन करे जिस पर वह क्रियात्मक शोध करना चाहता है । चर के चयन के पश्चात् समस्या का कथन लिखना आवश्यक है । इसके बाद समस्या के कथन से सम्बन्धित उद्देश्य लिखने चाहिये। जब अध्यापक या शोधकर्ता उपरोक्त लिखे तीनो कार्यो को पूर्ण कर लेता है तो समस्या की पहचान का सोपान पूरा हो जाता है ।

समस्या के कई स्त्रोत हो सकते है लेकिन क्रियात्मक शोध के अंतर्गत अध्यापक द्वारा स्वयं की कक्षा में शिक्षण संबंधित दिन-प्रतिदिन आने वाली समस्याओं में से एक समस्या का चयन करना है जिस पर क्रियात्मक शोध किया जाएगा । समस्या के चयन में अध्यापक की अहम भूमिका रहती है । समस्या का दूसरा नाम चर है इसलिए समस्या की पहचान के अंतर्गत ही चर या चरों का निर्धारण किया जाता है ।

समस्याएँ विभिन्न क्षेत्रों से हो सकती है जैसे कि:-

विद्यार्थियों का स्कूल में देर से आना ।

विद्यार्थियों द्वारा छोटी-छोटी चीजें चुराना ।

विद्यार्थियों में अनुसाशनहीनता ।

विद्यार्थियों की कुछ विषयों में अभिरुचि न होना ।

विद्यार्थियों का स्कूल से भाग जाना ।

विद्यार्थियों द्वारा स्कूल की वस्तुओं को तोडना ।

विद्यार्थियों का कक्षा में ध्यान न देना ।

विद्यार्थियों की शैक्षिक उपलब्धि ।

विद्यार्थियों का गणित विषय में असफल होना ।

विद्यार्थियों की मात्रा सम्बन्धित गलतियां होना, इत्यादि ।

समस्या का कथन :

चर के चयन के पश्चात् क्रियात्मक शोध के लिए शीर्षक लिखा जाता है । क्रियात्मक शोध का शीर्षक बहुत ही संकुचित होता है। शीर्षक में तीन जानकारियाँ दी जानी चाहिये । ये तीन जानकारियाँ है चर, जनसंख्या या समूह एवं शोध का प्रकार अथवा शोध की विधि। जिस शीर्षक में इनमे से कोई जानकारी नही दी गई है तो वह शीर्षक ठीक नही है । इनको ध्यान में रखते हुये निम्न चार समस्यों के कथन दिये है जो कि क्रियात्मक शोध के लिए उपयुक्त है। अध्यापक जब भी क्रियात्मक शोध करे तो उसे निचे दिये गये समस्या कथन के समान ही समस्या कथन का लिखना चाहिये।

1. शासकीय माध्यमिक विद्यालय न. 1 के नवीं कक्षा के विद्यार्थियों की गणित उपलब्धि पर गणित शिक्षण में सहायक सामग्री के प्रभाव का अध्ययन
2. केन्द्रीय विद्यालय न. 1 नई दिल्ली के कक्षा नवी के विद्यार्थियों के तनाव पर योग के प्रभाव का अध्ययन
3. डेमॉन्ट्रेशन स्कूल क्षेत्रीय शिक्षण संस्थान भोपाल के कक्षा VIII वी के विद्यार्थियों की हिन्दी उपलब्धि पर कक्षा-कक्ष कार्य के प्रभाव का अध्ययन
4. केंद्रीय विद्यालय संगठन स्कूल एन.सी.ई.आर.टी. (NCERT) के कक्षा V वी के विद्यार्थियों की अंग्रेजी उपलब्धि पर अंग्रेजी में श्रुतलेखन (Dictation) के प्रभाव का अध्ययन
5. विद्यार्थियों की गणित उपलब्धि पर ETV प्रोग्राम के प्रभाव का अध्ययन

उपरोक्त समस्या कथन न. 1 में गणित उपलब्धि एक चर है। शासकीय माध्यमिक विद्यालय न. 1 के नवीं कक्षा के विद्यार्थी एक समूह है जिस पर क्रियात्मक शोध किया जायेगा। इस शोध में सहायक सामग्री एक उपचार है। इस क्रियात्मक शोध के कथन में चर, एक समूह एवं शोध के प्रकार के बारे में जानकारी दी है इसलिए कथन न.1 उपयुक्त है।

समस्या कथन न. 2 में तनाव एक चर है। केन्द्रीय विद्यालय न.1 नई दिल्ली के कक्षा नवी के विद्यार्थी एक समूह है जिन पर क्रियात्मक शोध किया जायेगा। इस शोध में योग एक उपचार है। अतः इस क्रियात्मक शोध के कथन में चर, एक समूह एवं शोध के प्रकार के बारे में जानकारी दी है इसलिए कथन न. 2 भी उपयुक्त है।

समस्या कथन न. 3 में हिन्दी उपलब्धि एक चर है। डेमॉन्ट्रेशन स्कूल क्षेत्रीय शिक्षण संस्थान भोपाल के कक्षा VIII वी के विद्यार्थी एक समूह है जिन पर क्रियात्मक शोध किया जायेगा। कक्षा-कक्ष कार्य एक उपचार है। अतः इस क्रियात्मक शोध के कथन में चर, एक समूह एवं शोध के प्रकार के बारे में जानकारी दी है इसलिए कथन न. 3 भी उपयुक्त है।

समस्या कथन न. 4 में अंग्रेजी उपलब्धि एक चर है। केंद्रीय विद्यालय संगठन स्कूल एन.सी.ई.आर.टी. (NCERT) के कक्षा V वी के विद्यार्थी एक समूह है जिन पर क्रियात्मक शोध किया जायेगा। अंग्रेजी में शुद्ध-लेख एक उपचार है। अतः इस क्रियात्मक शोध में चर, समूह एवं शोध के प्रकार के बारे में जानकारी दी है इसलिए कथन न. 4 भी उपयुक्त है।

समस्या कथन नं 5 में गणित उपलब्धि एक चार है और ETV प्रोग्राम एक उपचार है। शोध किस पाठशाला एंवम किस कक्षा के विद्यार्थियों पर किया जायेगा , यह शीर्षक से स्पष्ट नहीं है क्योकि यह जानकारी शोधकर्त्ता ने शीर्षक में नहीं दी है। इसलिए दिये गये शीर्षक से समूह के बारे में जानकारी नहीं प्राप्त हो रही है। इस शीर्षक से चर और उपचार की जानकारीयों का पता लग रहा है लेकिन समूह से सम्बंधित जानकारी का पता नहीं चल रहा है इसलिए यह क्रियात्मक शोध का उचित शीर्षक नहीं है। अतः ऐसा क्रियात्मक शोध का शीर्षक नहीं लिखना चाहिये।

(ii) उद्देश्यों का निर्धारण

समस्या की पहचान के अन्तर्गत ही उद्देश्य या उद्देश्यों का निर्धारण किया जाता है। उद्देश्य ही क्रियात्मक शोध को दिशा प्रदान करता है चूँकि शिक्षक विषय में अच्छी समझ रखता है और चर का चयन भी कर लिया है जिसे शीर्षक में लिखा है । शीर्षक लिखने के पश्चात उससे सम्बंधित उद्देश्य लिखने चाहिये। क्रियात्मक शोध के उद्देश्य स्पष्ट होने चाहिये जिससे अध्यापक शोधकर्त्ता को दिशा मिल सके । उसको उद्देश्य पढ़ कर पता लग सकता है कि न्यादर्श के चयन में कौन सी न्यादर्श प्रविधि का उपयोग किया जाना चाहिये। क्रियात्मक शोधकर्त्ता अपनी इच्छा से न्यादर्श प्रविधि का

उपयोग नही कर सकता । उद्देश्य से ही शोध करने वाले को पता लगता है कि वह शोध किस प्रकार का है । उद्देश्य में चर का उल्लेख होता है तो शोधकर्त्ता उपकरण के बारे मे सोच सकता है । वह उपयुक्त उपकरण का चयन कर सकता है । इसके अतिरिक्त शोधकर्त्ता को प्रदत्त विश्लेषण के बारे मे भी बोध हो जाता है। क्रियात्मक शोध की गुणवत्ता उद्देश्यों की शब्दावली पर निर्भर होती है, अधिकतर शोध अध्यनों मे पाया गया है कि उद्देश्य स्पष्ट नही होते है जिसकी वजह से कई बार शोधक भटक जाता है और दिशाहीन हो जाता है। शोध को दिशा देने के लिए अनिवार्य है की उद्देश्य या उदेश्यों को स्पष्ट (Pin-Pointed) शब्दों में लिखना चाहिये। उपरोक्त 1, 2, 3 और 4 समस्याओं या शीर्षकों से सम्बंधित उद्देश्य निम्न लिखित हो सकते हैं ।

उद्देश्य:

- शीर्षक-1 से सम्बन्धित एक उद्देश्य निम्नलिखित हो सकता है। अगर अध्यापक या शोधकर्त्ता चाहे तो एक से अधिक भी उद्देश्य लिखे जा सकते है।

1. शिक्षण सहायक सामग्री के उपयोग से शिक्षण से पूर्व तथा पश्चात् विद्यार्थियों की गणित में औषत उपलब्धि अंको की तुलना करना।
   To compare mean scores of Achievement in Mathematics of students before and after teaching with the help of Teaching Aids.

- शीर्षक-2 से सम्बन्धित एक उद्देश्य निम्नलिखित हो सकता है ।

1. योग करने के पूर्व तथा पश्चात विद्यार्थियों के तनाव के औसत अंको की तुलना करना ।
   To compare mean scores of Stress of students before and after Yoga Practice.

- शीर्षक-3 से सम्बन्धित कई उदेश्यों में से एक उद्देश्य निम्नलिखित हो सकता है ।

1. कक्षा-कक्ष कार्य (असाइनमेंट) के पूर्व तथा पश्चात् विद्यार्थियों की हिंदी में उपलब्धि के औसत अंको की तुलना करना ।

   To compare mean scores of Achievement in Hindi of students before and after doing Classroom Assessments.

- शीर्षक-4 से सम्बन्धित एक उद्देश्य निम्नलिखित हो सकता है ।

1. अंग्रजी में श्रुतलेखन के पूर्व तथा पश्चात् विद्यार्थियों की अंग्रजी में उपलब्धि के औसत अंको की तुलना करना ।

   To Compare mean Scores of Achievement in English of Students before and after giving Dictation in English.

(v) परिकल्पना बनाना (Formulation of Hypothesis)

आप प्रथम अध्याय में पढ़ चुके है परिकल्पना समस्या का एक संभावित हल होता है या परिकल्पना किसी समस्या के हल के बारे में बौद्धिक संभावना (Intelligent Guess) होती है । क्योंकि परिकल्पना एक बौद्धिक संभावना होती है तो इसका कोई न कोई आधार होना चाहिये। परिकल्पना के प्रायः दो आधार होते है। एक सम्बंधित साहित्य की समीक्षा (Review of Related Literature) और दूसरा सिध्दांत (Theory) । इनके प्रपेक्ष में अध्यापक शोधकर्त्ता शुन्य परिकल्पना बना सकता है या दिशाई परिकल्पना बना सकता है । इसका निर्धारण शोधकर्त्ता अपने हिसाब से नही कर सकता। इस के लिए उसे सम्बंधित साहित्य की समीक्षा या सैद्धान्तिक आधार का सहारा लेना पड़ता है । अगर संबधित साहित्य आधार है तो शोधकर्त्ता को पता चल सकता है कि लिये गये चर से सम्बंधित कोई शोध नही हुआ है, तो ऐसी स्थिती में शून्य परिकल्पना ही बनानी पड़ेगी। अगर कुछ शोध हुये है लेकिन इसकी संख्या बहुत कम है मान लीजिये 40 , इतने कम शोधो के परिणामों के आधार पर दिशा देना संभव नही है तो भी शून्य परिकल्पना बनानी चाहिये। लेकिन अगर चर से सम्बंधित बहुत सारे शोध हुये है और विश्लेषण के पश्चात मान लीजिये पता चला है कि 80 % शोधों के निष्कर्षों से एक दिशा मिलती है, 5 % शोधों के निष्कर्षों से एक दूसरी दिशा मिलती है और 15% शोधो के निष्कर्षों से कोई दिशा नही मिलती है। ऐसी स्थिति में शोधकर्त्ता शून्य परिकल्पना नही बना सकता लेकिन दिशाई परिकल्पना बना सकता है, दिशाई परिकल्पना की दिशा वो ही होगी जो अधिकतम शोधो के निष्कर्ष से निकली है। इसके विपरीत अगर पूर्व में किये गये शोधों से कोई स्पष्ट दिशा नही मिलती है तो वहाँ पर शून्य परिकल्पना ही बनानी चाहिये । अकसर सम्बंधित साहित्य के आधार पर शून्य परिकल्पना ही बनाई जाती है क्योंकि अधिकतम शोधों के अभाव में दिशा देना संभव नही है । सामान्यतोर पर शोधकर्त्ता सम्बंधित साहित्य को ही समस्या का आधार बनाते है और उसी को परिकल्पना बनाने में उपयोग में लेते है इसलिए अधिकतर शून्य परिकल्पना बनाई जाती है। शोधकर्त्ता अक्सर सिद्धांत (थ्योरी) का उपयोग क्रियात्मक शोध में नही करता है । परन्तु अगर सिध्दांत (थ्योरी) परिकल्पना का आधार बने तो ऐसी स्थति में दिशाई परिकल्पना ही बनाना चाहिये । सिद्धांत (थ्योरी) ही दिशा का बोध करायेगी । परिकल्पना को वर्तमान काल में ही लिखना चाहिये क्योंकि इसका कोई आधार होता है । परिकल्पना का कथन लिखते समय सार्थक (Significant) शब्द का उपयोग करना अनिवार्य है। यहाँ सार्थक शब्द बोध करता है कि जो भी परिवर्तन चर में दिख रहा है वह संयोगवश नही है बल्कि वास्तविक है ।

उपरोक्त दिये गये चार उद्देश्यों की चार शून्य परिकल्पना बनाई जायेगी जो निम्नलिखित है।

प्रथम उद्देश्य से सम्बंधित शून्य परिकल्पना निम्न लिखित है।

1. शिक्षण सहायक सामग्री के उपयोग से शिक्षण से पूर्व तथा शिक्षण के पश्चात् विद्यार्थियों की गणित में औसत अंकों में कोई सार्थक अंतर नही है।
   There is no Significant difference in mean scores of Achievement in Mathematics of students before and after teaching with the help of Teaching Aids.

दूसरे उद्देश्य से सम्बंधित शून्य परिकल्पना निम्न लिखित है।

1. योग करने के पूर्व तथा पश्चात् विद्यार्थियों के तनाव के औसत अंकों में कोई सार्थक अंतर नही है।

   There is no significant difference in mean scores of Stress of students before and after Yoga Practic.

तीसरे उद्देश्य से सम्बंधित शून्य परिकल्पना निम्न लिखित है।

1. कक्षा-कक्ष कार्य (असाइनमेंट) करने के पूर्व तथा पश्चात् विद्यार्थियों की हिंदी में उपलब्धि के औसत अंकों में कोई सार्थक अंतर नही है।

   There is no significant difference in mean scores of Achievement in Hindi of students before and after doing classroom Assignments.

चोथे उद्देश्य से सम्बंधित शून्य परिकल्पना निम्न लिखित है।

1. अंग्रजी में श्रुतलेखन के पूर्व तथा पश्चात विद्यार्थियों की अंग्रजी में उपलब्धि के औसत अंकों में कोई सार्थक अंतर नही है।

   There is no significant difference in mean scores of Achievement in English of students before and after giving Dictation in English.

iii. शोध प्रविधि (Methodology)

शोध प्रविधि के अंतर्गत न्यादर्श, उपकरण एवम् शोध अभिकल्प से सम्बंधित जानकरी देनी चाहिये। क्रियात्मक शोध की गुणवत्ता शोध प्रविधि पर निर्भर करती है, अगर किसी ओर शोधकर्त्ता को यही शोध करना है तो उसे भी शोध प्रविधि से ही दिशा मिलती है। इसलिए शोध प्राविधि को उपरोक्त दिये गये शीर्षको के अन्तर विस्तार से लिखना चाहिये।

न्यादर्श:

न्यादर्श जनसंख्या का छोटा प्रतिनिधित्व करने वाला अंग है। न्यादर्श के चयन के लिए विभिन्न न्यादर्श विधियाँ है जिनको दो भागो में विभाजित किया गया है। एक भाग है असम्भाव्यता न्यादर्श (Non-Probability Sampling) और दूसरा है सम्भाव्यता न्यादर्श (Probability Sampling) । असम्भाव्यता न्यादर्श (Non-Probability Sampling) के अंतर्गत जो न्यादर्श विधियाँ आती है वो है सौदेश्य न्यादर्श (Purposive Sampling), प्रासंगिक न्यादर्श (Incidental Sampling), न्यायीक न्यादर्श (Judgemental Sampling) ,अंश न्यादर्श (Quata Sampling), सुविधानुसार न्यादर्श (Convenient Sampling) और स्नोबॉल न्यादर्श (Snowball Sampling) दूसरी तरफ सम्भाव्यता न्यादर्श के अंतर्गत जो न्यादर्श विधियाँ आती है वो है -यादृच्छिक न्यादर्श (Random Sampling) , स्तरिक यादृच्छिक न्यादर्श (Stratified Randam Sampling), स्तरिक अनुपातिक यादृच्छिक न्यादर्श (Stratified Proportionate Randam Sampling), गुच्छ न्यादर्श (Cluster Sampling), बहुस्तरीय न्यादर्श (Multistage Samplaing) और व्यवस्थित न्यादर्श (Systematic Sampling) । उपरोक्त दो प्रकार की दी गई न्यादर्श विधियों में से क्रियात्मक शोध में असम्भाव्यता न्यादर्श में से सौदेश्य न्यादर्श ज्यादा सटीक है क्योंकि अध्यापक उसी कक्षा के विद्यार्थिओं पर क्रियात्मक शोध करेगा जिनको वो पढ़ाता है । अध्यापक विद्यार्थिओं के अधिकतम पहलुओं को भली भांती जानता है। अतः वह समस्या का उपयुक्त समाधान निकल सकता है जो कि उसके समूह के अनुसार होगा।

आईये एक-एक क्रियात्मक शोध के शीर्षक को लेकर समझे की इनकी जनसंख्या क्या है जिन पर क्रियात्मक शोध किया जायेगा एवं उसके परिपेक्ष में कौन सी असम्भाव्यता न्यादर्श विधि उपयुक्त होगी। आप समझ गये है कि क्रियात्मक शोध के लिए जनसंख्या बहुत ही छोटी होती है जिसमे से आगे न्यादर्श का चयन नही हो सकता है। अतः उस कक्षा के सभी विद्यार्थिओं को क्रियात्मक शोध में समलित करना होगा।

प्रथम शीर्षक है " शासकीय माध्यमिक विद्यालय न. 1 के नवी कक्षा के विद्यार्थिओं की गणित उपलब्धि पर गणित शिक्षण में सहायक सामग्री के प्रभाव का अध्ययन"

इस शीर्षक से विदित होता है कि क्रियात्मक शोध नवी कक्षा के विद्यार्थिओं पर किया जायेगा जो कि शासकीय माध्यमिक विद्यालय न.1 में पढ़ते है। अतः जब भी विद्यार्थिओं पर क्रियात्मक शोध किया जायेगा उस वक्त सौदेश्य न्यादर्श विधि का उपयोग ही किया जायेगा।

दूसरा शीर्षक है " केंद्रीय विद्यालय न. १ नई दिल्ली के कक्षा नवी के विद्यार्थिओं के तनाव पर योग के प्रभाव का अध्ययन"

इस शीर्षक से विदित होता है कि क्रियात्मक शोध करने के लिए अध्यापक को कक्षा नवी के सभी विद्यार्थी लेने होगे जो कि केंद्रीय विद्यालय न. १ नई दिल्ली में पढ़ते है। इस क्रियात्मक शोध में भी सौदेश्य न्यादर्श विधि (Purposive Sampling Technique) का उपयोग किया जायेगा।

तीसरा शीर्षक है "डेमन्स्ट्रेशन स्कूल क्षेत्रीय शिक्षण संस्थान, भोपाल के कक्षा VIII वी के विद्यार्थिओं की हिन्दी उपलब्धि पर कक्षा-कक्ष कार्य के प्रभाव का अध्ययन"

इस क्रियात्मक शोध के शीर्षक से स्पष्ट है कि यह शोध डेमन्स्ट्रेशन स्कूल क्षेत्रीय शिक्षण संस्थान जो भोपाल में स्थीत है उसके कक्षा VIII के विद्यार्थिओं पर किया जाएगा। यह क्रियात्मक शोध कक्षा VIII वी में हिन्दी पढ़ाने वाले ही अध्यापक के द्वारा किया जायेगा। इस विद्यालय में हिन्दी पढ़ाने वाले कई अध्यापक हो सकते है लेकिन जो अध्यापक कक्षा VIII को हिन्दी नही पढ़ाते है उनके द्वारा कक्षा VIII वी के विद्यार्थिओं पर क्रियात्मक शोध नही किया जा सकता लेकिन जो अध्यापक जिन कक्षाओं में हिन्दी पढ़ाते है और अगर वो कोई समस्या अनुभव कर रहे है तो वो अध्यापक जिस कक्षा में हिन्दी पढ़ाते है उसी कक्षा के विद्यार्थिओं पर क्रियात्मक शोध कर सकते है। अतः उपरोक्त क्रियात्मक शोध के शीर्षक के आधार पर कह सकते है कि इस शोध के लिए भी सौदेश्य न्यादर्श विधि का ही उपयोग करके न्यादर्श का चयन किया जायेगा।

चौथा शीर्षक है "केंद्रीय विद्यालय संगठन स्कूल, एन.सी.ई.आर.टी. (NCERT) के कक्षा V वी के विद्यार्थिओं की अंग्रेजी उपलब्धि पर अंग्रेजी में शुद्ध लेख के प्रभाव का अध्ययन "

इस शीर्षक से स्पष्ट ज्ञात होता है कि अध्यापक इस क्रियात्मक शोध को कक्षा V के विद्यार्थिओं पर करेगा जो कि केंद्रीय विद्यालय संगठन स्कूल, एन.सी.ई.आर.टी (NCERT) में पढ़ते है। यह क्रियात्मक शोध उस अध्यापक के ही द्वारा किया जायेगा जो कि केंद्रीय विद्यालय संगठन स्कूल के कक्षा V वी के विद्यार्थिओं को अंग्रेजी पढ़ाता है और अनुभव करता है कि विद्यार्थिओं की अंग्रजी उपलब्धि संतोषजनक नही है और विद्यार्थिओं की अधिकतर गलतिया अंग्रेजी की इमला (spelling) की होती है। अध्यापक ने सोचा कि इन विद्यार्थिओं की अंग्रेजी की इमला (spelling) में किस प्रकार से सुधार करवाया जाये। इसके लिए अध्यापक क्रियात्मक शोध कर सकता है। इस शोध को वह कक्षा V वी के विद्यार्थिओं पर ही करेगा, जिनको वह अंग्रेजी पढ़ाता है। अतः इस शोध के लिए भी सौदेश्य न्यादर्श विधि (Purposive Sampling Technique) का उपयोग किया जायेगा।

उपरोक्त चार क्रियात्मक शोधों के शीर्षको से स्पष्ट है कि क्रियात्मक शोध के लिए उपयुक्त न्यादर्श तकनीक सौदेश्य न्यादर्श विधि (Purposive Sampling Technique) है। लेकिन प्रत्येक न्यादर्श के सदस्यों की विशेषता अलग होगी जिनकी क्रियात्मक शोध में अत्यंत मुख्य भूमिका होगी। इस लिए न्यादर्श के सदस्यों की विशेषताओं को जानना जरुरी है ताकि क्रियात्मक शोध करते समय इनका उपयोग किया जा सके।

उपकरण:

आप जानते है कि प्रत्येक प्रकार के शोध में चर होता है तो क्रियात्मक शोध में भी कम से कम एक चर का होना अनिवार्य है। चर के सम्बन्ध में प्रदत्तों को एकत्रित करना जरुरी है। प्रदत्यों को प्राप्त करने के लिए किसी न किसी उपकरण का उपयोग करना जरुरी है। प्रदत्यों की गुणवत्ता उपकरण की गुणवत्ता पर निर्भर करती है। उपकरण की विभिन्न विशेषताएं है, विश्वसनीयता (Reliability), वैधता (Validaty), वस्तुनिष्ठता (Objectivity), संवेदनशीलता (Sensitivity) और उपयोगिता (usability)। उपकरण मानकीकृत (standardised) और अमानकीकृत (unstandardized) होते है। प्रत्येक विषय में अध्यापक को परीक्षण प्रशासित (test administer) करने होते है। प्रत्येक पाठशाला में वार्षिक परीक्षा (Annual Exam) होती है इतना ही नहीं बल्कि विभिन्न स्पर्धा परीक्षा (Comptetive exam) में भी परीक्षण प्रशासित (test administer) किये जाते है। इन सब में उपकरण का उपयोग होता है वो उपकरण अमानकीकृत (unstandardized) होते है। अतः अमानकीकृत (unstandardized) उपकरण की वैधता (Validity) एवं विश्वसनीयता (Reliability) अज्ञात होती है इसलिए अगर किसी छात्र के गणित में मान लीजिए 100 % अंक आये है तो आप नहीं कह सकते है कि उस छात्र को गणित से संबंधित सब कुछ आता है। मानकीकृत उपकरण (Standardized Tool) बनाने की एक प्रक्रिया होती है। जिसका इस पाठ में विस्तार से विवरण नहीं किया जायेगा और क्रियात्मक शोध में अध्यापक या शोधकर्त्ता अधिकतर अमानकीकृत उपकरण का ही उपयोग करेगा।

क्रियात्मक शोध में अध्यापक या शोधक चर के अनुसार उपकरण बनायेगा । प्रथम शीर्षक में "गणित उपलब्धि" एक चर है। इसके मापन के लिए "गणित उपलब्धि परीक्षण" (Achievement in Mathematics Test) बनाया जायेगा। गणित की विषयवस्तु को ध्यान में रख कर प्रश्न लिखे जायेंगे। प्रश्न लघु उत्तरीय प्रकार (Short Answer Type) या विकल्पीय प्रकार (Multiple choice Type) के हो सकते हैं। गणित में शब्द की समस्या (word problem) भी होती है जिनका हल अधिकतर बच्चे सही नही निकाल पाते हैं। अतः गणित उपलब्धि परीक्षण में सभी प्रकार के प्रश्न होने चाहिय। अध्यापक कक्षा नवी के गणित के किन अध्यायों को क्रियात्मक शोध के लिए लेगा इसका चयन अध्यापक पर निर्भर करता है। लेकिन अध्याय वो होने चाहिए जिनमे विद्यार्थयों की उपलब्धि

ठीक नहीं है। गणित उपलब्धि परीक्षण में कितने प्रश्न होने चाहिये, कितना समय उत्तर लिखने के लिए देना चाहिये, अधिकतम अंक इत्यादि का निर्णय अध्यापक पर निर्भर करता है।

दूसरे क्रियात्मक शोध के शीर्षक से विदित है कि अध्यापक 'तनाव' चर से सम्बंधित शोध करना चाहता है। स्कूल का अध्यापक शायद तनाव के मापन के लिए उपकरण बनाने में सक्षम न हो इसलिए उसे पूर्व में बने हुए 'तनाव' से सम्बंधित उपयुक्त उपकरण का चयन करना चाहिये जो कि कक्षा XI वी के विद्यार्थिओं के लिए उपयुक्त हो। ये उपकरण स्कूल के निर्देशन एवं परामर्श प्रकोष्ठ (Guidence and Councilling Cell) में मिल सकता है। अन्यथा किसी भी कॉलेज के मनोवैज्ञानिक विभाग (Pscyhology Department) या शिक्षण महाविद्यालय में मिल सकता है। अगर 'तनाव' चर के मापन के लिए उपकरण न मिले तो स्कूल का अध्यापक तनाव चर को लेकर क्रियात्मक शोध नही कर सकता है। अतः क्रियात्मक शोध के लिए चर का चयन करते समय सुनिश्चित करना पड़ेगा कि उपयुक्त उपकरण उपलब्ध होगा या नही। अगर उपकरण उपलब्ध नही होगा तो उस चर से सम्बंधित अध्यापक क्रियात्मक शोध नही कर सकता।

तीसरे शीषक से विदित है कि हिन्दी उपलब्धि एक चर है जिसका मापन किया जायेगा या जिस से सम्बंधित प्रदत्तों का एकत्रीकरण किया जायेगा । इस क्रियात्मक शोध को अध्यापक कक्षा VIII के विद्यार्थियों पर करेगा । अतः कक्षा VIII के पाठ्यर्चा से ही सम्बंधित कुछ विषय वस्तु होगी जिस पर अध्यापक क्रियात्मक शोध करना चाहेगा । विषय वस्तु का चयन अध्यापक पर ही र्निभर होगा । मान लीजिये अध्यापक व्याकरण से सम्बंधित कोई विषय वस्तु लेता है जिसमें अधिकतर विद्यार्थियों को समझने में कठनाई महसूस हो रही हे । अध्यापक उस व्याकरण की विषय वस्तु से सम्बंधित हिन्दी में उपलब्धि परीक्षण (Achievement in Hindi Test) बनायेगा । इस परीक्षण (test) में कितने प्रश्न होने चाहिए , किस विषय वस्तु से संबधित हो, कितना समय प्रश्नों के उत्तर लिखने के लिये दिया जाये इत्यादि का निर्णय कक्षा VIII में हिन्दी पढ़ाने वाले अध्यापक पर ही निर्भर करता है । अतः तीसरे क्रियात्मक शोध के लिए अध्यापक को एक हिन्दी परख में उपल्बिध परीक्षण (Achievement in Hindi Test) को बनाना होगा । इस परीक्षण को प्रमाणित (standardized) करना जरूरी नही है क्योकि 'शायद स्कूल में पढ़ाने वाला अध्यापक प्रमाणित (standardized) प्रक्रिया से भली भाती परीचित नही है और निर्पूण (Competent) भी नही होगा ।

चौथा शीषक से विदित है कि अंग्रेजी उपलब्धि एक चर है जिससे सम्बंधित अध्यापक को प्रदत्तो को एकत्रित करना होगा जिसके लिए अध्यापक को एक इंग्लिश में उपल्बिध परीक्षण (Achievement in English Test) चाहिए । इस परीक्षण को क्रियातमक शोध करने वाला अध्यापक ही बनायेगा । इस परीक्षण को बनाने में अध्यापक ही विषय वस्तु का चयन, प्रश्नों की संख्या, प्रश्नों के प्रकार इत्यादि का

निर्णय लेगा और वह एक अंग्रेजी में उपलब्धि परीक्षण (Achievement in English Test) को बनायेगा जिसका उपयोग अध्यापक क्रियात्मक शोध में करेगा ।

इस प्रकार अध्यापक क्रियात्मक शोध के शीर्षक से चर का पता लगायेगा और उससे सम्बधित प्रदत्तो के एकत्रीकरण करने के लिए उपकरण या तो बनायेगा और या बने हुए में से उपयुक्त उपकरण का चयन करेगा और प्रदत्तो के एकत्रीकरण के लिए उपयोग में लायेगा ।

iz;kxkRed vfHkdYi **(Experimental Design)**

क्रियात्मक शोध हमेशा प्रयोगात्मक ही होता है । प्रयोग करने के लिए किसी प्रयोगात्मक अभिकल्प (Experimental Design) का उपयोग करना जरूरी है । प्रयोगात्मक अभिकल्प (Experimental Design) विभिन्न प्रकार के होते है जिनको मुख्यतः तीन भागों में विभजित किया गया है । पहला भाग है पूर्व प्रयोग अभिकल्प (Pre- Experimental Design), दुसरा भाग है आंशिक प्रयोगात्मक अभिकल्प (Quasi-Experimental Design) और तीसरा भाग है असल प्रयोगात्मक अभिकल्प (True Experimental Design). क्रियात्मक शोध में अधिकतर पूर्व प्रयोगात्मक अभिकल्प (Pre Experimental Design) ही उपयोग में लाया जाता है क्योकि क्रियात्मक शोध अध्यापक अपनी कक्षा के विद्यार्थियों पर ही करता है । इस शोध के लिऐ अध्यापक को किसी और स्कूल के विद्यार्थियों को लेने की जरूरत नही है । क्रियात्मक शोध के निष्कर्षो (Finding) के आधार पर सामान्यीकरण (Generalize) नहीं कर सकते है क्योकि इसका न्यायदर्श , जनसंख्या (population) का प्रतिनिधित्व (representation) नहीं करता है। अगर शोधकर्त्ता किसी उपाधि (Degree) के लिए शोध कर रहा है

तो उसे क्रियात्मक शोध नही करना चाहिये बल्कि प्रयोगात्मक शोध करना चाहिये ।

प्रयोगात्मक शोध के लिए शोधकर्त्ता आंशिक प्रयोगात्मक अभिकल्प (Quasi - Experimental Design) में से कोई भी उपयुक्त अभिकल्प ले सकता है । अधिकतर शिक्षा से संम्बंधित प्रयोगात्मक शोध में असल प्रयोगात्मक अभिकल्प (True Experimental Design) का उपयोग नही करना चाहिये क्योकि इससे सम्बधित शर्ते बहुत ही जटिल है। अधिकतर विज्ञान के क्षेत्र में शोधार्थी ही असल प्रयोगात्मक अभिकल्प (True Experimental Design) का उपयोग कर सकता है ।

उपरोक्त से स्पष्ट है कि अधिकतर क्रियात्मक शोध में पूर्व प्रयोग अभिकल्प (Pre -Experimental Design) का ही उपयोग किया जाता है । इसके अर्न्तगत कई डिजाइन है जिनमें से पूर्व परख –

पाश्चय परख एक समूह अभिकल्प (Pretest - Posttest Single Group Design) को ही क्रियात्मक शोध में उपयोग करते है । इस डिजाइनस के अर्न्तगत अध्यापक उस कक्षा के विद्यार्थीयो को लेता है जिनपर वह क्रियात्मक शोध करना चाहता है । प्रथम क्रियात्मक शोध के शीर्षक से स्पष्ट है कि अध्यापक क्रियात्मक शोध शासकीय माध्यमिक विद्यालय न. 9 के नवी कक्षा के विद्यार्थीयो पर करेगा । इस विद्यालय में जितने विद्यार्थी कक्षा नवी में है उन सब पर सबसे पहले गणित उपलब्धि परीक्षण दिया जायेगा । जिसे गणित में पूर्व उपल्बिधी (Pre - Achievement in Mathematics) कहेगें । इस के बाद गणित से संबंधित विषय वस्तु का चयन करके उसे सहायक सामग्री के द्वारा पढ़ाया जायेगा । विषय वस्तु को पढाने का अंतराल (duration) अध्यापक ही सुनिश्चित करेगा । यह अंतराल एक या दो कलांश (period) का नहीं होना चाहिए क्योकि इतने कम समय में विद्यार्थीयो में परिवर्तन उभरकर नहीं आयेगा। इसके लिए अंतराल दस या पन्द्रह कलांश का हो तो विद्यार्थीयो में परिवर्तन दिखने लग सकता है । उपचार की समय अवधि विद्यार्थीयो की पूर्व उपलब्धि , घर का वातावरण , विषय में रूचि, पढ़ाने की विधि इत्यादि पर बहुत निर्भर करता है । अध्यापक जो भी गणित से संबंधित विषय वस्तु सहायक सामग्री के द्वारा जितने भी समय तक पढ़ायेगा उसके पश्चात् जिस गणित उपलब्धि परीक्षण (Achievement in Mathematics Test) का उपयोग पढ़ाने से पूर्व किया था उसी उपकरण का उपयोग उपचार (treatment) समाप्त होने के बाद करना चाहिए । इसी प्रकार इस क्रियात्मक शोध में उपचार से पहले एवं उसके पश्चात् विद्यार्थियो की गणित उपलब्धि (Achievement in Mathematics) के अंक प्राप्त हो जायेगे ।

दूसरे क्रियात्मक शोध के शीर्षक से स्पष्ट है कि यह शोध केन्द्रीय विद्यालय न. 1 नई दिल्ली के कक्षा XI के विद्यार्थियो पर किया जायेगा । इस शोध में तनाव एक चर है । तनाव से संबंधित उपकरण इस स्कूल के सभी कक्षा ग्यारहवीं के विद्यार्थियो पर प्रशासित करके प्रदत्तो को एकत्रित किया जायेगा । इस के पश्चात् इन विद्यार्थियो को योग के द्वारा कुछ भोतिक अभ्यास (Physical exercise) कुछ दिनों तक करवाया जायेगा । मानलिजिये अध्यापक योग प्रत्येक दिन तीस मिनट की दर से तीस दिनों तक करवाता है इसके पश्चात् जिस उपकरण का उपयोग योग करने से पहले विद्यार्थियो पर प्रशासित किया था उसी उपकरण का उपयोग तीस दिनों के पश्चात् किया जायेगा । इस प्रकार अध्यापक के पास योग के पूर्व एवं पाश्चय् तनाव से संबंधित जानकारी आजायेगी ।

तीसरे क्रियात्मक शोध के शीर्षक से विदित है कि क्रियात्मक शोध डिमोन्स्ट्रेशन स्कूल क्षैत्रीय शिक्षण संस्थान, भोपाल के कक्षा आठवीं के विद्यार्थियो पर किया जायेगा । **इस क्रियात्मक शोध में हिंदी उपलब्धि एक चर है। यह शोध उस अध्यापक के द्वारा किया जायेगा जो कि कक्षा VIII वी के विद्यार्थिओं को हिंदी विषय पढ़ाता है। हिंदी विषय से सम्बंधित उस विषयवस्तु को**

अध्यापक लेगा जिसमे अधिकतर विद्यार्थिओं को विषयवस्तु समझने में समस्या है । इस विषयवस्तु से सम्बंधित अध्यापक ने एक उपलब्धि परीक्षण बनाया है तो इस की सहायता से अध्यापक विद्यार्थिओं की हिन्दी उपलब्धि की जाँच कर लेगा। इसके पश्चात अध्यापक कक्षा VIII वी के विद्यार्थिओं को कक्षा-कक्ष कार्य करवयेगा, जैसे उसने योजना बनाई है। यह कक्षा-कक्ष कार्य मान लीजिये अध्यापक लगातार 20 दिनों तक करवाता है। प्रत्येक दिन वह एक कालांश (period) ही पढ़ाता है। 20 दिनों के पश्चात् अध्यापक उसी उपलब्धि परीक्षण को प्रशासित (administer) करेगा जिसे कक्षा-कक्ष कार्य करने के पूर्व किया था। इस प्रकार अध्यापक के पास कक्षा VIII वी विद्यार्थिओं की कक्षा-कक्ष कार्य के पूर्व एवं पश्चात् के आंकड़े आ जायेंगे जिनका विश्लेषण अध्यापक बाद में करेगा।

चौथे क्रियात्मक शोध के शीर्षक से विदित है कि यह शोध केंद्रीय विद्यालय संगठन स्कूल, एन.सी.ई.आर.टी. (NCERT) के कक्षा V वी के विद्यार्थिओं पर किया जायेगा। इस क्रियात्मक शोध में अंग्रेजी उपलब्धि एक चर है। आपने उपकरण के अंतर्गत पढ़ा है कि जो अध्यापक इस क्रियात्मक शोध को करेगा उसे एक अंग्रेजी उपलब्धि परीक्षण बनाना होगा। इस अंग्रेजी उपलब्धि परीक्षण को अध्यापक कक्षा V वी के उन विद्यार्थिओं पर प्रशासित (adminster) करेगा जिन पर अध्यापक क्रियात्मक शोध करना चाहता है। इसके पश्चात अध्यापक इन विद्यार्थियों को प्रत्येक दिन श्रुतलेखन (Dictation) देगा। इस श्रुतलेखन (Dictation) की समय अवधि अध्यापक सुनिश्चित करेगा। श्रुतलेखन (Dictation) के पश्चात् अध्यापक प्रत्येक विद्यार्थियों को उसके द्वारा कि गई गलतियों के बारे में प्रति-उत्तर (feedback) देगा। मान लीजिये अध्यापक श्रुतलेखन (Dictation) 15 दिनों तक प्रत्येक दिन एक कालांश (period) की दर से कराता है। 15 दिनों के पश्चात् अध्यापक उसी अंग्रेजी उपलब्धि परिक्षण को इन विद्यार्थियों पर प्रशासित (administer) करेगा। इस प्रकार अध्यापक के पास अंग्रजी उपलब्धि से सम्बंधित जानकारी आ जाएगी जो कि उपचार (Treatment) के पूर्व एवं पश्चात् की होगी।

iv. प्रदत्तों का एकत्रीकरण (Procedure of Data Collection)

प्रत्येक प्रकार के शोध में प्रदत्तों का एकत्रीकरण आवश्यक है। प्रदत्तों के अभाव में शोध अधुरा रह जायेगा। शोध की गुणवत्ता प्रदत्तों के एकत्रीकरण की प्रक्रिया पर निर्भर करता है। प्रदत्तों का एकत्रीकरण एक व्यवस्थित प्रक्रिया (systematic Process) है। प्रदत्तों के एकत्रीकरण की प्रक्रिया को विस्तार से लिखना चाहिए ताकि कोई अन्य शोधार्थी (Researcher) भी इस शोध को उसी प्रकार से कर सके जैसे शोधकर्ता ने किया है। इस तरह निष्कर्षों (Findings) की पुष्टि हो सकती है। निष्कर्षों (Findings) की पुष्टी करना महत्वपूर्ण है क्योंकि यह सामान्यीकरण (Generalization) में सहायता करता है। आपको स्पष्ट होना चाहिये कि क्रियात्मक शोध की निष्कर्षों (Findings) से सामान्यीकरण

(Generalization नहीं किया जा सकता है क्योंकि जिस समुह पर क्रियात्मक शोध करते है वह समुह जनसंख्या का प्रतिनिधित्व नहीं करता है। इसके निम्न कारण है -

1. क्रियात्मक शोध अध्यापक के द्वारा किया जाता है जो कि उस समस्या का हल निकालना चाहता है जो वो अधिकतर उस कक्षा के विद्यार्थी को पढ़ाते समय महसूस करता है।
2. क्रियात्मक शोध में अधिकतर पूर्व परीक्षण-पश्च परीक्षण एकल समूह अभिकल्प (Pretest-Posttest Single Group Design) का उपयोग किया जाता है। इस प्रकार के शोध के आधार पर अध्यापक विश्वास के साथ नहीं कह सकता है कि अगर दूसरे अध्यापक इसी शोध को करे तो विद्यार्थियों में यही बदलाव आयेगा। अतः क्रियात्मक शोधों के निष्कर्षों (Findings) से सामान्यीकरण (Generatlization) नहीं किया जा सकता है।
3. अध्यापक के द्वारा बनाये गये उपकरणो का ही उपयोग किया जाता है। अतः अधिकतर क्रियात्मक शोध में अमान्यीकृत (Unstandardized) उपकरण का उपयोग किया जाता है।
4. क्रियात्मक शोध में लिया गया न्यादर्श जनसंख्या का प्रतिनिधित्व नहीं करता है इसलिए भी इस प्रकार के शोधों की निष्कर्षों (Findings) से सामान्यीकरण (Genersalization) नहीं किया जा सकता है।

उपरोक्त लिखी गई कमियों के होते हुये भी क्रियात्मक शोध अध्यापकों के लिए बहुत उपयोगी होते है क्योंकि अध्यापक अध्यापन के दौरान आने वाली समस्याओं का हल निकाल सकते है। इस प्रकार का अनुभव अध्यापक के लिए बहुत उपयोगी होता है । क्रियात्मक शोध के आधार पर अध्यापक पढ़ाने की विधि में परिवर्तन कर सकता है। जिसके कारण अधिगम प्रभावशील बन सकता है।

इस मॉड्यूल में लिखे गये चार क्रियात्मक शोधों के शीर्षक से संबंधित प्रदत्तों का एकत्रीकरण निम्न प्रकार से किया जायेगा।

प्रथम क्रियात्मक शोध के लिए अध्यापक शासकीय माध्यमिक विद्यालय न. 1 के नवी कक्षा के विद्यार्थियों को लेगा। मान लीजिए विद्यार्थियों को लाभ एवं हानि (Profit and Loss) के प्रश्न हल नहीं करने आते है जबकि अध्यापक ने विद्यार्थियों को पढ़ा दिया है। अध्यापक न पहले भी अनुभव किया होगा कि विद्यार्थियों को लाभ एवं हानि वाले प्रश्नों को हल करने में कठिनाई आती है। अध्यापक लाभ एवं हानि से सम्बंधित गणित उपलब्धि परीक्षण (Achievement in Mathematics Test) जो अध्यापक ने बनाया है उसे कक्षा के विद्यार्थियों पर प्रशासित (administer) करेगा। इसके पश्चात् विद्यार्थियों के द्वारा लिखे गये प्रश्नों के उत्तरों की जांच करेगा और पता लगायेगा कि विद्यार्थियों ने प्रश्नों के उत्तर लिखने में किस प्रकार की त्रुटि की है। इसके पश्चात अध्यापक इन विद्यार्थियों को सहायक सामग्री की सहायता से लाभ एवं हानि वाला पाठ पढ़ायेगा। यह प्रक्रिया मान लीजिये 15 दिनों तक चलती है। 15 दिनों के पश्चात् पूर्व में उपयोग में लाया गया गणित उपलब्धि परीक्षण (Achievement in Mathematics Test) इस समूह के विद्यार्थियों पर दोबारा प्रशासित

किया जायेगा। इसके पश्चात् अध्यापक विद्यार्थियों के दोबारा प्रश्नों के लिखे उत्तरों की जाँच करेंगा। इस प्रकार अध्यापक के पास पूर्व-गणित उपलब्धि परीक्षण (Pre-Achievement in Mathematices) एवं पश्च-गणित उपलब्धि परीक्षण (Post-Achievement in Mathematics) के अंक आ जायेंगे। जिन विद्यार्थियों ने पूर्व परीक्षण एवं पश्च परीक्षण लिये है उन्ही के अंकों को प्रदत्तों के विश्लेषण के लिए लिया जायेगा।

दूसरा क्रियात्मक शोध केंद्रीय विद्यालय न. 1 नई दिल्ली के कक्षा XI वी के विद्यार्थियों पर किया जायेगा। केंद्रीय विद्यालय न. 1 का जो अध्यापक इस क्रियात्मक शोध को करना चाहता है वह सबसे पहले तनाव मापन पूर्व में बनाई गई तनाव मापनी (Scale) कि सहायता से करेगा। विद्यार्थियों के उत्तरों को तनाव मापनी के विवरणिका (Manual) में दी गई गणन प्रक्रिया (Scoring Procedure) के अनुसार मापनी करेगा। प्रत्येक विद्यार्थी के तनाव सम्बंधित अंक प्राप्त हो जायेंगे। इसके पश्चात् अध्यापक विद्यार्थियों को योग का पहला अभ्यास (exercise) करके दिखायेगा। इसके पश्चात् वह विद्यार्थियों से इसी अभ्यास (exercise) को मान लीजिये 10 मिनिट तक करवायेगा। इसके बाद विद्यार्थियों को 5 मिनिट विराम (rest) करवयेगा। 5 मिनिट के बाद अध्यापक एक और अभ्यास (exercise) करके दिखयेगा। इसके बाद सभी विद्यार्थी दूसरी अभ्यास (exercise) लगभग १० मिनिट तक करेगे । इस प्रकार एक दिन में विद्यार्थियों ने योग दो अभ्यास (excercise) किये। अध्यापक को पहले सुनिश्चित करना पड़ेगा कि वह विद्यार्थियों को कुल कितने अभ्यास (excericse) करवाना चाहता है और एक दिन में कितना अभ्यास (exercise) करवाना चाहता है । इसके पश्चात् अध्यापक 30 मिनिट की दर से 30 दिनों तक योग करवायेगा। 30 दिन के बाद उसी तनाव मापनी की सहायता से अध्यापक विद्यार्थियों के तनाव का मापन करेगा। अतः इस क्रियात्मक शोध के बाद विद्यार्थियों के पूर्व तनाव एवं पाश्चय तनाव के अंक आ जायेंगे जिनका उपयोग प्रदत्तों के विश्लेषण में किया जायेगा। अध्यापक उन्ही विद्यार्थियों के पूर्व तनाव एवं पाश्चय तनाव के अंकों का उपयोग करेगा जो कि क्रियात्मक शोध शुरू होने और समाप्त (End) होने तक उपस्थित थे।

तीसरा क्रियात्मक शोध डेमोंस्ट्रेस्शन स्कूल क्षेत्रीय शिक्षण संस्थान, भोपाल के कक्षा VIII वी के विद्यार्थियों पर किया जायेगा। इस क्रियात्मक शोध को हिन्दी पढ़ाने वाला वो अध्यापक करेगा जो कि कक्षा VIII वी के विद्यार्थियों को हिन्दी पढ़ाता और अनुभव करता है कि विद्यार्थियों की हिन्दी उपलब्धी बहुत उत्तम नहीं है क्योंकि विद्यार्थी कई प्रकार की गलतियां या लिखने में अशुद्धिया करते है। अध्यापक विद्यार्थीयों को बातयेगा कि आप में से अधिकतर विद्यार्थीयों की हिन्दी उपलब्धि ठीक नहीं है इसके लिए मैं एक प्रयोग करना चाहता हूँ जिसके लिए मैं आपकी हिन्दी उपलब्धि को हिन्दी उपलब्धि परीक्षण के द्वारा मापूँगा जो कि पूर्व हिन्दी उपलब्धि कहलाई जाएगी। इसके पश्चात् मैं आप सब को कक्षा-कक्ष कार्य करवाऊँगा जिसके करने से शायद आप सबकी हिन्दी उपलब्धि में सकारात्मक बदलाव आयेगा। कक्षा-कक्ष कार्य की नियोजना (Planning) अध्यापक ही करेगा। इसके अनुसार अध्यापक 20 दिनों तक विद्यार्थीयों से कक्षा-कक्ष कार्य करवयेगा। इसके अंत में

विद्यार्थियों की हिन्दी उपलब्धि का परीक्षण उसी हिन्दी उपलब्धि परीक्षण से किया जायेगा जिसका उपयोग उपचार देने के पूर्व में किया था। अतः क्रियात्मक शोध के अन्त में अध्यापक के पास पूर्व हिन्दी उपलब्धि एवं पाश्चय हिन्दी उपलब्धि के अंक प्राप्त हो जायेगे। इन प्रदत्यों का उपयोग विश्लेषण में किया जायेगा।

चौथा क्रियात्मक शोध केंद्रीय विद्यालय संगठन स्कूल, एन सी ई आर टी (NCERT) के कक्षा V वी के विद्यार्थियों पर किया जायेगा। यह क्रियात्मक शोध अंग्रेजी विषय से सम्बंधित होगा। कक्षा V वी में अंग्रेजी पढ़ाने वाले अध्यापक ने महसुस किया होगा कि अधिकतर विद्यार्थी किस प्रकार की गलतिया करते है। गलतियों को ध्यान में रखते हुये अध्यापक ने एक अंग्रेजी उपलब्धि परीक्षण (Achievement in English Test) बनाया है। सबसे पहले अध्यापक विद्यार्थियों को बतायेगा कि अधिकतर विद्यार्थियों की अंग्रेजी उपलब्धि परीक्षण (Achievement in English) अच्छी नहीं है और मै चाहता हूँ कि आप सबकी अंग्रेजी उपलब्धि (Achievement in English) में सुधार हो। इसके लिए मै एक प्रयास करना चाहता हूँ। इसके अन्तर्गत मै सबसे पहले पूर्व में बनाया गया अंग्रेजी उपलब्धि परीक्षण (Achievement in English Test) की सहायता से आप सबकी अंग्रेजी उपलब्धि (Achievement in English) के अंक प्राप्त करूँगा । इस परीक्षण के विश्लेषण से विद्यार्थियों की गलतियों का पता लग सकता है। अध्यापक को विशेलषण के पश्चात पता लग जायेगा कि अधिकतर विद्यार्थी किस प्रकार कि गलतिया करते है। गलतियों को ध्यान में रखकर अध्यापक श्रुतलेखन (Dictation) देगा। प्रत्येक श्रुतलेखन (Dictation) के बाद अध्यापक प्रत्येक विद्यार्थी द्वारा की गई गलतियों का बोध करवायेगा और उससे सम्बंधित सही उत्तर भी बतायेगा। मानलीजिए यह प्रक्रिया 15 दिनों तक चलेगी। इसके पश्चात विद्यार्थियों पर वही अंग्रेजी उपलब्धि परीक्षण (Achievement in English Test) प्रशासित करेगा जो कि क्रियात्मक शोध शुरू करने के पहले उपयोग में लाया गया था। विद्यार्थियों के उत्तरों की जाँच करके प्रत्येक विद्यार्थी के अंक प्राप्त कर लिए जायेंगे। इस प्रकार पूर्व एवं पाश्चय अंग्रेजी उपलब्धि परीक्षण (Achievement in English Test) के अंकों का उपयोग प्रदत्तों के विश्लेषण के लिए किया जायेगा।

उपरोक्त विवरण से आप समझ गये होगे कि क्रियात्मक शोध के प्रदत्तों का एकत्रिकरण कैसे किया जाता है।

v. प्रदत्तों का विश्लेषण

प्रदत्त अकसर दो प्रकार के होते है । एक गुणात्मक एवं दूसरा संख्यात्मक । क्रियात्मक शोध में अधिकतर संख्यात्मक प्रदत्त प्राप्त होते है । इन का विश्लेषण सांख्यिकी तकनीक (Statistical Technique) के द्वारा किया जायेगा। उपरोक्त चारो क्रियात्मक शोधों से प्राप्त प्रदत्तों के विश्लेषण के लिए सहसम्बन्ध 'टी' परीक्षण (Correlated t-test) या Paired Samples t-test का उपयोग किया

जायेगा। यह विश्लेषण अध्यापक अपने आप भी कर सकता है या किसी भी शोधकर्त्ता की सहायता से कर सकता है । इसके अतिरिक्त संगणक (Computer) की सहायता से भी कर सकता है। अगर Statistical Package for the Social Sciences (SPSS) Software उपलब्ध हो तो इसका उपयोग भी किया जा सकता है। जिन अध्यापकों को माध्य (Mean) (M), मानक विचलन (Standard deviation) (SD), और सहसम्बन्ध (correlation) निकालना आता है तो वो निम्न सूत्र की सहायता से विश्लेषण कर सकता है।

$$Correlated\ t = \frac{M1 - M2}{\sqrt{SE_1^2 + SE_2^2 - 2SE_1 * SE_2}}$$

M1-M2 is the difference between means of group at two points of time, so it has to be positive

Where M1 = Mean of Pretest Scores

M2 = Mean of Post test Scores

SE_1 = Standard Error of Pretest Scores

SE_2 = Standard Error of Posttest Scores

$$SE_1 = \frac{SD_1}{\sqrt{N_1}} \qquad SE_2 = \frac{SD_2}{\sqrt{N_2}}$$

Where SD_1 = Standard deviations of Pretest Scores

N_1 = No. of observations in the Group at Pretest

SD_2 = Standard deviation of Posttest Scores

N_2 = No. of observation in the Group at Post test

Normally $N_1=N_2=N$ because all students who will be presented at Pretest as well as Posttest, their Scores will be considered for calculation

r= Correlation between Pretest and Posttest Scores

df = N-1

MODULE 2

STEPS OF ACTION RESEARCH

INTRODUCTION

Action Research is primarily concerned about finding solutions of problems related to different aspects of classroom teaching. In order to find solutions of problems related to classroom teaching or to improve own teaching, teacher himself or herself identifies the problem and finds the solution as per own capability and competency. Action Research is done by the teacher who is part of the problem whose solution is being researched upon. The person, who is not the part of the problem, cannot do Action Research. Action Research is primarily conducted by the teacher to find solution of classroom related problems so that maximum students get benefited.

OBJECTIVES

After reading this module, the reader will be able to

1. Write the meaning and definition of Action Research.
2. Give examples of Action Research.
3. List characteristics of Action Research.
4. Write Title of Action Research.
5. List steps of Action Research in proper sequence.

MEANING OF ACTION RESEARCH

Normally, it is observed that the same teacher teaches the whole class using same method of teaching but different students understand to the different extent. There might be different reasons. The Action Research is done in the context of the classroom problems. In Education, Action Research is primarily done to improve the activities related to teaching – learning process. The problem may relate to any aspect of classroom instruction. During teaching, you may face problems which effect teaching-learning process. The problems primarily may relate to time, situation, place, method of teaching etc. whose solution is to be found out through Action Research. For example, problems related to classroom discipline, English pronunciation or Hindi pronunciation, profit and loss problems in Mathematics, difficulty in understanding concepts in different subjects, etc. In Action Research the emphasis is on getting solution of the problem. For Action Research, the teacher or researcher may have problem related to any aspect of classroom and activities are to be carried out systematically to find solution of problem related to any aspect of classroom.

DEFINITIONOF ACTION RESEARCH

Action Research refers to a process wherein activities are carried out systematically to find solution of problem related to any aspect of teaching.

EXAMPLE OF ACTION RESEARCH

The following are two examples of Action Research:

1. While teaching Mathematics to middle class students, teacher observed that some of the students could not solve the given problems but some could solve the given problems. Those who could solve problems were asked to help those students who could not solve the given problem. This continued till students were able to solve problems themselves. Thus cooperative learning was found to be beneficial by the teacher.

2. Computer teacher while teaching programing to students found that some of the students had difficulty in programming. Teacher asked one of the students who could write correct programme to explain it to the whole class. This was followed with discussion. The teacher observed that students could write correct programme themselves. In this way cooperative learning was found to be useful by the computer teacher.

CHARACTERISTICS OF ACTION RESEARCH

1. Action Research is a process.
2. In Action Research, different activities are carried out.
3. Action Research is systematic.
4. Action Research helps in finding solution of problems encountered by the teacher.
5. Action Research is cooperative in nature.
6. There is a possibility in bringing improvement in the situation.
7. Action Research aims at finding solution to immediate problems.
8. Methodology of Action Research is flexible.
9. Action Research is self-evaluated.
10. Generalization is not the aim of the Action Research.
11. Action Research is cyclic in nature but not like a straight line.

TITLE OF ACTION RESEARCH

You know that the title of the book is broad. Research paper also has a title which is longer than the title of book. Similarly, the title of research is longer than the title of book. Sometime the length of title of research paper and Research might be quite close to each other. There are some words which are used only in the title of research but not title of research paper. The words used in writing title of research are "A Study of……..,", Effectiveness of……", "A study of Effect of……"etc. From the appropriate title of research, the reader must get information about Variable, population and type of research or method of research. If such information is not given in the research title, then the research title is incorrect. Thus, title of Action Research must give information about the variable, group on which Action Research is done and type of research or method of research. Let us analyze the following two titles of Action Research and judge their appropriateness.

1. A study of effect of English Conversation on English Speaking of Class VIII students of Government Middle School, Saket, New Delhi.

2. A study of effect of ETV Programme in Science on Achievement in Science of Class VI students of Demonstration School, Regional Institute of Education, Ajmer

From **title 1**, as give above, it is clear that effect of English Conversation on English Speaking is to be studied. So English Speaking is the dependent variable and English Conversation is the independent variable. The group on which this research is to be conducted is Class VIII students of Government Middle School, Saket, New Delhi. The teacher uses English Conversation in the classroom so as to see whether student's English Speaking skill develops. It indicates about the type of research or method of research. This title gives information about the variable, group and type of research. Thus title 1, given above, of Action Research is appropriate.

From **title 2**, as given above, one can say that ETV programme in Science is the independent variable and Achievement in Science is the dependent variable. The group on which this research is to be conducted is Class VI students of Demonstration School, Regional Institute of Education, Ajmer. Since effect of ETV Programme is to be studied, so it indicates the type of research or method of research. Title 2 gives information about the variable, group and type of research. Thus title 2 of Action Research is appropriate.

STEPS OF ACTION RESEARCH

Action research is to be carried out systematically, so there are steps to be followed. The steps are as given below:

1. Identification of Problem
2. Formulation of Hypothesis
3. Method of Research
4. Data collection
5. Data Analysis

The details of each step are given below:

1. Identification of Problem

In this step, the researcher has to first select or decide the variable related to which the Action Research is to be conducted. After selecting the variable, the researcher has to write the title of Action Research. Lastly, the objective(s) of Action Research is/are to be written. Now the first step of Action Research is completed.

There are different Sources of Problem but in for conducting Action Research the problem or variable must be related to the school context or teaching which the teacher faces day-to-day in the classroom. The teacher plays an important role in selecting the problem or variable.

Problem may relate to different aspect, such as,

- Students coming late to school
- Students stealing small things
- Students indiscipline
- Students not interested in some subjects
- Students run away from school
- Students not attentive in the class
- Student's academic achievement
- Students failure in Mathematics
- Students make punctuation mistakes while writing, etc.

(i) Statement of Problem or Title writing

After selecting the variable, statement of the problem is to be written. The title of Action research is too narrow. From the title of Action Research, the reader must get information related to variable, group and type of research or method of research. Title, which does not give all the three information, is not appropriate. In the following four appropriate title of Action Research are given. Whenever teacher wants to conduct Action Research, he/she must write title similar to the following:

1. A study of Effect of Teaching Aids in Mathematics on Achievement in Mathematics of Class IX students of Government Middle School No.1, New Delhi
2. A study of Effect of Yoga on Stress of class IX students of Central school No.1, New Delhi
3. A study of Effect of Classroom Assignment on Achievement in Hindi of class VIII students of Demonstration School of Regional Institute of Education, Bhopal
4. A study of Effect of Dictation in English on Achievement in English of class V students of Central School, NCERT, New Delhi
5. A study of Effect of ETV Programme on Achievement in Mathematics of students

From **title 1**, as given above, one can note that Achievement in Mathematics is the dependent variable. This study is to be conducted on Class IX students of Government Middle Schools No.1, New Delhi. The group on which the research is to be conducted is given. The effect of Teaching Aids is to be studied. So Teaching Aids is the treatment. In this students belong to a particular school, so the finding cannot be extended to other schools of New Delhi. This title is complete as it gives information about the variable, group and type of research.

From **title 2**, as given above, Stress is the dependent variable and Yoga is the independent variable. This study is to be conducted on class IX students of Central school No.1, New Delhi. It is an Action Research because its finding cannot be extended to other schools of New Delhi. This title is complete as it gives information about the variable, group and type of research.

From **title 3**, one can see that Achievement in Hindi is the dependent variable. Classroom Assignment is the independent variable. The finding will be restricted to class VIII students

of Demonstration School of Regional Institute of Education, Bhopal only. So it is the title of an Action Research. This title is complete as it gives information about the variable, group and type of research.

From **title 4**, one can see that Achievement in English is the dependent variable. Dictation in English is the independent variable. The finding will be restricted to class V students of Central School, NCERT, New Delhi only. So it is the title of an Action Research. This title is complete as it gives information about the variable, group and type of research.

Lastly from **title 5**, one can see that Achievement in Mathematics is dependent variable and ETV Programme is the independent variable. This study is to be conducted on students but students belong to which school, city, country etc. is not given in the title. So this title only gives information related to variable and partial information about the group. The type of research is experimental but in the absence of complete information about the group, it is difficult to decide the group on which Action Research is to be conducted. This title is not appropriate as the complete information about the group is not given. Thus this is not appropriate title of Action Research.

(ii) Objectives Writing

Under Identification of Problem, one must select the variable and write the title of the Action Research. This must be followed by Objective(s) writing. Objectives must be worded pin-pointedly so that the researcher or teacher gets direction. After reading Objectives, the teacher or researcher will decide the sampling technique to be used for selecting the sample. The objectives will include the variables. Keeping in mind the nature of variable, the teacher can decide the tool to be used for collecting data. The quality of Action Research depends on the wording of Objectives. Majority of times, researchers are not able to write pin-pointed Objectives. In other words, sometime the Objectives are vaguely worded which does not give clear direction to researcher. To understand the wording of objectives, the objectives have been written for titles 1 to 4 given before.

Objective

- Related to **title1**, the following objective may be written. Researcher can write more than one objective.

1. To compare mean scores of Achievement in Mathematics of students before and after Teaching with the help of Teaching Aids.

- Related to **title 2**, the following objective has been written.

2. To compare mean scores of Stress of students before and after Yoga Practice.

- Related to **title 3**, the following objective has been written.

3. To compare mean scores of Achievement in Hindi of students before and after doing Classroom Assignments.

- Related to **title 4**, the following objective has been written.

4. To compare mean scores of Achievement in English of students before and after giving Dictation in English.

II. FORMULATION OF HYPOTHESIS

In chapter 1, you have studied that Hypothesis is the tentative solution of the problem. Another definition is, Hypothesis is the intelligent guess about the solution of problem. Since Hypothesis is the intelligent guess or tentative solution, so there must be a base. Without base one cannot formulate Hypothesis. The bases of Formulation Hypothesis are Review of Related Literature and Theory. Keeping these bases in mind, one can formulated Hypothesis either in Null Hypothesis Form or Directional / Alternative Form. On the basis of Review of Related Literature, if the researcher finds that no research has been completed related to the variable under study, than the researcher has to formulate Hypothesis in the Null form. On the other hand, if researcher finds that researches have been conducted but these are a few which may not be a strong base for giving direction, so under such condition the researcher has to formulate Hypothesis in the Null form only. Further, if large numbers of researches have been conducted related to a variable, on analyzing the findings, one comes to know that 80% of researches give one direction, 5% of them give another direction and 15% give different direction, than the researcher must formulate Hypothesis in the Directional Form or Alternative Form. On the other hand, if researcher is unable to get clear direction on the basis of Review of Related Literature, than the researcher has to formulate Hypothesis in the Null Form. Normally, on the basis of Review of Related Literature, Hypothesis is formulated in the Null form. It is possible that the researcher is conducting a research on a variable for which there is a Theory. If so, than the researcher must formulate Hypothesis in the directional or Alternative Form. As for every Hypothesis, there has to be a base so it must be written in the present tense. Further, in formulating Hypothesis, significant word has to be used because whatever change the researcher observes after the treatment is not due to chance but it is due to the Treatment or deliberate attempt made by the researcher.

For the four Objectives given before, the following Hypothesis may be formulated in the Null Form.

- For **first Objective**, the following Hypothesis in the Null Form may be formulated as
  1. There is no significant difference in mean scores of Achievement in Mathematics of students before and after Teaching with the help of Teaching Aids.
- For **second Objective**, the following Hypothesis in the Null Form may be formulated as
  2. There is no significant difference in mean scores of Stress of students before and after Yoga Practice.
- For **third Objective**, the following Hypothesis in the Null Form may be formulated as
  3. There is no significant difference in mean scores of Achievement in Hindi of students before and after doing Classroom Assignment.
- For **fourth Objective**, the following Hypothesis in the Null Form may be formulated as
  4. There is no significant difference in mean scores of Achievement in English of students before and after Dictation in English.

III. METHODOLOGY

Under Methodology, the researcher or teacher should give information about Sample, Tool, Experimental Design, Procedure of data Collection, and Data Analysis. One should write the Methodology explicitly under different headings as given before so that any researcher can follow the same steps if he wants to do similar Action Research as he also might be facing the similar problem in his class. The details which the researcher should give under different heads are given separately in the following captions.

Sample

Sample is the small representative portion of Population. There are different Sampling Techniques which are classified as Non-Probability Sampling and Probability Sampling. Non-Probability Sampling techniques are Purposive Sampling, Incidental Sampling, Judgement Sampling, Quota Sampling, Convenient Sampling, and Snowball Sampling. On the other hand, Probability Sampling Techniques are Random Sampling, Stratified Random Sampling, Stratified proportionate Random Sampling, Cluster Sampling, Multistage Sampling and Systematic Sampling. Of the two types of Sampling Techniques, in Action Research only Purposive Sampling is the most appropriate because the teacher or researcher conducts the researcher on the same students of the class where he is facing the problem. As the teacher is teaching the students the subject, s/he knows students to a great extent. The knowledge about each student will help the teacher in conducting Action Research.

Let take each topic and try to understand the group in the context of their environment and the sampling technique which can be used for selecting sample from the group. By now you have understood that the group size for the Action Research is too small and further sampling may not be required. So the researcher has to take all students of the group for conducting Action Research.

The **first title** is "A study of Effect of Teaching Aids in Mathematics on Achievement in Mathematics of Class IX students of Government Middle School No.1, New Delhi"

From the **first title**, it is evident that the Action Research is to be conducted on Class IX students of Government Middle School No.1, New Delhi. All students belonging to Class IX and studying in Government Middle Schools No.1 situated in New Delhi are taken up for Action Research. The group is selected by using Purposive Sampling Technique because the teacher is facing some problem while teaching Mathematics to class IX students.

The **second title** is "A study of Effect of Yoga on Stress of class IX students of Central school No.1, New Delhi"

From the **second title**, it is evident that this Action Research is to be conducted on Class IX students of Central School No.1, New Delhi. All students belonging to Class IX and studying in Central School No.1 situated in New Delhi are taken up for Action Research. The group is selected by using Purposive Sampling Technique because the teacher observes that the students are stressed most of the time. The teacher wants to study the effect of Yoga on Stress of Class IX students.

The **third title** is "A study of Effect of Classroom Assignment on Achievement in Hindi of class VIII students of Demonstration School of Regional Institute of Education, Bhopal"

From the **third title**, it is evident that this Action Research is to be conducted on Class VIII students of Demonstration School of Regional Institute of Education, Bhopal. All students of Class VIII studying in Demonstration School of Regional Institute of Education, Bhopal are taken up for Action Research. The group is selected intentionally by using Purposive Sampling Technique because the teacher teaching Hindi found some students are not performing well in the tests.

The **fourth title** is "A study of Effect of Dictation in English on Achievement in English of class V students of Central School, NCERT New Delhi"

From **fourth title**, it is evident that the teacher wants to do Action Research on Class V students of Central School, NCERT New Delhi. This Action Research is to be done by the teacher of Central School who is teaching English to Class V students and felt that the performance of students is not satisfactory as they are not able to write correct spelling of some words. Due to this, teacher might have thought of trying his/her idea of helping students for improving the spelling. For trying out his/her idea, s/he will take class V students of her/his school. Thus, the group has been selected using Purposive Sampling Technique.

Thus, it is clear that for conducting Action Research, the most appropriate Sampling Technique to be used is Purposive Sampling. It is important to know the characteristics of all members of the group taken up for Action Research.

Tool

By now you must have understood that there must be at least one variable in the Action Research related to which the data are to be collected. For collecting data one must use appropriate tool. The quality of data depends on the quality of tool used. Different characteristics of tool are Validity, Reliability, Objectivity, Sensitivity, and Usability. Tool can be Standardized and Unstandardized. Each teacher administers test in his/her class. Also annual examination is conducted in each institution. All papers used in the tests and annual examinations are unstandardized. In case of unstandardized tools Validity and Reliability are unknown. Due to this, if a student scores 100% marks in any subject, one cannot say that this student knows everything. There is a procedure of standardizing a tool which is beyond the scope of this material.

For Action Research, the teacher or researcher develops the tool as per the variable. From the **first title**, it is evident that Achievement in Mathematics is the variable and for assessing it, Achievement in Mathematics Test has to be developed. Keeping in mind the Content of Mathematics, the teacher can write multiple choice question and short answer type question. In Mathematics, there are word problems and students make mistakes in solving word problems. So there should be different types of questions in the test. The teacher has to decide the chapters which he wants to take up for Action Research and the questions must be from

the chapters taken up for Action Research. The total number of items, time of answering, maximum score etc. are to be decided by the teacher conducting the Action Research.

From the **second title** it is evident that Stress is the variable related to which the data are to be collected. The school teacher may not be competent to develop tool for assessing Stress of students, so he has to select tool which is appropriate for assessing Stress of Class IX students. Tool for assessing Stress can be obtained from Guidance and Counselling Cell/ Unit or it can be taken from any Department of Psychology or Education of any College or University. In case, the tool is not available for assessing Stress than the teacher cannot conduct Action research.

From the **third title**, it is evident that Achievement in Hindi is the variable related to which the data are to be collected. This Action Research is to be conducted on Class VIII students. There must be some portion of Hindi Syllabus related to which the teacher wants to conduct Action Research. The content is to be decided by the teacher. Suppose the teacher feels that the students do not understand some concepts of Grammar. So the teacher has to develop Achievement in Hindi Test where the questions must be related to different concepts of Grammar which students fail to understand and make mistakes. The total number of items, time of answering, maximum score etc. are to be decided by the teacher conducting the Action Research. Thus the teacher has to develop Achievement in Hindi Test and it may not be standardized as the teacher may not know the procedure of its development and standardization. Mostly in Action Research, unstandardized tools are used.

From **title four**, it is clear that Achievement in English is the variable related to which the data are to be collected. For collecting data, the teacher or researcher must develop Achievement in English Test. This test has to be developed by the teacher who wants to conduct Action Research. The teacher selects the content, decides type and number of items, duration of test, maximum marks, etc. The Achievement in English Test is to be developed by the concerned teacher only.

Thus you must have understood that in Actin Research most of the time the teacher has to develop tool which he/she has to use in conducting Action research. Tools used in Action Research are mostly unstandardized.

Experimental Design

Action Research is experimental in nature. For conducting experimental research, Experimental Design is a must. Experimental Designs are classified into three categories, such as, Pre-Experimental Design, Quasi- Experimental Design, and True Experimental Design. In Action Research Pre-Experimental Design is used because the teacher conducts the research by taking her/his class students because s/he wants to find the solution of problem encountered by her/him in the class. The findings of Action Research cannot be generalized because the group taken for Action Research may not represent the population. In case a researcher is working for a degree, s/he should not conduct Action Research. Further, for Social Science Researches, the appropriate designs are Quasi- Experimental Designs.

True Experimental Designs are not applicable in Social Sciences. These are applicable in disciplines like, Sciences, Engineering, Pharmacy, etc. because randomization is easy to use.

Pre- Experimental Designs are most useful in Action Research. Among different Pre-Experimental Designs, Pretest-Posttest Single Group Design is mostly used in conducting Action Research. For conducting Action Research, the teacher or researcher takes students of the class on whom he wants to do Action Research. From the **first title** of Action Research, it is evident that this Action Research is to be conducted on Class IX students of Government Middle School No.1, New Delhi. In case there are many sections of Class IX than the teacher has to take the students from that section of class IX which s/he teaches and on whom the Action Research is to be conducted. On all students of the selected section, Achievement in Mathematics Test developed by the teacher or researcher is to be administered. This constitutes Pre- Achievement in Mathematics. Teacher analysis the responses of the students on the test and teaches the topics with the help of Teaching Aids. The topics to be taught and the duration of teaching are to be decided by the teacher only. The treatment duration should not be too short. It should be long enough so that the effect of the treatment is visible. At the end of the Treatment, the same Achievement in Mathematics Test is to be administered. This constitutes Post-Achievement in Mathematics. During the process of treatment, many variables may play their role and it may be visible in the Post-Achievement in Mathematics Test. One has to be very careful in understanding the change in Achievement in Mathematics. Thus the teacher or researcher will get score of Achievement in Mathematics before as well as after the treatment.

From the **second title**, it is evident that this Action Research is to be conducted on Class IX students of Central School No.1, New Delhi. In this research Stress is the variable. The teacher after selecting the Stress Scale, s/he has to administer it on all Class IX students. This constitutes the Pre- Stress. This group is given training in Physical Exercises and asked all the students to do the Physical Exercises for 30 days at the rate of 30 minutes per day. At the end of 30 days, the same Stress Scale is administered on all students of the group. This constitutes Post-Stress. Thus the teacher will have Stress scores before as well as after the treatment.

From the **third title**, it is evident that this Action Research is to be conducted on Class VIII students of Demonstration School of Regional Institute of Education, Bhopal. Achievement in Hindi is the variable. The teacher has already decided the content of Hindi which he/she wants to take for the Action Research and prepared Achievement in Hindi Test. This test is to be administered on all students of class VIII-B because she wants to do Action Research on students of class VIII-B. This constitutes Pre- Achievement in Hindi. Now teacher gives classroom work as per her planning and students do it as per the instruction of the teacher. This continues for, say, 20 days at the rate of one period per day. At the end of 20 days, the teacher administers the same Achievement in Hindi Test which was administered before the treatment and it constitutes Post- Achievement in Hindi. Thus, the teacher or researcher will have scores of Achievement in Hindi before as well as after the treatment.

From **fourth title**, it is evident that the teacher wants to do Action Research on Class V students of Central School, NCERT New Delhi. In this Action Research, Achievement in English is the variable. The teacher has already developed Achievement in English Test. This test has to be administered on those students of Class V on whom the teacher wants to do Action Research. This constitutes Pre- Achievement in English. Now the students are given Dictation in English for 15 days. At the end of the treatment of 15 days, the same Achievement in English Test is to be administered again which was administered before the treatment and it will constitute Post-Achievement in English. Thus the teacher will have score of Achievement in English before as well as after the treatment.

IV. PROCEDURE OF DATA COLLECTION

Data collection is a must in each and every research. Research is incomplete in the absence of data. The quality of research to a great extend depends on Procedure of Data Collection. The Procedure of Data Collection is systematic in nature. The researcher must write Procedure of Data Collection in minute details so that any person interested in conducting the same study can do so. By now you must have understood that the findings of Action Research cannot be generalized because the group, on which Action Research is done, does not represent the population to which the group belongs. For such as state of affairs, the following might be some of the reasons:

1. Action Research is done by the teacher who is interested in finding the solution of problem encountered by him. Each teacher may encounter different problems and thus each teacher has to do Action Research so as to get the solution of the problem.
2. Mostly researchers use Pretest-Posttest Single Group Design for conducting Action Research. In Action Research one cannot say with confidence that same will be the finding if the same Action Research is done by another teacher. Thus the findings of Action Research can not be generalized.
3. Mostly tool used in Action research is developed by the teacher who conducts the Action Research. So the tools used in Action Research are unstandardized.
4. The group taken for Action Research does not represent the population. Thus findings of different Action Research on the same aspect cannot be generalized.

In spite of above mentioned limitations of Action Research, it is still useful for teachers because the teacher can find the solution of problem encountered by them in the classroom or school. On the basis of the findings of Action Research the teacher can bring change in different aspects of teaching. Thus Action Research is very useful for teachers, principals and administrators.

Let us understand the Procedure of Data Collection in the context of the before mentioned four problems of Action Research.

From the **first title** of Action Research, it is evident that this Action Research is to be conducted on Class IX students of Government Middle School No.1, New Delhi. Teacher teaches Mathematics to class IX students, s/he might have noticed that the students are not able to solve Problems of Profit and Loss although teacher has taught them. Teacher might

have solved many numerical problems of Profit and Loss but students were unable to solve Problems of Profit and Loss when given as home work. Teacher, while checking home-work, might have found the types of mistakes which most of students might have done. Keeping in mind the types of mistakes, the teachers should develop the Achievement in Mathematics Test by keeping in mind the content of Profit and Loss chapter. In the test, suppose the teacher decide to write 20 questions covering all aspects of Profit and Loss where students have problems. This test is administered on those students of Class IX who are not able to solve problems related to Profit and Loss. The responses of students on this Achievement in Mathematics Test are analysed and further try to pinpoint the problems of students. Now the teacher teaches of Profit and Loss with the help of Teaching Aids. Suppose s/he teaches this topic for 15 days at the rate of one period of 30 minutes per day. At the end of 15 days, the same Achievement in Mathematics Testis administered. This constitutes Post-Achievement in Mathematics Test. During the process of treatment, many variables may play their role and it may be visible in the Post-Achievement in Mathematics Test. One has to be very careful in understanding the change in Achievement in Mathematics. Thus the teacher or researcher will get score of Achievement in Mathematics before as well as after the treatment.

From the **second title**, it is evident that this Action Research is to be conducted on Class IX students of Central School No.1, New Delhi. In this research Stress is the variable. The teacher after selecting the Stress Scale, s/he has to administer it on all Class IX students. This constitutes the Pre- Stress. This group is given training in one Physical Exercises and asked all the students to do this Physical Exercises for 30 minutes. The teacher may ask students to do the same Physical Exercise for 30 minutes on the second day. On the third day, the teachers may demonstrate another Physical Exercise which may be appropriate for controlling Stress. The students after observing this exercise will practice it for 30 minutes. For another two days the students may do both the exercises as per the instructions by the teacher. Now the teacher may demonstrate another Physical Exercise and ask students to practice it for 30 minutes. Like this it continues for 30 days. At the end of 30 days, the same Stress Scale is administered on all students of the group. This constitutes Post-Stress. Thus the teacher will have Stress scores before as well as after the Treatment.

From the **third title**, it is evident that this Action Research is to be conducted on Class VIII students of Demonstration School of Regional Institute of Education, Bhopal. Achievement in Hindi is the variable. The teacher has already decided the content of Hindi which he/she wants to take for the Action Research and prepared Achievement in Hindi Test. This test is to be administered on all students of class VIII-B because she wants to do Action Research on students of class VIII-B. This constitutes Pre- Achievement in Hindi. Now teacher gives classroom work as per her planning and students do it as per the instruction of the teacher. This continues for, say, 20 days at the rate of one period per day. Since it is a class work so, it has to be done in the School only. At the end of 20 days, the teacher administers the same Achievement in Hindi Test which was administered before the treatment and it constitutes Post- Achievement in Hindi. Thus the teacher or researcher will have scores of Achievement in Hindi before as well as after the Treatment.

From **fourth title**, it is evident that the teacher wants to do Action Research on Class V students of Central School, NCERT New Delhi. In this Action Research, Achievement in English is the variable. The teacher has already developed Achievement in English Test. This test has to be administered on those students of Class V on whom the teacher wants to do Action Research. This constitutes Pre- Achievement in English. Now the students are given Dictation in English for say 15 minutes. The dictation taken by the students has to be checked by the teachers and the mistake done by students has to be pointed out. After checking the dictation, the teacher can find out the common mistakes done by students as well as individual mistakes. Keeping the mistakes in mind, the teacher plans another dictation and gives it to students for 15 minutes. Now the teacher checks dictation of each student and try to find out the mistakes done by each students as well as the common mistakes. This continues for 15 days and at the end of the 15 days treatment, the same Achievement in English Test is administered again which was administered before the treatment and it will constitute Post-Achievement in English. Thus the teacher will have score of Achievement in English before as well as after the Treatment.

V. DATA ANALYSIS:

In each of the above cited four Action Research problems, the data were collected before as well as after the Treatment. The data can be analysed with the help of Correlated t-test or Paired Samples t-test. It can be done with the help of SPSS package or Excel.

मॉड्यूल-3

क्रियात्मक शोध की प्रक्रिया

प्रस्तावना

द्वितीय मॉड्यूल के अध्ययन के पश्चात् आप क्रियात्मक शोध की परिभाषा, विशेषताएं एवं उदाहरणों को भलीभांति समझ चुके होगें | क्रियात्मक शोध के सोपानों की क्रमबद्ध सूची भी बना चुकें होगें | इस मॉड्यूल में आप क्रियात्मक शोध की प्रक्रिया का अध्ययन करेंगें | जिसमें आप क्रियात्मक शोध के शीर्षक (Title) के अनुसार उद्देश्य (Objective), परिकल्पना (Hypothesis), प्रविधि (Methodology) तथा परिणामों की व्याख्या (Result and Interpretation) तथा विवेचना एवम् निष्कर्ष (Discussion and Findings) का अध्ययन करेगें | प्रविधि के अंतर्गत न्यादर्श (Sample), उपकरण (Tool), प्रयोगात्मक अभिकल्प (Experimental Design), प्रदत संकलन की विधि (Procedure of Data Collection) तथा प्रदत्तों का विश्लेषण (Data Analysis) का अध्ययन करेगें | जैसा कि आप पहले ही अध्ययन कर चुके हैं, कि क्रियात्मक शोध को किसी क्षेत्र विशेष में कार्य करने वाला व्यक्ति ही क्रियान्वित कर सकता हैं | विद्यालय के संदर्भ में अध्यापक या प्राचार्य क्रियात्मक शोध कर सकते है | क्रियात्मक शोध के द्वारा विद्यालय में कक्षा या अन्न किसी पहलु से सम्बंधित समस्या का हल निकाला जाता है ताकि उस क्रियात्मक शोध से विद्यालय को लाभ पहुंचे |

इस मॉड्यूल का अध्ययन करने के पश्चात आप -

- क्रियात्मक शोध का शीर्षक लिख सकेगें |
- क्रियात्मक शोध के शीर्षक के अनुसार उद्देश्य लिख सकेगें |
- क्रियात्मक शोध के उद्देश्य के अनुसार परिकल्पना लिख सकेगें |
- क्रियात्मक शोध की प्रविधि की चरणबद्ध व्याख्या कर सकेगें |

- क्रियात्मक शोध के परिणामो की व्याख्या कर सकेगें |
- क्रियात्मक शोध की विवेचना एवम् निष्कर्ष कर सकेगें |
- क्रियात्मक शोध के निष्कर्ष लिख सकेगें |

क्रियात्मक शोध का शीर्षक

सर्वप्रथम शोधक को क्रियात्मक शोध करने के लिए उसके द्वारा चयन (Select) की गई समस्या (Problem) की आवश्यकता का औचित्य (Rationale) बताना होगा जिसके बारे में आप मॉड्यूल -2 में पढ़ चुके हैं। अध्यापक होने के नाते आप जानते हैं कि कक्षा में सभी विद्यार्थीओं को एक जैसा समझ में नहीं आता है। कुछ विद्यार्थी किसी विषय में अच्छी समझ रखते है और किन्ही विषयों में अच्छी नहीं रखते । अकसर अनुभव किया गया है कि विद्यार्थियों को संकल्पनायों की समझ नहीं होती है जिसके कारण उनको संकल्पनायों पर आधारित जानकारी समझ में नहीं आती है। विषय से सम्बन्धित जानकारी को समझने के लिए संकल्पनायों को समझना बहुत जरुरी है। जैसे - गणित विषय के अध्यापक जो कक्षा सात में पढ़ाता हैं, उन्होंने अपनी कक्षा में गणित विषय की शिक्षण अधिगम प्रक्रिया के दौरान अनुभव किया कि बच्चे गणित विषय में "भिन्न" की संकल्पना (Concept) को भलीभांति समझने में कठिनाई महसुस कर रहे हैं | अतः अध्यापक ने सोचा की इस समस्या पर क्रियात्मक शोध किया जाए | यहाँ पर उदाहरण के तौर पर इस समस्या से सम्बन्धित क्रियात्मक शोध का एक शीर्षक दिया जा रहा हैं , जो इस प्रकार है -

"**केंद्रीय विद्यालय न. १, नई दिल्ली के कक्षा सात के विद्यार्थियों की गणित विषय में भिन्नात्मक संख्याओं को घटाने की उपलब्धि पर गतिविधि आधारित शिक्षण की प्रभाविता का अध्ययन**"

आप पढ़ एवं समझ चुके है कि उपर्युक्त क्रियात्मक शोध के शीर्षक में तीन जानकारिया निहित होनी चाहिये। ये तीन जानकारियाँ है, चर, जनसंख्या (population/sample) या समूह एवं

शोध के प्रकार (Type of Research). उपरोक्त शीर्षक से पता चलता है की इस क्रियात्मक शोध में "भिन्नात्मक संख्यायों को घटाने की उपलब्धि " एक चर है । यह क्रियात्मक शोध "केंद्रीय विद्यालय न. 1 नई दिल्ली के कक्षा सात के विद्यार्थियों पर किया जायेगा। यह न्यादर्श नई दिल्ली में स्थित केंद्रीय विद्यालय के कक्षा सात के विद्यार्थियों का प्रतिनिधित्व नहीं करता है। क्रियात्मक शोध का न्यादर्श बहुत ही सकुचित या विशिष्ट होता है। इस शीर्षक से पता चलता है कि अध्यापक कक्षा सात के विद्यार्थियों को गणित विषय में से भिन्नात्मक संख्यायों को घटाना सिखाना चाहता है क्योंकि अधिकतर बच्चों को शायद इस पाठ से सम्बंधित सवाल या प्रश्न को हल करने में कठिनाई आ रही होगी। अध्यापक ने सोचा कि क्यो न मै बच्चों को इस पाठ को पढ़ाने में "गतिविधि आधारित शिक्षण विधि " का उपयोग करके देखु। अतः क्रियात्मक शोध के अन्तर्गत अध्यापक प्रयोग करके देखता है और परिणाम आने के बाद अपनी शिक्षण विधि में बदलाव लाने के बारे में सोच सकता है। अतः क्रियात्मक शोध प्रयोगात्मक ही होते है। उपरोक्त शीर्षक से चर , समूह एवं शोध के प्रकार की जानकारियाँ प्राप्त होती है इसलिए यह क्रियात्मक शोध का शीर्षक उपुक्त है।

उद्देश्य

शोधक को क्रियात्मक शोध का शीर्षक निर्धारित करने के पश्चात उसके उद्देश्य लिखना होता है, क्योकि क्रियात्मक शोध के उद्देश्य शोधक को दिशा प्रदान करते है | उपरोक्त क्रियात्मक शोध के शीर्षक से सम्बंधित एक से ज्यादा उद्देश्य लिखे जा सकते है। ज्यादा उद्देश्यों का मतलब है कि आप समस्या के कई पहलुओं से सम्बंधित हल निकालना चाहते है। कक्षा एवं विषय से सम्बंधित क्रियात्मक शोध अकसर अध्यापक ही करेगा क्योंकि वह समस्या को भलीभांति समझता है एवं इसके उपचार से विद्यार्थियों एवं अध्यापक को लाभ पहुंचता है। इसलिए अकसर एक उद्देश्य भी प्राप्त होता है। अतः उपरोक्त क्रियात्मक शोध से सम्बंधित एक ही उद्देश्य लिया गया है जो कि निम्न तरह से लिखा जा सकता है।

गतिविधि आधारित शिक्षण विधि से पढ़ाएँ गये विद्यार्थियों के समूह की गणित विषय में भिन्नात्मक संख्याओं को घटाने की उपलब्धि के पूर्व एवं पश्चात् माध्य फलांको की तुलना करना |

Objective

To compare mean scores of Achievement in Subtraction of Fraction in Mathematics of the group before and after having taught through Activity Based Method.

परिकल्पना

शोधक को क्रियात्मक शोध के अंतर्गत निर्धारित उद्देश्य या उद्देश्यो के आधार पर परिकल्पना लिखनी होती है | क्योकि परिकल्पना किसी भी समस्या का अनुमानित समाधान (Tentative Solution) होता हैं | इसे शोधकर्त्ता अपनी इक्छा से नहीं लिख सकता है। परिकल्पना लिखने का आधार होता है। आप पढ़ चुके है कि परिकल्पना लिखने के केवल दो आधार होते है एक सम्बंधित साहित्य की समीक्षा (Review of Related Literature) और दूसरा सिद्धान्त (Theory)। सम्बंधित साहित्य की समीक्षा (Review of Related Literature) के आधार पर शोधकर्त्ता शून्य परिकल्पना या दिशात्मक परिकल्पना बना सकता है। दिशात्मक परिकल्पना बनाने के लिए ठोस आधार होना चाहिए। कई बार शोधकर्त्ता के पास ठोस आधार का अभाव होता है इसलिए शोधकर्त्ता शून्य परिकल्पना बनाता है। अगर किसी शोधकर्त्ता के पास ठोस आधार हो तो दिशाई परिकल्पना ही बनानी चाहिये। परिकल्पना बनाने का अगर आधार सिद्धान्त (Theory) हो तो भी दिशाई परिकल्पना ही बनानी चाहिये। ठोस आधार के अभाव में शून्य परिकल्पना ही बनानी चाहिये। ऊपर दिये गये क्रियात्मक शोध के उद्देश्य के लिए निम्न शून्य परिकल्पना है।

गतिविधि आधारित शिक्षण विधि से पढ़ाएँ गये विद्यार्थियों के समूह की गणित विषय में भिन्नात्मक संख्याओं को घटाने की उपलब्धि के पूर्व एवं पश्चात् माध्य फलांको में सार्थक अंतर नहीं हैं |

Hypothesis

There is no significance difference between mean scores of Achievement in Subtraction of Fraction in Mathematics of the group before and after having taught through Activity Based Method.

प्रविधि (Methodology)

प्रविधि के अंतर्गत आप पढ़ चुके है कि क्रियात्मक शोध के लिये न्यादर्श, उपकरण, प्रयोगात्मक अभिकल्प, प्रदत संकलन विधि एवं प्रदत्त विश्लेषण का विवरण करना होता है। इस पाठ में दिये गए क्रियात्मक शोध के लिए प्रविधि निम्न दी है।|

न्यादर्श: आप पढ़ चुके है कि क्रियात्मक शोध के लिए न्यादर्श के चयन के लिए असम्भाव्यता न्यादर्श (Non-Probability Sampling) का उपयोग करते है और न्यादर्श जनसंख्या का प्रतिनिधित्व नहीं करता है। अकसर शोधकर्त्ता उस कक्षा के विद्यार्थियों को शोध के लिए लेता है जिनसे सम्बंधित समस्या का हल निकालना हो। क्रियात्मक शोध के निष्कर्ष (Finding) को सामान्यीकरण (Generalization) करने के उपयोग में नहीं लाते है क्योंकि पूर्व परीक्षण-पश्च परीक्षण एकल समूह अभिकल्प (Pretest-Posttest Single Group Design) की आन्तरिक वैधता (Internal Validity) एवं बाह्य वैधता (External Validity) बहुत कमजोर होती है और न्यादर्श/समूह जनसंख्या का प्रतिनिधित्व भी नहीं करता है।

अत: इस पाठ में दिये गये शीर्षक से स्पष्ट होता है कि क्रियात्मक शोध केंद्रीय विद्यालय न. १, नई दिल्ली के कक्षा सात के विद्यार्थियों पर किया जायेगा, जिनको अध्यापक ने शिक्षण

अधिगम प्रक्रिया के दौरान अनुभव किया कि बच्चे गणित विषय में "भिन्न" की संकल्पना को भलीभांति समझने में कठिनाई महसुस कर रहे है | तो अध्यापक क्रियात्मक शोध अपनी ही कक्षा सात के खण्ड (Section) के विद्यार्थियों पर करेगा | साथ ही, अध्यापक को इस समूह के विद्यार्थियों की पृषठभूमि भी पता है | इस प्रकार क्रियात्मक शोध के लिए न्यादर्श का चयन सौदेश्य न्यादर्श तकनीकी (Purpusive Sampling Teachnique) की सहायता से किया जाता है |

<u>उपकरण</u>: आप समझ चुके है कि चर के बिना शोध नहीं हो सकता। शोध करने के लिए चर से सम्बंधित जानकरी एकत्रित करना जरुरी होता है क्योकि जानकरी के बिना समस्या का समाधान निकालना असंभव है। चर से सम्बंधित जानकारी लेने के लिए उपकरण का उपयोग किया जाता है। उपकरण मानकीयकृत एवं अमानकीयकृत होते है। प्रदत्तों की गुणवत्ता उपकरण की गुणवत्ता पर निर्भर करते है। अमानकीयकृत उपकरण के द्वारा एकत्रित कि गई जानकारी की विश्वसनीयता एवं वैधता (Validity) का पता नहीं होता है। क्रियात्मक शोध अकसर स्कूल में कार्यरत अध्यापक के द्वारा किया जाता है। हो सकता है कि अध्यापक को उपकरण को मानकीयकृत करने की विधियों के बारे में जानकारी न हो और समय का भी अभाव होता है। इसलिए अध्यापक क्रियात्मक शोध के लिए अमानकीयकृत उपकरण का उपयोग करता है। अधिकतर अध्यापक कक्षा में परिक्षण के दौरान अपने आप बनाये गये उपकरण का उपयोग करते है जो कि अमानकीयकृत होते है। अत: ऊपर दिये गये शीर्षक में दिया गया चर '*गणित विषय में भिन्नात्मक संख्याओं को घटाने की उपलब्धि*' के लिये उपकरण के रूप में '*गणित विषय में भिन्नात्मक संख्याओं को घटाने की उपलब्धि परीक्षण*' होगा | यह उपलब्धि परीक्षण शिक्षक द्वारा ही बनाया जायेगा | इसलिये इसे अमानकीकृत (Unstandardize) परीक्षण कहेगे| इस उपलब्धि परीक्षण में कितने प्रश्न होगे, किस प्रकार के प्रश्न होगे, कितनी समय अवधि होगी इत्यादि का निर्णय क्रियात्मक शोधकर्त्ता यानि अध्यापक पर होता है। अध्यापक को पता है कि प्रश्न कई प्रकार के होते है जैसे निबंधात्मक प्रकार(Essay Type), लघु उत्तरीय प्रकार

(Short Answer Type) एवं वस्तुनिष्ठ प्रकार (Objective Type) । अधिकतर क्रियात्मक शोध के लिए अध्यापक लघु उत्तरीय प्रकार (short Answer) और वस्तुनिष्ठ प्रकार (Objective Type) की ही प्रश्न लिखते है। प्रश्नों कि संख्या विषयवस्तु पर निर्भर करती है। प्रश्न इतने होने चाहिये ताकि क्रियात्मक शोध के लिए ली गई पूर्ण विषयवस्तु का प्रतिनिधित्व हो सके। अध्यापक ही अंको के बारे में निर्णय लेता है।

<u>प्रयोगात्मक अभिकल्प</u>: क्रियात्मक शोध की प्रकृति प्रयोगात्मक (Experimental) है | इसलिये शोधक को एक प्रयोगात्मक अभिकल्प (Experimental Design) का उपयोग करना होता है | आप मॉड्यूल-2 में पढ़ चुके है कि प्रयोगात्मक अभिकल्पों को तीन श्रेणीयों में विभाजित किया है। ये तीन श्रेणीया है पूर्व प्रयोगात्मक अभिकल्प (Pre-Experimental Design), आंशिक प्रयोगात्मक अभिकल्प (Quasi Experimental Design) और असल प्रयोगात्मक अभिकल्प (True Experimental Design) | क्रियात्मक शोध के लिए सबसे उपयुक्त प्रयोगात्मक अभिकल्प पूर्व परीक्षण-पश्च परीक्षण एकल समूह अभिकल्प (Pretest-Posttest single Group Design) है जो पूर्व प्रयोगात्मक अभिकल्प (Pre-Experimental Design) की श्रेणी में से एक अभिकल्प है। आप पढ़ चुके है कि पूर्व-पश्च एकल समूह अभिकल्प के लिए समूह जैसा उपलब्ध हो वैसा ही समूह क्रियात्मक शोध के लिए लेते है इसलिए यह समूह जनसंख्या का प्रतिनिधित्व नहीं करता है। अतः इस प्रकार के शोधों के परिणामों के आधार पर सामान्यीकरण (Generalization) नहीं किया जा सकता है। क्रियात्मक शोध के परिणामों को उपयोग उसी समूह पर होता है जिस पर वह शोध किया गया है। अतः इस मॉड्यूल में क्रियात्मक शोध के लिए एक शीर्षक एवं उससे सम्बंधित एक उद्देश्य दिया है, इनके परिपेक्ष में उपयुक्त प्रयोगात्मक अभिकल्प पूर्व -पश्यात एकल समूह अभिकल्प है जिसका खाका (layout) निम्न प्रकार है।

O_1 X O_2

उपरोक्त खाके में दिये गये चिन्ह निम्न प्रदर्शित करते है :

O_1= आश्रित चर का पूर्व परीक्षण, X = उपचार, O_2 = आश्रित चर का पश्यत परीक्षण

पूर्व-पश्यात एकल समूह अभिकल्प के खाके से स्पष्ट है कि जिस समूह पर क्रियात्मक शोध किया जायेगा उस समूह के विद्यार्थियो परचयनित उपकरण को प्रशासित करके प्रत्येक विद्यार्थियो के अंक प्राप्त क्र लेंगे। जिसे O_1 कहेगे। इसके बाद उस समूह के सभी विद्यार्थियो पर वो उपचार लगाया जायेगा जैसा की शोधकर्त्ता अथवा अध्यापक ने सोचा है। उपचार लगाने की प्रक्रिया, समय अवधि इत्यादि भी उसी प्रकार से होगी जैसा अध्यापक ने सोचा है। उपचार के अन्त में उसी उपकरण का उपयोग किया जायेगा जो उपचार देने से पहले किया था। उपचार के बाद में उपयोग में जाये गये उपकरण की स्कॉरिंग करके अंक प्राप्त क्र लेंगे जिसे O_2 कहेंगे।

<u>प्रदत संकलन</u>: इसके अंतर्गत शोधक (अध्यापक) द्वारा चयनित न्यादर्श पर चयनित उपकरणो को प्रशासित (Administer) कर प्रदत्तों का संकलन (Data Collection) किया जाता है | अत: इस मॉड्यूल में दिये गये शीर्षक में शोधक द्वारा चयनित न्यादर्श (केंद्रीय विद्यालय न. १, नई दिल्ली के कक्षा सात के विद्यार्थियों) पर चयनित उपकरण (भिन्नात्मक संख्याओं को घटाने की उपलब्धि का परीक्षण) प्रशासित (Administer) कर प्रदत्तों का संकलन किया जाएगा | इसमें सर्वप्रथम शोधक द्वारा चयनित न्यादर्श पर पूर्व परीक्षण के रूप में भिन्नात्मक संख्याओं को घटाने का उपलब्धि परीक्षण प्रशासित (Administer) कर प्रदत्त संकलित किए जाएगे | इसे पूर्व परीक्षण (Pretest) कहते है | तत्पश्चात शोधक द्वारा उपचार के रूप में गणित विषय में भिन्नात्मक संख्याओं को घटाने की विषयवस्तु गतिविधि आधारित शिक्षण विधि (संख्या कार्ड) द्वारा पढाई जाएगी, जिसकी अवधि (Duration) मान लीजिए 15 दिन है प्रत्येक दिन 50 मिनिट की दर से| इस उपचार के पश्चात् शोधक द्वारा पश्च परीक्षण के रूप मे भिन्नात्मक

संख्याओं को घटाने का उपलब्धि परीक्षण जिसका उपयोग उपचार से पहले किया गया है उसी को दोबारा उसी समूह पर प्रशासित (Administer) कर प्रदत्त संकलित किए जाएगें | यह पश्च परीक्षण कहलाया जायेगा | पूर्व एवं पश्च परीक्षण (Pretest and Posttest) की समय अवधि शोधकर्ता स्वयं सुनिश्चित करता है और यह एक जैसी होती है | इसके बाद विद्यार्थियो के उत्तरो की जाँच करके अंक प्रदान किये जायेगे और प्रत्येक विद्यार्थी के कुल अंक प्राप्त क्र लिए जायेगे जिनका उपयोग प्रदत्तो के विश्लेषण में किया जायेगा।

<u>प्रदत्त विश्लेषण</u>: शोधक द्वारा क्रियात्मक शोध में प्रयोगात्मक अभिकल्प के रूप मे यदि पूर्व-पश्च एकल समूह अभिकल्प (Pretest-Posttest Single Group Design) का उपयोग किया गया हैं | तो वह संकलित प्रदत्तों के विश्लेषण के लिये सांख्यिकी तकनीक (Statistical Technique) के रूप मे सहसम्बंधित 'टी' टेस्ट (Correlated t-test) या युग्मित न्यादर्श 'टी' टेस्ट (Paired Samples t-test) का उपयोग कर सकता हैं । जिसके लिये वह निम्नलिखित सूत्र (Formula) का उपयोग कर प्रदत्तों का विश्लेषण कर सकता हैं । इसके अतिरिक्त वह प्रदत्तों के विश्लेषण के लिए SPSS (Statistical Package for Social Sciences) का भी उपयोग कर सकता हैं ।

सूत्र: सहसम्बंधित 'टी' टेस्ट (Correlated t-test) या युग्मित नमूना 'टी' टेस्ट (Paired Samples t-test)

$$t = M_1 - M_2 \; / \; \sqrt{(SE_1^2 + SE_2^2 - 2r \times SE_1 \times SE_2)}$$

M_1 = Mean of Pre test scores (पूर्व परीक्षण का माध्य फलांक)

M_2=Mean of Posttest scores (पश्च परीक्षण का माध्य फलांक)

SE_1= Standard of Error of Pre test scores (मानक त्रुटि - पूर्व परीक्षण के फलांक)

SE_2= Standard Error of Post test scores (मानक त्रुटि - पश्च परीक्षण के माध्य फलांक)

r = Correlation Coefficient between Pre test scores and Post test scores

(पूर्व एवम पश्च परीक्षण के फलांको में सहसम्ब्न्ध गुणांक)

$SE_1 = \sigma_1 / \sqrt{n_1}$

$SE_2 = \sigma_2 / \sqrt{n_2}$

Where $n_1 = n_2 = n$

σ_1 = *Standard Deviation of Pre test scores* (पूर्व परीक्षण के अंको का मानक विचलन)

σ_2 = *Standard Deviation of Post test scores* (पश्च परीक्षण के अंको का मानक विचलन)

n_1 and n_2 = *Total Number of Subjects in the Group*

(समूह के कुल विद्यार्थियो की संख्या)

यहाँ पर उदाहरण के लिये ऊपर दिये गये क्रियात्मक शोध के प्रदत्तों का विश्लेषण दिया गया है । इस क्रियात्मक शोध का उद्देश्य था - गतिविधि आधारित शिक्षण विधि (संख्या कार्ड) से पढ़ाएँ गये विद्यार्थियों के समूह की गणित विषय में भिन्नात्मक संख्याओं को घटाने की उपलब्धि के पूर्व एव पश्चात माध्य फलांको की तुलना करना । इस उद्देश्य से सम्बन्धित प्रदत्तों का विश्लेषण सहसम्बंधित 'टी' टेस्ट (Correlated t-test) की सहायता से किया गया। जिसके परिणाम तालिका 1.0 में दिया गया हैं -

तालिका 1.0: परीक्षण वार में भिन्नात्मक संख्याओं को घटाने की उपलब्धि के M, SD, r, N तथा सहसम्बंधित 'टी' का मान

समूह	M	SD	r	N	सहसम्बंधित 'टी' का मान
पूर्व-परीक्षण	60.88	6.92	0.79	20	25.01**
पष्च-परीक्षण	79.65	7.52		20	

** 0.01 सार्थकता स्तर पर सार्थक

तालिका 1. 0 से विदित होता है कि भिन्नात्मक संख्याओं को घटाने की उपलब्धि के पूर्व-परीक्षण एवं पश्च-परीक्षण के 'टी' का मान 25.01 है, जो कि 0.01 स्तर पर सार्थक है, जबकि df = 18 है । इसका अर्थ है कि भिन्नात्मक संख्याओं को घटाने की उपलब्धि के पूर्व-परीक्षण एवं पश्च-परीक्षण के माध्य फलांकों में सार्थक अंतर है। इस परिप्रेक्ष्य में शून्य परिकल्पना कि गतिविधि आधारित शिक्षण विधि (संख्या कार्ड) से पढाए गये विद्यार्थियों के समूह की भिन्नात्मक संख्याओं को घटाने की उपलब्धि के पूर्व एव पश्च माध्य फलांको में सार्थक अंतर नहीं हैं निरस्त की जाती है। तालिका 1.0 से स्पष्ट होता है कि पश्च-परीक्षण का माध्य फलांक 79.65 है, जो कि पूर्व-परीक्षण के माध्य फलांक 60.88 से सार्थक उच्च है। अतः गतिविधि आधारित शिक्षण विधि (संख्या कार्ड) भिन्नात्मक संख्याओं को घटाने की उपलब्धि के आधार पर प्रभावी पाई गई।

<u>परिणाम की व्याख्या:</u> (**DISCUSSION)**

शोधक द्वारा उक्त सांख्यिकी तकनीक के आधार पर प्रदत्तों के विश्लेषण से प्राप्त परिणाम की व्याख्या (Discussion) की जाती है | इसके अन्तर्गत मे शोधक प्राप्त परिणाम का आधार

बताता है कि ऐसा परिणाम क्यों आया ? इसकी विवेचना अध्यापक पूर्व मे हुए शोध अध्ययन के परिणाम को ध्यान में रखकर कर सकता है। इसके अतिरिक्त अध्यापक विद्यार्थियों के परिपेक्ष , उपचार के दौरान की गई गतिविधियाँ, उपचार की अवधि इत्यादि को ध्यान में रखकर कर सकता है। अध्यापक द्वारा कि गई परिणाम की व्याख्या एक सार्थक योगदान होता है जो कि पढ़ने वालों के लिए बहुत लाभदायक सिद्ध हो सकता है। इसे निम्न तरह से लिखना चाहिये ।

इस क्रियात्मक शोध में पाया कि गतिविधि आधारित शिक्षण विधि (संख्या कार्ड) भिन्नात्मक संख्याओ को घटाने की उपलब्धि के आधार पर प्रभावी पाई गई। इसके कई संभावित कारण हो सकते है अध्यापक अधिकतर व्याख्यान विधि से पढाते है। जिसके दौरान अध्यापक सक्रिय रहते है और अधिक विद्यार्थी निश्चित रहते है। कई विद्यार्थियों को यह भी पता नहीं चलता कि अध्यापक ने इस पाठ में किन-किन बिन्दुओं की व्याख्या की है । इसके विपरीत गतिविधि आधारित शिक्षण विधि के अन्तर्गत अधिकतर विद्यार्थी सक्रिय रहते है । जिसके कारण उन्हें विषयवस्तु को समझने में कष्ट नहीं होता है और जब विद्यार्थियों को विषयवस्तु समझ में आने लगती है तो एकाग्रता (Concentration) एवं रूचि बढ़ने लगती है। विद्यार्थी को गणित सरल लगने लगता है। उपरोक्त लिखित कारणों की वजह से हो सकता है कि उपयोग में ली गई शिक्षण विधि प्रभावशील पाई गई ।

Module 3

PROCESS OF ACTION RESEARCH

INTRODUCTION

After studying second module, you may have understood the definition, Characteristics, title writing and steps of conducting Action Research. In this module, you will study the process of Action Research under headings like Title, Objectives, Hypothesis, and Methodology. Under Methodology, you will study Sample, Tool, Experimental design, Procedure of Data Collection and Data Analysis. As you have already studied that Action Research is to be conducted by the teacher who faces problem in the classroom or school in different aspects. With the help of Action Research, one can find the solution of the issues related to classroom and other aspects of the school so that the findings of Action Research benefit the school.

After going through this module, you will be able to -

- Write the Title of Action Research
- Write the Objectives according to the Title of the study
- Write the Hypothesis according to the Objectives of the study
- Describe the Methodology of conducting Action Research
- Analyze the data and interpret the results of Action Research
- Write the discussion of the study
- Write out the findings of Action Research

TITLE OF ACTION RESEARCH

Being a teacher you understand that there are individual differences in the classroom due to which students understand and learn the subject matter to different extent. Some students have a good understanding of some subjects and some are not good in any subject. It has often been observed that students do not understand the concepts, due to which they do not understand the content based on concepts. It is very necessary to understand the concept in order to understand the subject matter. A teacher of Mathematics, who teaches through lecture method to students of class VII might have experienced that students have difficulty in understanding the concept "Fraction" in Mathematics. Therefore the teacher thought of doing Action Research to find out the solution of the problem that is why students don't understand the concept of "Fraction" when taught through Lecture Method. With reference to this problem the title of Action Research can be written as below:

"Effectiveness of Activity Based Method on the basis of Achievement in Fraction in Mathematics of Class VII students of Kendriya Vidyalaya No.1, New Delhi"

You must have read and understood that the title of Action Research should give information related to variable, population / sample / group of the study and Type of Research / Method of Research. From the above title it is clear that the variable is Achievement in Fraction in Mathematics. Class VII students of Kendriya Vidyalaya No.1, New Delhi is the sample of the study. The sample of the Action Research must be very narrow and specific. From the above title it is clear that the teacher wants to teach Fraction from Mathematics through Activity based Method because most students faced difficulty in solving questions related to Fraction. It indicates that the teacher has to do experiment to see the effect of Activity based Method on Achievement in Fraction in Mathematics. Thus the above mentioned title of an Action Research gives information about variable, group and type of research. Hence it is an appropriate title of Action Research.

OBJECTIVE

After finalizing the Title of Action Research the researcher has to write the objective(s) of the study. The objective of the study gives direction to the whole study. On the basis of the above title more than one objective may be formulated. More objectives will help the researcher to find out solutions of various aspects of the problem. An Action Research should be conducted by the teachers only as s/he better understands the problems of her/his classroom and can implement the results for the benefit of the students of her/his classroom. However, one objective has to be written. For the above mentioned Title of Action Research one objective has been formulated which can be written as given in the following:

To compare mean score of Achievement in Fraction in Mathematics of class VII students before and after having taught through Activity Based Method

HYPOTHESIS

By now you know that Hypothesis is a tentative solution of a problem. The researcher has to formulate hypothesis for the above stated objective of Action Research. A researcher cannot formulate hypothesis according to his own wish because there must be basis of formulating hypothesis. You have studied that the basis of formulating Hypothesis are Review of Related Literature and Theory. Further you also know that on the basis of Review of Related Literature, the researcher can formulate either Null Hypothesis or Directional Hypothesis. There must be strong base to formulate Hypothesis in directional form. In absence of strong base the researcher has to formulate hypothesis in Null form. For the above mentioned objective, the following Null hypothesis can be formulated.

There is no significant difference between mean scores of Achievement in Fraction in Mathematics of students before and after having taught through Activity Based Method.

METHODOLOGY

You have studied under Methodology that Action Research must include Sample, Tools, Experimental Design, Procedures of Data Collection, and Data Analysis. The Methodology for the above mentioned Action Research is as given below:

Sample

You have studied that Purposive Sampling Technique is used to select the sample for Action Research. In Action Research, sample is not the representative portion of the population. The teacher takes only those students who are directly related to the problem. The finding of Action Research cannot be generalized because the group does not represent the population of the study.

It is clear from the above mentioned Title that the Action Research is to be conducted on those students of Class VII of Kendriya Vidyalaya No.1, New Delhi who has difficult in understanding the concept of Fraction as observed by the teacher during teaching. As a result the teacher thought to conduct Action Research on students of Class VII who faced difficulty in solving numerical problems related to Fraction in Mathematics. Therefore for the above mentioned study Purposive Sampling Technique is to be used to select sample.

Tool

You already understood that each research has at least one variable related to which data are to be collected. For collecting data, relevant tool has to be used. You also know that Tools are of two types, namely, standardized and non-Standardized. Quality of data depends on the quality of tool used. The reliability and validity of Non-standardized tool are not known. Generally Action Research is conducted by a working teacher who may not know the technical procedure of standardization of tool. So the teacher has to use non-standardized tool to collect information or data for the Action Research. Also teachers administer tools prepared by themselves which is non-standardized in nature. In the above Action Research Achievement in Fraction in Mathematics Test will be the tool for the study. This test will be prepared by the teacher only. The teacher will decide number of questions to be included in test, type of questions and duration of test, maximum marks, etc. Teacher knows that questions are of various types such as essay type questions, short answer type and objective type. Mostly teacher prepare short answer type and objective type questions for Action Research. Number of question depends on the subject matter and must represent to the whole topic chosen for Action Research.

Experimental Design

Action Research is experimental in nature. Therefore the researcher must use Experimental Design while conduction research. Already you have studied in Module 2 that Experimental Designs are classified into three categories, such as, Pre –Experimental Design; Quasi – Experimental Design; and True –Experimental Design. For Action Research the most suitable Experimental Design is Pretest –posttest Single Group Design which belongs to the category of Pre-Experimental Design. You have studied that in Pre-experimental Design one takes the

group of students where s/he is facing problem, so the group is not the representative of population to which it belongs. Therefore the findings of Action Research cannot be generalized. In this module one title and one objective is given for Action Research. For this Action Research the suitable Experimental Design is Pretest-posttest Single Group Design. The layout of the design is given below:

O_1 X O_2

O_1 = Pre-Test of variable of the Action Research

X = Treatment

O_2= Post-Test of variable of the Action Research

It is clear from the above layout that to start with Achievement in Fraction in Mathematics Test is to be administered to all students of the class where Action Research is to be conducted. This is denoted by O_1 and called Pre-Achievement in Fraction in Mathematics Test. Now the teacher teaches Fraction topic to students through Activity Based Method for one period of 30 minutes per day for 15 days. After 15 days, the same Achievement in Fraction in Mathematics Test is to be administered which was administered before started teaching with the help of Activity Based Method. This is denoted by O_2 and called Posttest-Achievement in Fraction in Mathematics Test.

PROCEDURE OF DATA COLLECTION

From the title of Action Research it is evident that Action Research is to be conducted on students of Class VII of Kendriya Vidalaya, New Delhi by Mathematics teacher who experienced that many students fails to solve numerical problems related to Fraction. The teacher first administers the Achievement in Fraction in Mathematics Test developed by her/him. After this s/he teaches Fraction with the help of Activity Based Method at the rate of 30 minutes per day for 15 days. Teacher only has to decide the activity to be done by the students in order to understand Fraction. At the end of the treatment the same Achievement in Fraction in Mathematics Test will be administered to collect data. This is known as Post-Achievement in Fraction in Mathematics Test. The duration of pre-test and post-test is decided by the teachers and it should be same for both pre-test as well as post-test. After this the response sheets of each student is to score for Pre as well as Posttests. The total scores thus obtained are to be used during data analysis stage.

DATA ANALYSIS

You have already studied in Module 2 that the data collected through the use of Pretest-posttest Single Group Design are to be analysed with the help of Correlated t-test or Paired Samples t-test. The formula to be used in analyzing the data has already been given in Module 2. However, the teacher can also use Statistical Package for Social Sciences (SPSS) to analyse the data.

मॉड्यूल - 4

प्रतिवेदन लेखन (Report Writing)

प्रस्तावना

अब तक आप क्रियात्मक शोध की संकल्पना, विशेषताएं एवं सोपानों का अध्ययन कर चुके हैं । इस शोध का अंतिम चरण प्रतिवेदन लेखन है जो एक महत्वपूर्ण पक्ष है । इसका प्रयोजन शोध की प्रक्रिया को स्पष्ट करना है जिससे क्रियात्मक शोध में रुचि रखने वाला व्यक्ति यह जानकारी प्राप्त कर सके कि क्रियात्मक शोध किस प्रकार किया जाता है । किन परिस्थितियों में इस प्रकार का शोध सर्वाधिक उपयुक्त है अथवा इसकी क्या सीमाएँ हैं । इस मॉड्यूल को पढ़ने के बाद आप:

1. प्रतिवेदन लेखन के महत्व की विवेचना कर सकेंगे ।
2. प्रतिवेदन लेखन के समय ध्यान रखने योग्य बिंदुओं को सूचीबद्ध कर सकेंगे ।
3. क्रियात्मक शोध प्रतिवेदन के प्रारूप को बता सकेंगे ।
4. सन्दर्भों को APA (American Psychological Association Format) प्रारूप में लिख सकेंगे ।

प्रतिवेदन लेखन का महत्व

क्रियात्मक शोध का लक्ष्य समस्या का हल निकालना है । यह शोधकों को नया ज्ञान प्रदान करता है । शोध में सम्मिलित सभी क्रियाओं की व्याख्या प्रतिवेदन लेखन में की जाती है । इन सभी गतिविधियों को एक साथ मिलाकर क्रमबद्ध रूप में लिखा जाता है । शोध के परिणाम को प्रसारित करने में शोध प्रतिवेदन का अत्यधिक महत्त्व है। प्रायः यह देखा गया है कि कक्षा में अध्यापक को शिक्षण अथवा अनुशासन सम्बंधित अनेक प्रकार की समस्याओं का

सामना करना पड़ता है ।अध्यापक अपने अनुसार समाधान प्राप्त करता है किन्तु वह व्यवस्थित प्रकार से कार्य करके समाधान प्राप्त नहीं कर पाता है । क्रियात्मक शोध द्वारा अध्यापक छात्रों की समस्याओं के समाधान हेतु व्यवस्थित रूप से उपचार प्रदान करता है तथा समस्या का समाधान प्राप्त करता है । प्रतिवेदन लेखन द्वारा समस्या के समाधान को दूसरों तक पहुंचाया जाता है । इसमें सम्मिलित विभिन्न गतिविधियों / क्रियाकलापों का भी ज्ञान अन्य शोधकों को प्राप्त होता है | अतः क्रियात्मक शोध के परिणामों को प्रतिवेदन द्वारा प्रसारित करना अन्य शोधकों के लिए उपयोगी होता है ।

प्रतिवेदन लेखन के समय ध्यान रखने योग्य बिंदु

शोधक को निम्नलिखित बिंदुओं को ध्यान में रखते हुए क्रियात्मक शोध का प्रतिवेदन लेखन करना चाहिए:

1. प्रतिवेदन उद्देश्यपूर्ण होना चाहिए ।
2. सटीक शब्दों एवं सरल वाक्यों का प्रयोग करना चाहिए ।
3. पहली बार पूर्ण रूप में शब्द को लिखकर शब्द संक्षेप (Abbreviation) के साथ देना चाहिए । उदाहरण के तौर पर बुद्धिलब्धि (IQ), राष्ट्रीय शैक्षिक अनुसन्धान एवं प्रशिक्षण परिषद (NCERT) आदि । बाद में शब्द संक्षेप का प्रयोग कर सकते हैं ।
4. प्रतिवेदन को भूतकाल (Past Tense) में लिखना चाहिए । परन्तु प्रतिवेदन के प्रथम अध्याय तथा सारणी में दी गयी जानकारी के उल्लेख के लिए वर्तमान काल (Present Tense) का ही प्रयोग करना चाहिए ।
5. प्रतिवेदन के वाक्यों में “मैं” , “मैंने” , "हम" आदि शब्दों की जगह शोधक/ अन्वेषक/ प्रयोगकर्ता (Researcher/ Investigator/ Experimenter) तथा "उसकी" , "वह" , "वे" के लिए प्रतिभागी/ विषयी/ छात्र (Participant/ Subject/ Student) आदि शब्दों का प्रयोग करना चाहिए ।

6. प्रतिवेदन वर्तनी तथा व्याकरण की दृष्टि से शुद्ध होना चाहिए ।
7. प्रत्येक शीर्षक के अंतर्गत उपयुक्त विषय वस्तु होनी चाहिए ।
8. प्रत्येक सारणी का उपयुक्त शीर्षक तथा क्रमांक होना चाहिए ।
9. संख्याओं को दशमलव के दो अंको तक ही प्रदर्शीत करना चाहिए ।
10. सांख्यिकीय विश्लेषण में उपयोग न आने वाले प्रदत्तों को प्रदर्शित नहीं करना चाहिए ।
11. अस्पष्ट (vague) शब्दों का उपयोग नहीं करना चाहिए | जैसे कम, अधिक, सुन्दर आदि शब्दों का उपयोग नही करना चाहिये।
12. तकनीकी शब्दों (Technical Words) के लिखने में संपूर्ण प्रतिवेदन में एकरूपता होनी चाहिए । जैसे यदि मध्यमान शब्द का प्रयोग प्रारम्भ में किया है तो पूरे शोध प्रतिवेदन में मध्यमान शब्द का ही प्रयोग करना चाहिए न कि उसके समानार्थी अन्य शब्दों का ।
13. प्रतीक चिन्हों जैसे M (मध्यमान) को सभी स्थानों पर Capital “M” ही लिखना चाहिए न कि Small “m” ।

क्रियात्मक शोध प्रतिवेदन का प्रारूप

प्रतिवेदन लेखन के अंतर्गत सर्वप्रथम आवरण पृष्ठ लिखा जाता है जिस पर जानकारी निम्न क्रम में दी जानी चाहिए :

- अध्ययन का शीर्षक
- शोधक का नाम
- क्रियात्मक शोध का सत्र
- विद्यालय/ संस्था का नाम

आवरण पृष्ठ का प्रारूप उदाहरणार्थ दिया गया है -

केन्द्रीय विद्यालय, सेक्टर -2 आर के. पुरम, नई दिल्ली के आठवीं कक्षा के छात्रों की हिन्दी वर्तनी सम्बन्धित अशुद्धियों पर दृश्य-श्रव्य सामग्री के प्रभाव का अध्ययन

प्रवीण कुमार

२०१६

केंद्रीय विद्यालय, सेक्टर -2 आर के. पुरम

नई दिल्ली

आवरण पृष्ठ के पश्चात् क्रियात्मक शोध प्रतिवेदन के प्रारूप के अंतर्गत सोपान / भाग आते हैं। शोधक को प्रतिवेदन लेखन के सभी सोपानों को ध्यान में रखते हुए लेखन शुरू करना चाहिए । प्रतिवेदन लेखन को मुख्यतः तीन सोपानों / भागों में विभाजित किया गया है -

1. प्रारंभिक भाग (Preliminary Part)
2. मुख्य भाग (Main Part)
3. पूरक भाग (Supplementary Part)

१. प्रारंभिक भाग (Preliminary Part)

प्रारंभिक भाग शोध प्रतिवेदन का ब्लूप्रिन्ट (Blueprint) होता है । शोध प्रतिवेदन के प्रारंभिक भाग में आभार, विषय सूची, सारणी सूची तथा चित्र सूची यदि हो तो सम्मिलित रहते हैं । प्रारंभिक भाग के पृष्ठों के क्रमों का अंकन प्रायः रोमन अंकों (i, ii, iii) द्वारा किया जाता है।

क) आभार (Acknowledgment)

शोधकार्य में कई व्यक्तियों का प्रत्यक्ष या अप्रत्यक्ष रूप से सहयोग लिया जाता है । अतः उन सभी का आभार प्रकट करना चाहिए । इसका उल्लेख आभार के अंतर्गत करते है।

ख) विषय और सारणी सूची (Content and List of Tables)

प्रतिवेदन के अन्तर्गत विषय और सारणी सूची को उनके क्रमांक एवं पृष्ठ संख्या के साथ दर्शाना आवश्यक है ।

२. मुख्य भाग (Main Part)

क्रियात्मक शोध में प्रतिवेदन को विभिन्न अध्यायों में न बांटकर विभिन्न शीर्षकों के अंतर्गत लिखा जाता है, क्योंकि यह प्रतिवेदन अन्य शोधों की तुलना में लघु शोध प्रबंध होता है । इस भाग में सामान्यतः प्रस्तावना (Introduction), सैद्धांतिक पृष्ठभूमि (Conceptual Framework), सम्बंधित साहित्य (Review of Related Literature), शोध का औचित्य (Rationale), समस्या का कथन (Statement of the Problem), उद्देश्य (Objective), परिकल्पना (Hypothesis), अध्ययन की परिसीमाएं (Delimitations), शोध प्रविधि (न्यादर्श , उपकरण, प्रयोगात्मक अभिकल्प, प्रदत्त संकलन एवं प्रदत्तों का विश्लेषण), परिणाम एवं व्याख्या (Results and Interpretation), विवेचना (Discussion) एवं निष्कर्ष (Finding) सम्मिलित किये जाते हैं । उपरोक्त सभी का विवरण निम्न प्रकार से है -

प्रस्तावना (Introduction)

प्रस्तावना के अंतर्गत क्रियात्मक शोध की समस्या के सन्दर्भ को बताया जाता है | यह संदर्भ कक्षा कक्ष अथवा विद्यालय हो सकता है ।

अतः कक्षा कक्ष एवं विद्यालय की पृष्ठ भूमि बताना आवश्यक है।

किस कक्षा में किस प्रकार की समस्या का सामना अध्यापक को करना पड़ रहा है तथा अध्यापक किस प्रकार उस समस्या का समाधान करने का प्रयास कर रहा है आदि का वर्णन यहाँ किया जाता है।

सैद्धांतिक पृष्ठभूमि (Conceptual Framework)

इस भाग में शोधक समस्या की उत्पत्ति का सैद्धांतिक आधार बताता है । उदाहरण के तौर पर यदि छात्रों की हिन्दी वर्तनी सम्बन्धित अशुद्धियों पर दृश्य-श्रव्य सामग्री के प्रभाव का अध्ययन करना है तो हिंदी वर्तनी सम्बन्धित अशुद्धिया जैसे अनुस्वार कहाँ लगाना है , बड़ी तथा छोटी मात्राएँ किस शब्द में कहाँ लगेंगी, आदि को स्पष्ट करना चाहिए। उपचार हेतु उपयोग में ली जाने वाली दृश्य-श्रव्य सामग्री जैसे स्लाईड (Slides), ट्रांसपरेंसीस (Transparencies), श्याम/श्वेत पट्ट (Black/White Board), फ्लिप-चाट (Flip-chart), वीडियो (Video), सीडी (CD), टेप रिकॉर्डर (Tape-recorder) आदि के बारे में तथा क्रियात्मक शोध समस्या के समाधान में इनकी उपयोगिता के विषय में वर्णन करना चाहिए ।

सम्बंधित साहित्य (Review of Related Literature)

शोधक सम्बंधित साहित्य का सर्वेक्षण कर उसे प्रस्तुत करता है, इससे समस्या की पृष्ठभूमि ज्ञात होती है । केवल उन्ही शोधों को सम्मिलित करना चाहिए जो क्रियात्मक शोध की समस्या से सम्बन्धित हों | व्यावहारिक शोध (Applied Research) यदि क्रियात्मक शोध की

समस्या से सम्बंधित हो तो उन्हें भी लिख सकते हैं । सम्बंधित साहित्य के अंतर्गत निम्न जानकारी देना चाहिए जिसे लिखते समय इस क्रम का अनुसरण करना चाहिए |

सर्वप्रथम शोधक का उपनाम (Last Name), (वर्ष), अध्ययन का उद्देश्य, परिकल्पना, न्यादर्श (न्यादर्श की संख्या एवं न्यादर्श चयन विधि और सदस्यों की कोई विशेष विशेषताऐं अगर लिखी हो), उपकरण, प्रयोगात्मक अभिकल्प, सांख्यिकीय विश्लेषण तथा निष्कर्ष । इसी क्रम के अनुसार सम्बंधित साहित्य लिखा जाता है । एक अध्ययन को एक ही अनुच्छेद में लिखा जाता है । इसे निम्न उदाहरण द्वारा समझा जा सकता है -

पटेल (२०१७) द्वारा किये गए क्रियात्मक शोध का उद्देश्य गतिविधि आधारित शिक्षण विधि द्वारा पढ़ाये गए छात्रों के समूह की हिंदी विषय में संयुक्त अक्षर शब्दों के पठन की उपलब्धि के पूर्व एवं पश्चात् मध्यमान फलांको की तुलना करना था । उन्होंने परिकल्पित बनाई कि गतिविधि आधारित शिक्षण विधि द्वारा पढ़ाये गए छात्रों के समूह की हिंदी विषय में संयुक्त अक्षर शब्दों के पठन की उपलब्धि के पूर्व एवं पश्चात् मध्यमान फलांको में सार्थक अंतर नहीं है। इस अध्ययन हेतु कक्षा ८ के उन छात्रों को लिया गया, जिस कक्षा में हिंदी विषय के अध्यापक ने शिक्षण अधिगम प्रक्रिया के दौरान अनुभव किया कि छात्र सयुंक्त अक्षर शब्दों को भली-भांति समझने में कठिनाई का सामना कर रहे हैं । न्यादर्श चयन हेतु सोद्देश्यपूर्ण विधि का प्रयोग किया गया । सयुंक्त अक्षरों के पठन में सुधार हेतु वर्ण कार्ड, अक्षर कार्ड, ऑडियो उपकरणों तथा सस्वर वाचन द्वारा ३ महीने तक उपचार दिया गया । प्रदत्तों का विशलेषण corrected t-test की सहायता से किया गया। परिणामस्वरूप पाया गया कि छात्रों के सयुंक्त अक्षर पठन में सार्थक सुधार हुआ ।

अन्य शोधकर्त्ता के शोधों को भी इसी प्रकार लिखना है।

क्रियात्मक शोध का औचित्य

क्रियात्मक शोध का औचित्य या आवश्यकता से सम्बंधित महत्वपूर्ण बिंदुओं को इस शीर्षक के अंतर्गत लिखा जाता है ताकि दूसरे शोधकर्त्ता को समझ में आये कि यह क्रियात्मक शोध क्यों किया है। औचित्य लिखने के लिए अध्यापक या शोधकर्त्ता तर्क दे सकता है जिसको पढ़ कर दुसरे शोधकर्त्ता इस शोध की आवश्यकता को समझ सके। तर्क देने के अतिरिक्त , शोधकर्त्ता या अध्यापक पूर्व में किये गये सम्बंधित साहित्य के परिणामों का भी उल्लेख करके क्रियात्मक शोध का औचित्य लिख सकते है । अतः क्रियात्मक शोध का औचित्य स्पष्ट रूप से परिलक्षित होना चाहिये।

समस्या का कथन (Statement of Problem)

क्रियात्मक शोध की समस्या का कथन निम्न प्रकार से लिखा जाना चाहिये। निम्न समस्या का कथन केवल एक उदाहरण है।

" केन्द्रीय विद्यालय, सेक्टर -2 आर के. पुरम, नई दिल्ली के आठवीं कक्षा के छात्रों की हिन्दी वर्तनी सम्बन्धित अशुद्धियों पर दृश्य-श्रव्य सामग्री के प्रभाव का अध्ययन"

उद्देश्य (Objective)

इसके अंतर्गत शोध का उद्देश्य स्पष्ट रूप से लिखा जाता है , जैसे नीचे लिखा है ।

दृश्य-श्रव्य सामग्री के प्रयोग से पढ़ाये गए छात्रों के समूह की हिंदी विषय में वर्तनी सम्बंधित अशुद्धियों में श्रुतलेख द्वारा प्राप्त उपलब्धि के पूर्व एवं पश्चात् मध्यमान फलांको की तुलना करना ।

परिकल्पना (Hypothesis)

क्रियात्मक शोध के अंतर्गत शोधक को निर्धारित उद्देश्य के आधार पर परिकल्पना लिखनी होती है जैसे निम्न लिखा गया है।

दृश्य-श्रव्य सामग्री के प्रयोग से पढ़ाये गए छात्रों के समूह की हिंदी विषय में वर्तनी सम्बंधित अशुद्धियों में श्रुतलेख द्वारा प्राप्त उपलब्धि के पूर्व एवं पश्चात् मध्यमान फलांको में सार्थक अंतर नहीं है ।

अध्ययन की परिसीमाएं (Delimitations)

उन सारे कारकों का उल्लेख परिसीमन के अंतर्गत किया जाता है, जिन्हें शोधक किन्हीं कारणों से शोध में सम्मिलित नहीं कर पा रहा है । जैसे यदि क्रियात्मक शोध केवल हिंदी विषय के छात्रों पर किया जा रहा है तो परिसीमन के अंतर्गत हिंदी भाषा आ जाएगी । इसी तरह यदि आठवीं कक्षा के वर्ग अ को न्यादर्श रूप में लिया गया तो यह वर्ग परिसीमन में आ जायेगा, इत्यादि ।

शोध प्रविधि (Research Methodology)

शोध प्रविधि में निम्न बिंदुओं का वर्णन किया जाता है -

- **न्यादर्श (Sample)**

  न्यादर्श के अन्तर्गत न्यादर्श विधि, समुह का आकार एवं समुह के सदस्यों की विशेषताओं का उल्लेख करना चाहिये ताकि दूसरे अध्यापक या शोधकर्त्ता क्रियात्मक शोध को समझ सके।

- **उपकरण (Tools)**

  क्रियात्मक शोध में आश्रित चर के आकलन के लिए उपयुक्त उपकरण का निर्माण अकसर अध्यापक द्वारा किया जाता है । उपयोग में लाये गये उपकरण से सम्बंधित निम्न

जानकारियाँ देनी चाहिये। उपकरण का नाम, उपकरण बनाने वाले का नाम , उपकरण में कुल प्रश्नो की संख्या , प्रश्नो के प्रकार, प्रत्येक प्रश्न के अंक , कुल अंक, कुल समय अवधि , उत्तर देने के लिए निर्देश, इत्यादि की जानकारी देनी चाहिये।

प्रयोगात्मक - अभिकल्प (Experimental Design)

इसके अन्तर्गत क्रियात्मक शोध करते समय उपयोग में लाया गया प्रयोगात्मक अभिकल्प से सम्बंधित पूर्ण जानकारी देनी चाहिये ताकि कोई और अध्यापक भी इसे उपयोग में ला सके अगर उचित हो तो। प्रयोगात्मक-अभिकल्प के अन्तर्गत निम्न जानकारीयाँ देनी चाहिये।

प्रयोगात्मक अभिकल्प का नाम, उपचार का नाम, आश्रित चर का नाम एवं परिस्थिती का उल्लेख, उपचार की समय अवधि, उपचार देने का विस्तर से विवरण, आश्रित चर का मापन इत्यादि।

- **प्रदत्तों का संकलन (Data Collection)**

  प्रत्येक क्रियात्मक शोध करता प्रदत्तों का संकलन उस प्रयोगात्मक अभिकल्प के अनुसार करता है जिसका उपयोग क्रियात्मक शोध में किया गया है। इसको विस्तार पूर्ण से लिखना चाहिये ताकि अन्य अध्यापक या शोधकर्त्ता उसी प्रकार का अगर क्रियात्मक शोध करना चाहे तो उन्हें मार्ग दर्शन मिल सके। अतः प्रदत्तों के संकलन कि प्रक्रिया विस्तार एवं क्रमबद्ध तरीके से लिखनी चाहिये।

- **प्रदत्तों का विश्लेषण (Data Analysis)**

  प्रदत्तों का विश्लेषण जिस सांख्यकीय तकनीकी के उपयोग से किया गया है उसका केवल नाम लिखना है। सूत्र देने की आवश्यकता नहीं है।

- **परिणाम एवं व्याख्या (Result and Interpretation)**

  मॉड्यूल 3 में क्रियात्मक शोध से सम्बंधित एक परिणाम दिया गया है एवम उसकी व्याख्या कि गई है। क्रियात्मक शोधक को भी इसी प्रकार परिणाम लिखना चाहिये एवम उसकी व्याख्या करनी चाहिये।

- **विवेचना (Discussion)**

  क्रियात्मक शोध का जो परिणाम आया है उसका क्या कारण हो सकता है यह अध्यापक या शोधकर्त्ता को लिखना चाहिये। विवेचना क्रियात्मक शोध को नई दिशा भी दे सकती है। विवेचना को सोच समझ से लिखना चाहिये। अगर पूर्व में भी किसी ने इसी प्रकार का शोध किया है तो वर्त्तमान शोध के परिणाम को पूर्व शोध के प्रवेश में भी देखकर विवेचना करनी चाहिये।

- **निष्कर्ष (Finding)**

  इसके अन्तर्गत क्रियात्मक शोध के द्वारा जो निष्कर्ष आया उसे लिखना चाहिये जैसे मॉड्यूल 3 में दिया गया है।

३. पूरक भाग (Supplementary Part)

यह प्रतिवेदन लेखन का अंतिम भाग है । इसमें सन्दर्भ ग्रन्थ सूची तथा परिशिष्ट सम्मिलित किये जाते हैं -

१. सन्दर्भ ग्रन्थ सूची (References)

शोधक द्वारा प्रत्यक्ष एवं परोक्ष रूप में संदर्भित सभी स्त्रोतों को सन्दर्भ सूची में सम्मिलित किया जाना चाहिए । सन्दर्भ सूची को APA प्रारूप (American Psychological Association Format) में बनाएं । सन्दर्भ सूची में दी गई पुस्तक, शोध पत्रिका, अप्रकाशित शोध प्रबंध एवं

अंतर्जाल स्त्रोत (Internet Source) में उपलब्ध सूचनाओं का APA शैली में उल्लेख होना चाहिए, जिसके उदहारण नीचे दिये गये है।

पुस्तक (Book)

उपनाम, प्रथम नाम का प्रथम अक्षर (Initial of first name) (प्रकाशन वर्ष). सम्पूर्ण शीर्षक. प्रकाशन स्थान: प्रकाशक का नाम.

i) पाल, एच. (2004). शैक्षिक शोध. भोपाल: मध्य प्रदेश हिंदी ग्रन्थ अकादमी |

ii) शर्मा, बी. एस. (२०१५). शिक्षा में क्रियात्मक अनुसन्धान. नई दिल्ली: पूर्वा प्रकाशन ।

दो लेखकों द्वारा लिखी गई वाली पुस्तक (Books written by two Authors)

प्रथम लेखक का उपनाम, प्रथम नाम का प्रथम अक्षर तथा दूसरे लेखक का उपनाम, दूसरे लेखक के प्रथम नाम का प्रथम अक्षर (वर्ष). पुस्तक का शीर्षक. प्रकाशन स्थान: प्रकाशक.

i) गुप्ता, एम. के. एवं सिंह, एस. बी. (२०१७). शैक्षिक शोध. आगरा: मीनाक्षी प्रकाशन ।

सम्पादित पुस्तक (Edited Book)

एक सम्पादक (For Single Editor)

संपादक का उपनाम, प्रथम नाम का प्रथम अक्षर. (संपादक) (वर्ष). पुस्तक का शीर्षक. प्रकाशन स्थान: प्रकाशक.

i) पाल, एच. (संपादक) (2004). शैक्षिक शोध. भोपाल: मध्य प्रदेश हिंदी ग्रन्थ अकादमी |

एक से अधिक सम्पादक (More than one Editor)

गुप्ता, एम. के. एवं सिंह, एस. बी. (संपादक) (२०१७). शैक्षिक शोध. आगरा: मीनाक्षी प्रकाशन।

शोध पत्रिका (Research Journal)

लेखक का नाम (उपनाम पहले), (प्रकाशन वर्ष). लेख का शीर्षक. शोध पत्रिका का शीर्षक, Vol. No. (Issue No.), पृष्ठ संख्या.

i) श्रीवास्तव, राजेश (2016). राजनीतिक क्षेत्र में जेंडर असमानता का समीक्षात्मक अध्ययन. भारतीय आधुनिक शिक्षा, 37(2), पृष्ठ 11-24.

अप्रकाशित लघु शोध / शोध प्रबंध / प्रतिवेदन (Unpublished Dissertation/ Thesis/ Report)

i) कुमार, पी. (२०१७). आठवीं कक्षा के छात्रों की हिन्दी वर्तनी सम्बन्धित अशुद्धियों पर दृश्य-श्रव्य सामग्री के प्रभाव का अध्ययन. अप्रकाशित लघु शोध, नई दिल्ली: दिल्ली विश्वविद्यालय.

अंतर्जाल स्त्रोत (Internet Source)

अंतर्जाल पर दो तरह से सामग्री उपलब्ध है-

I. डेटा बेस (Database)

Ii. ऑनलाइन दस्तावेज (Online Document)

डेटा बेस से लिये गये लेख के प्रारूप

लेखक का नाम, (प्रकाशन वर्ष). लेख का शीर्षक. शोध पत्रिका का शीर्षक, Vol. संख्या (Issue No.), पृष्ठ संख्या, पुनः प्राप्ति (Retrieved), मास, दिनांक, वर्ष, डेटाबेस का नाम

i) Webb, J. (2002). Benefits of Cooperative learning in a multimedia environment. Retrieved on November 8, 2006, from ERIC database.

ऑनलाइन दस्तावेज (Online Document) के लिए प्रारूप

लेखक का नाम, (प्रकाशन वर्ष). लेख का शीर्षक, पुनः प्राप्ति (Retrieved), मास, दिनांक, वर्ष, http://web Address

i) Panitz, T. (2000). Cooperative learning saves the day-one teacher story. Retrieved on November 20, 2007, from http://home.Capecod.net/tpanitz/tedsarticles/coopmath.html

पृष्ठ संख्या अंकित करना (Pagination)

प्रतिवेदन के प्रत्येक पृष्ठ पर संख्या (No.) अवश्य लिखना चाहिए । प्रारम्भिक भाग के पृष्ठों पर रोमन अक्षरों (i, ii, iii….) से संख्या अंकित करनी चाहिए। यह रोमन अक्षर पृष्ठ के निचले भाग पर बीच में डालना चाहिए । प्रतिवदेन के प्रथम पृष्ठ से निष्कर्ष तक अरेबिक (Arabic) संख्या (1,2,3…) डालना चाहिए । सन्दर्भ एवं परिशिष्ट के पृष्ठों पर संख्या पृष्ठ के ऊपरी भाग पर दाहिनी तरफ लिखनी चाहिए ।

MODULE 4

REPORT WRITING

INTRODUCTION

By now you might have understood the whole process of conducting Action Research. After completing Action Research, its' report must be written so that other teachers who want to conduct Action Research can get some guidance. So the report writing is the last step of the Action Research which is an important aspect. The purpose of report writing is to clarify the process of research so that the person interested in Action Research can understand as to how Action Research is to be conducted; under which condition this type of research is most appropriate; and what are its limitations. After reading this module, you should be able to:

1. discuss the importance of report writing
2. list out the points to be kept in mind while report writing
3. list the headings under which Action Research report is to be written
4. Analyze the data and interpret the results of Action Research
5. write the discussion of the study
6. write the finding(s) of Action Research, and
7. write references in the APA (American Psychological Association) format

IMPORTANCE OF REPORT WRITING

The purpose of Action Research is to find solution of the problems faced by teachers and principals / dministrators. This can be done more efficiently if teachers have an opportunity to read reports of Action Researches done by teachers of different schools. This is possible if each teacher doing Action Research writes report and makes it available to other teachers. Report writing of Action Research has to be done systematically so that any teacher interested in doing the same in her/his class can do it without much problem. Report writing is very important for transmitting the results of the any research. Therefore, transmission of the results of Action Research through report writing is useful for teachers and Principals.

IMPORTANT POINTS TO BE KEPT IN MIND WHILE

WRITING REPORT OF ACTION RESEARCH

The researcher should keep in mind the following points while writing report of Action Research.

1. Report should be purposeful.
2. Use appropriate words and simple sentences.

3. For the first time, the words should be used in full form along with their abbreviations. For example Intelligent Quotient (IQ), National Council for Educational Research and Training (NCERT) etc. Later on, the abbreviations can be used.
4. Report should be written in the past tense. The present tense should be used in explaining the concept, the information given in tables, etc.
5. In place of personalized words such as 'I', 'you', 'We' etc., the words such as teacher / researcher / investigator / experimenter, and in place of 'he', 'they', 'participants/subjects/ students, etc. should be used.
6. The report should be correct from spelling and grammar point of view.
7. Appropriate content should be included / presented under each caption.
8. Each table should be given appropriate title and serial number.
9. The results should be expressed up to two decimal points only.
10. Data or information not being used in the statistical analysis should not be given
11. Vague words / expressions such as 'Less' , 'More' , 'Beautiful', etc. should not be used
12. While writing the technical words, uniformity should be maintained throughout the report. If the word 'Median' is used in the beginning, this word should be used throughout the report but do not use any other similar word.
13. The symbols such as 'M' (Mean), 'r' (Correlation), 'N' (number), etc. should be used as it is but not sometime capital and sometime small.

OUTLINE OF REPORT OF ACTION RESEARCH

Under report writing, the cover page is written which includes the following information:

Title of the Study
Name of the Researcher
Session of Action Research
Name of School/institution

An example of a cover page is given in the following:

A STUDY OF EFFECT OF DICTAION IN HINDI ON HINDI SPELLINGS OF CLASS VIII STUDENTS OF KENDRIYA VIDYALAYA, SECTOR – 2. R.K. PURAM, NEW DELHI

Praveen Kumar

2016

Kendriya Vidyalaya, Sector – 2, R.K. Puram,
New Delhi

After the cover page, the various parts of report of Action Research are written. The researcher should start writing all the parts of the report carefully. Report writing can be divided into three parts:

1. **Preliminary part**
2. **Main Part**
3. **Supplementary part**

1. Preliminary Part

First part of report of Action Research is Blueprint. It includes Acknowledgement, Content, List of Tables and Diagram etc. The pagination of the first part is done in Roman number (i, ii, iii).

Acknowledgment
The support, directly or indirectly, taken from various persons during the process of Action Research must be acknowledged. This is presented under 'Acknowledgement' part.

Content and List of Tables
It is necessary to show the content and the list of tables along with their page number and serial number in the report.

2. Main Part

The report of Action Research should be written under various headings but not into separate chapters because the report of Action Research is small in comparison to other researches. In this part, Introduction, Conceptual framework, Review of Related Literature, Rationale, Statement of Problem, Objective(s), Hypothesis, Delimitations of the study, Methodology (Sample, Tool, Experimental Design, Procedure of Data Collection and Data Analysis), Results and Interpretation, Discussion and Finding(s) are included. The details are as follows:

INTRODUCTION
Under Introduction, the following information is to be given:

This Action Research was done in XYZ School by LMN teacher teaching Hindi who observed that large number of students were making spelling mistakes in Hindi. The report of Action Research is being written under captions, such as, Conceptual Frame work, Review of Related Literature, Rationale, Statement of Problem, Objective, Hypothesis, Delimitations, Methodology, Results and Interpretation, Finding(s) and Discussion.

CONCEPTUAL FRAMEWORK
In this part the teacher, who has done Action Research, discusses the basis of the problem. That is, how the teacher during teaching Hindi encountered the problem. Teacher must have observed that students were making spelling mistakes in writing. The teachers should explain the types of mistakes students were making. It must help reader in understanding the Action Research done by the teacher who teaches Hindi.

REVIEW OF RELATED LITERATURE

There might have been some researches done by teachers or researchers who might have studied problems related to spellings in English, Hindi, Sanskrit, Gujarati, Marathi, etc. Teachers might have tried out different methods or strategies to help students in overcoming the problems of Spellings. Only those research studies which are related to the problem of the Action Research should be included. For each related research, the information to be given must include the last name of researcher, year, objective, hypothesis, sample (sample size and sampling techniques and specific characteristics of sampled participants if any), tools, experimental design, statistical analysis and findings. The Review of Related Literature should give information in the order as mentioned in the present sentence. The Review of Related Literature of one study is presented in one paragraph only. This can be understood through the following example:

Sharma (2006) studied the effect of English Dictation on English Spellings of students. The object was to compare mean scores of English Spellings of students before and after English Dictation. It was hypothesized that there is no significant difference in mean scores of English Spellings of students before and after English Dictation. The sample consisted of 29 class V students of Government Higher Secondary School of Bhopal. The English teacher developed English Spellings Test. The English Spellings Test was administered before giving English Dictation. The teacher gave English Dictation at the rate of 30 minutes per day for 15 days. At the end of 15 days the same English Spellings Test was administered which was administered before starting the experiment. The data were analysed with the help of correlated t-test. Dictation in English was found to be significantly helpful in improving English Spellings of students.

RATIONALE OF ACTION RESEARCH

The important points of rationale / need of Action Research are presented under this title, so that other researchers can understand as to why this Action Research was done. The teacher or researcher should explain as to why this Action Research was conducted so that other researchers can understand the need of the Action Research. If there are Action Researches conducted by other teachers their findings are to be given. Keeping in mind the importance of Action Research and findings of Action Researches, the teacher should make out a case of undertaking Action Research. Hence, the rationale of Action Research should be explicitly reflected in the report of Action Research.

STATEMENT OF PROBLEM

The problem of Action Research was stated as given below.

A Study of effect of Dictation in Hindi on Hindi Spellings of Class VII students of Kendriya Vidyalaya, Sector – 2, R.K. Puram, New Delhi

OBJECTIVE

The following was the objective of Action Research.

To compare mean scores of Achievement in Hindi Spellings before and after giving Dictation in Hindi.

HYPOTHESIS

The following was the Hypotheses.

There is no significant difference in mean scores of Achievement in Hindi Spellings before and after giving Dictation in Hindi.

DELIMITATIONS

The following were the delimitations of this Action Research.

1. This Action Research was conducted by Hindi teacher of Kendriya Vidyalaya, Sector – 2, R.K. Puram, New Delhi.
2. It was conducted on Class VII students of Kendriya Vidyalaya, Sector – 2, R.K. Puram, New Delhi.
3. The teacher wanted to study the effect of Dictation in Hindi on Achievement in Hindi Spellings.

METHODOLOGY

The following points are discussed under this title.

Sample: Under this, the name of sampling technique, size of sample and characteristics of sampled group are mentioned so that other teachers or researchers can understand the findings of Action Research in the context of the group / sample. Normally in Action Research Purposive Sampling Technique is used for the selection of the group.

Tools: Action Research is experimental in nature so there must be at least one dependent variable related to which data are to be collected with the help of some tool. Most of the time teacher conducting the Action Research develops appropriate tool which is not standardized. The information to be provided about the tool used in the Action Research are: Name of the tool, name of the person who prepared the tool, total number of items/questions in the tool, types of questions, marks allotted to each question, total marks, total time allotted, instruction for writing the answers, etc.

Experimental Design: Action Research is experimental in nature. Normally Pretest-Posttest Single Group Design is used. Complete information about the Experimental Design used by the teacher in conducting Action Research should be given under this title so that other teachers can also use it if it is appropriate for their Action Research. The information given under Experimental Design should include Name of Experimental Design, name of Treatment, duration of Treatment, name of dependent variable/s, condition under which the Action Research was carried out, group characteristics, etc.

Procedure of Data Collection: Action Research is done by the teacher teaching the subject to students of the class. In the present example, Hindi teacher of Class VII students of Kendriya Vidyalaya, Sector – 2, R.K. Puram, New Delhi observed that students commit lots of mistakes in Hindi spelling in writing. S/he thought of trying out a strategy of teaching Hindi so that students do not commit many spelling mistakes while writing. Teacher developed Achievement in Hindi Spelling Test for Class VII students. This test is administered to all students of Class VII. Now the teacher starts giving Hindi Dictation to students. Those Hindi words where most of students were not able to write correctly were taken for Dictation. The Hindi Dictation continued for 15 days at the rate of 30 minutes per day. At the end of 15 days, the same Achievement in Hindi Spelling Test was administered which was used in the beginning by the teacher.

Data Analysis: Only the name of statistical technique used for analyzing data should be mentioned. There is no need to give the formula.

The data were analysed with the help of correlated t-test.

Results and Interpretation: Action researcher should write the Results and Interpretation as given below:

The objective of Action Research was to compare mean scores of Achievement in Hindi Spellings of students before and after giving Hindi Dictation. The data were analyzed with the help of correlated t-test. The results are given in Table 1.

Table 1: Testing-wise M, SD, r, N and correlated t-values of Achievement in Hindi of students

Testing	M	SD	N	r	Correlated t-test	Remark
Pretest	6.13	1.74	38	0.20	11.81	$p<0.01$
Posttest	11.13	2.33				

From Table 1, it is clear that the correlated t-value is 11.81 which is significant at 0.01 level with df=37. This means that there is a significant difference in mean scores of Achievement in Hindi Spellings before and after giving Dictation in Hindi. Thus the Null Hypothesis that there is no significant difference in mean scores of Achievement in Hindi Spellings before and after giving Dictation in Hindi is rejected. Further the mean score of Achievement in Hindi Spellings before giving Dictation in Hindi is 6.13 which is significantly lower than after giving Dictation in Hindi whose mean score of Achievement in Hindi Spellings is 11.13. It may, therefore, be said that Hindi Spellings improved after giving Dictation in Hindi. In other words Dictation in Hindi was found to be significantly helpful in improving Hindi Spellings of students.

Findings: Under this the finding(s) of the Action Research should be given. In the context of the present Action Research, the finding is as given below:

Dictation in Hindi was found significantly helpful in improving Hindi Spellings of students.

- **Discussion:** The teacher or researcher has to discuss the results which he gets after data analysis. Under this the teacher gives the reasons as to why such results came. Discussion can also be done keeping in view the results of previous related researches. Apart from this discussion can also be done keeping in mind the activities conducted during treatment, duration of the treatment, group characteristics, etc. The interpretation of results done by the teacher is a meaningful contribution which can prove to be very beneficial for the reader. It should be written in the following ways. It is just an example.

  In the above Action Research, Dictation in Hindi was found helpful in improving Hindi Spellings of students. It is a well-known fact that practice makes a man perfect. It is because of this, exercises are given in Mathematics. Similarly dictations are given in Languages so that students are able to remember spellings of difficult words. Repetition is an important activity and very useful in helping to memorize difficult words, formula, dates, etc. These might be the reason of the present study.

3. Supplementary part

This is the last part of report writing. The list of references and appendices are included in this part.

- References
  The list of all the sources referred directly by the teacher / researcher should be included. The books, research journal, unpublished research document and internet sources referred in the research report should be presented in the form of APA Format. The same is given as follows:

Book: Last name, initial of first name, (Year of publication). Title of the Book. Place of Publication: Name of Publisher.

Samaras, A. P. (2010). Self-study Teacher Research: Improving your practice through Collaborative Inquiry. New Delhi: Sage Publication.

Sharma, B.S. (2015). Action Research in Education. New Delhi: Poorva Publication.

Book written by two Authors: Last name of first author, Initial of First name and last name of second author, initial of the first name of second author (Year). Title of the Book. Place of publication: Publisher.

Creswell, J. W. & Poth, C. N. (2017). Qualitative Inquiry and Research Design: Choosing among five approaches. Sage publication.

Edited Book

Single Editor

Last name of the Editor, Initial of the first name. Editor, year, Title of the Book. Place of publication: Publisher.

Pal, H. (Ed.) (2004). Educational Research. Bhopal: Madhya Pradesh Hindi Granth Academy.

More than one Editor

Gupta, M.K. and Singh, S.B. (Eds.) (2017). Educational Research. Agra: Meenakshi Publication.

Research Journal

Name of the author (Last name first), Year of Publication. Title of the Article. Title of the Research Journal, Volume, No. (Issue No.), page number.

Srivastava, Rajesh (2016). A critical study of Gender differences in politics. *Modern Indian Education, 37 (2),* pp. 11-24.

Unpublished Thesis/Report

Kumar, P. (2017). A Study of Effect of Audio-Video Materials on Hindi Spelling Errors of VIII Class students. Unpublished Dissertation, New Delhi: University of Delhi.

Internet Source

Two types of resources are available on internet –

1. Database
2. Online Document

1. Database – Article

Name of the writer, Year of publication, Title of the Article, Title of the Research Journal, Volume. No. (Issue No.), Page No., Retrieved (month, date, year, name of database).

Webb, J. (2002). Benefits of Cooperative Learning in a Multimedia Environment. Retrieved on November 8, 2006, from ERIC Database.

2. Online Document

Name of the writer, Publication Year. Title of the article, retrieved (month, date, year, http:// web address)

Panitz, T. (2000). Cooperative Learning saves the day: one teacher story. Retrieved on November 20, 2007, http://home.capecod.net/tedsarticles/coolmath.html

- Pagination

It is necessary to write number on each page of the report. On the pages of the preliminary part of the report, Roman numbers (i, ii, iii) should be written. The Roman number should be given in the middle of the lower part of the page. On the first page of the report to the results, Arabic numbers (1, 2, 3……) should be written. On the pages of reference and appendices, page number should be written on right side of upper part of the page.

Video Support

VIDEO SUPPORT ON ACTION RESEARCH

As part of supporting material of online course 10 video programs were developed on various themes of Action Research. The programs were produced with the help of CIET. The description of few program are given below:

Video 1 - Concept of Educational Research

Video 1 tries to explain about –

- What is a research?
- What are the characteristics of research?
- What is research in Education?
- What are the types of educational researches?

The expert tries to explain all of the above things in a very clear, concise and crisp manner with the help of PowerPoint presentation which is very adequate.

Video 2 & 3 - Concept of Action Research

Video explains about –

- Meaning of Action Research
- Characteristics of Action Research.
- Why Action Research?
- When to use Action Research?

It is an essential component of the course to be learned by the participants for performing effectively on Action Research. The video was uploaded in two parts due to some technicalities of website.

Video 4 - Importance and Limitations of Action Research

Video 4 explains about –

- Importance and limitations of Action Research.
- Why doesn't everyone do action research?
- Limitations of action research

For performing an Action Research the practitioner should know its pros and cons also. And definitely it is not going to leave a negative impact on the practitioner in fact it will help in performing in a better way.

Video 5 - Identifying the Problem

Video 5 explains about –

The first step of action research: identifying the problem.

It includes –

- Sources of problem- existing data within the school, classroom and school observation, test results, interviews, visual records and photographs
- Questions that are not appropriate for action research
- Rules for selecting a problem

Video 6 - Plan Action

Video 6 explains about –

The second step of action research: plan action.
In action research, planning the action is the most important step of action research.

It includes –

- Plan the intervention
- Try some question strategy
- Plan the type of assessment tools
- Plan the time to assess student learning and to collect other student's data.

Video 7 - Collection of Data

Video 7 explains about –

The third step of action research: the collection of data.

The three major decisions to take while collecting the data are –

- From which group of student's data are to be collected?
- Which tools to be used in data collection?
- How the intervention is to be made operative?

Video 8– Action Research – Analysis Finding and Reflection

Video 8 explains about –

The fourth step of action research: Analyze the data
The fifth step of action research: Finding/ sharing the result
The sixth step of action research: Review/ Reflect

Video 9 - Case Study Research

Video 9 explains about –

Case Study Research. It includes:

- meaning of case
- identification of case

- procedure of conducting a case study –
  - Personal details of the case
  - History of the case
  - Data collection – questionnaire, observation, interview
- Report writing - personal details of the case, history of the case, data collection procedure, and conclusion.

Video 10- Report Writing for Action Research

Video 10 explains about –

Report Writing for Action Research.

It includes –

- Points to be kept in mind while writing report
- Format of writing research report.

To begin with the action research, first, the proposal needs to be sent to the funding agency. If it is approved, one needs to write the report in order to inform others about the subject of research. Here, it informs the learner about the way to go about writing the report. Some basic points like simple language, appropriate headings, brevity, use of abbreviations etc. are elaborative discussed in this episode with examples.

Feedback of Participants

FEEDBACK BY PARTICIPANTS ON VARIOUS ASPECTS OF THE COURSE

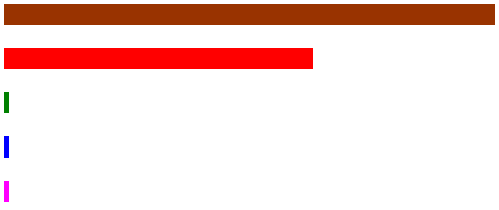
A. Feedback through Rating Scale

I. Feedback of participants on Course Material

1. The material provided during the course covered the various aspect of AR appropriately

Strongly Agree:	55 (54.46 %)
Agree:	46 (45.54 %)
Undecided:	0
Disagree:	0
Strongly Disagree:	0

2. The language of the material was easy to understand

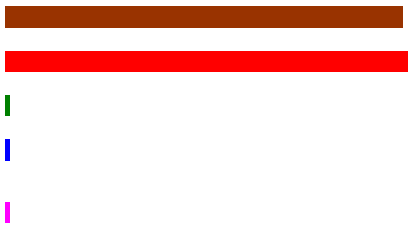


Strongly Agree:	62 (61.39 %)
Agree:	39 (38.61 %)
Undecided:	0
Disagree:	0
Strongly Disagree:	0

3.The lengths of the modules were appropriate

Strongly Agree:	37 (36.63 %)
Agree:	59 (58.42 %)
Undecided:	2 (1.98 %)
Disagree:	3 (2.97 %)
Strongly Disagree:	0

4.Concepts of different terminologies used in the material were clear and easily comprehensible



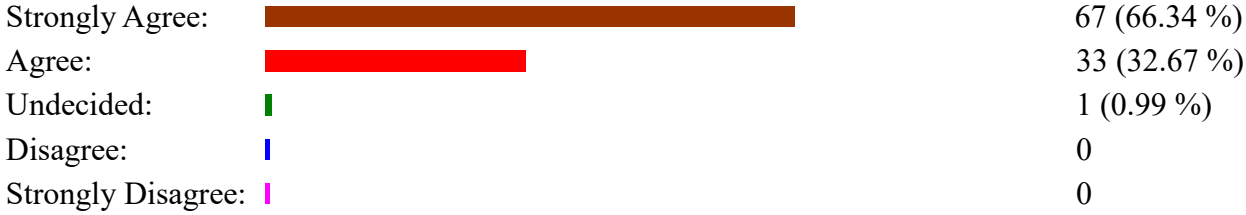
Strongly Agree:	50 (49.50 %)
Agree:	51 (50.50 %)
Undecided:	0
Disagree:	0
Strongly Disagree:	0

II. Feedback of participants on Course Procedure

5. The process of registration in the course was easy

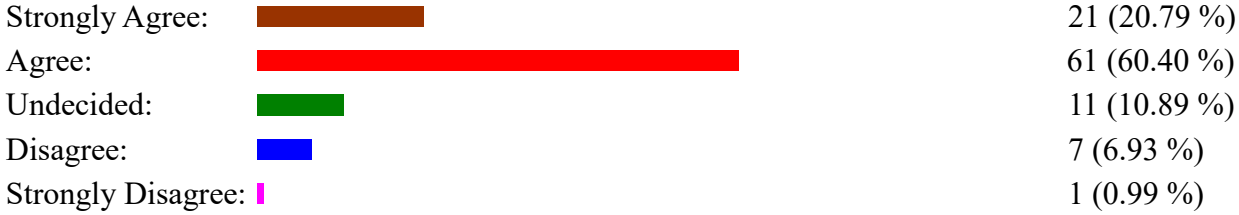
Strongly Agree:	72 (71.29 %)
Agree:	28 (27.72 %)
Undecided:	1 (0.99 %)
Disagree:	0
Strongly Disagree:	0

6. The assignments given with the modules were helpful in exploring the content



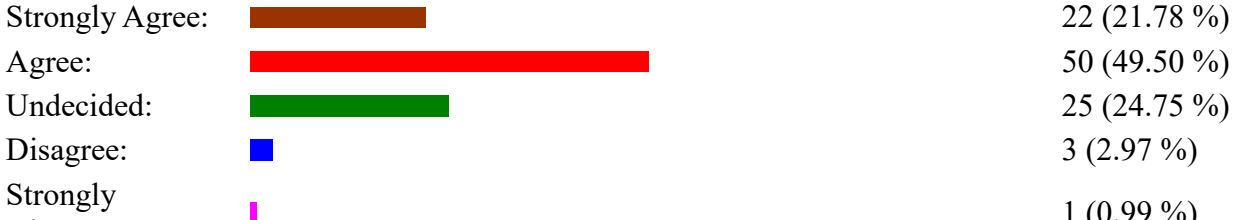
Strongly Agree:	67 (66.34 %)
Agree:	33 (32.67 %)
Undecided:	1 (0.99 %)
Disagree:	0
Strongly Disagree:	0

7. Time for weekends Synchronous meetings were suitable



Strongly Agree:	21 (20.79 %)
Agree:	61 (60.40 %)
Undecided:	11 (10.89 %)
Disagree:	7 (6.93 %)
Strongly Disagree:	1 (0.99 %)

8. Synchronous meetings helped to understand the content, concepts & technicalities of system

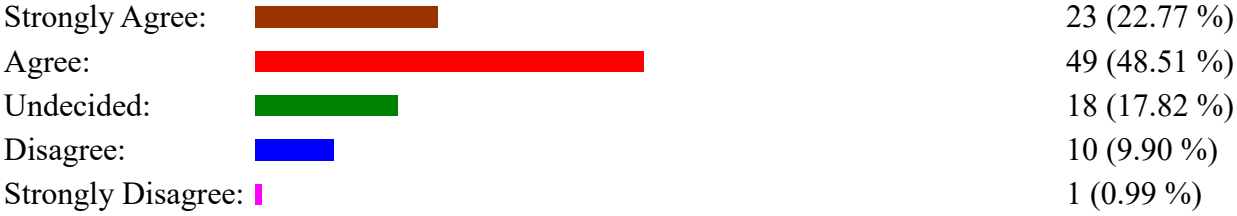


Strongly Agree:	22 (21.78 %)
Agree:	50 (49.50 %)
Undecided:	25 (24.75 %)
Disagree:	3 (2.97 %)
Strongly Disagree:	1 (0.99 %)

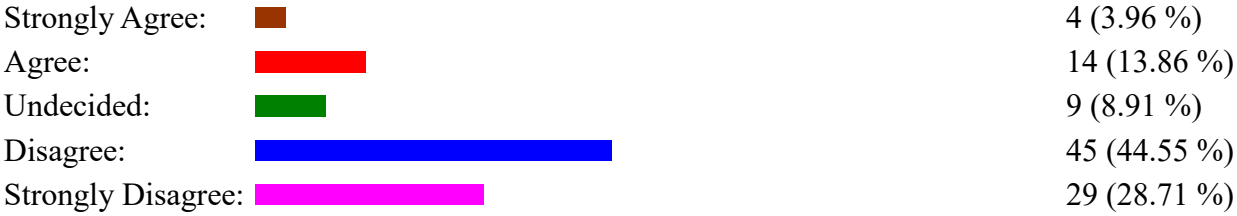
9. Regular communications through SMS, Telegram and e-mails Motivated to keep continuance in the course

Strongly Agree:	64 (63.37 %)
Agree:	37 (36.63 %)
Undecided:	0
Disagree:	0
Strongly Disagree:	0

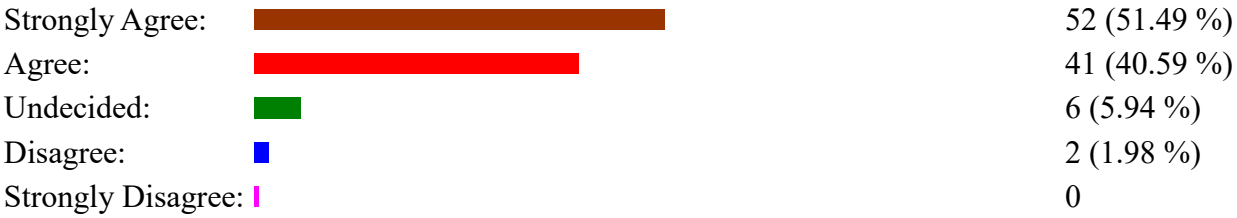
10. Frequency of synchronous meetings was sufficient



11. For synchronous meetings I had to go to the cybercafé



12. Online guidance on selection of topic and development of AR project was supportive



III. Feedback of participants on Technical Aspects

13. I have used telegram first time

14. I am using WhatsApp for various communication purposes

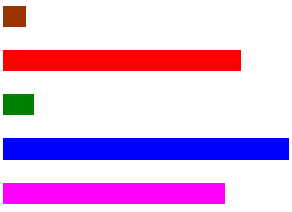
15. I found telegram is better than whatsapp while communicating text/audio/video

16. I found my technological/ academic queries were immediately satisfy through telegram

17. Many a time fellow participant responded queries appropriately through telegram

Yes:	90 (89.11 %)
No:	4 (3.96 %)
Undecided:	7 (6.93 %)

18. Sometimes it was difficult to open the website of AR

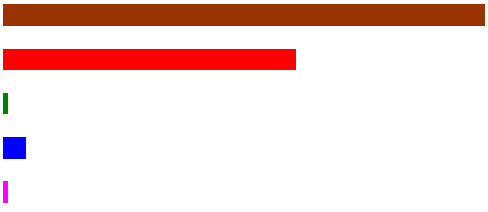


Strongly Agree:	3 (2.97 %)
Agree:	30 (29.70 %)
Undecided:	4 (3.96 %)
Disagree:	36 (35.64 %)
Strongly Disagree:	28 (27.72 %)

19. The login id & password were not working many a times

Strongly Agree:	4 (3.96 %)
Agree:	5 (4.95 %)
Undecided:	2 (1.98 %)
Disagree:	39 (38.61 %)
Strongly Disagree:	51 (50.50 %)

20. Uploading and downloading of content was easy



Strongly Agree:	61 (60.40 %)
Agree:	37 (36.63 %)
Undecided:	0
Disagree:	3 (2.97 %)
Strongly Disagree:	0

21. Internet facility at my working station was easily available

Strongly Agree:	40 (39.60 %)
Agree:	48 (47.52 %)
Undecided:	4 (3.96 %)
Disagree:	9 (8.91 %)
Strongly Disagree:	0

IV. Feedback of participants on Evaluation Process

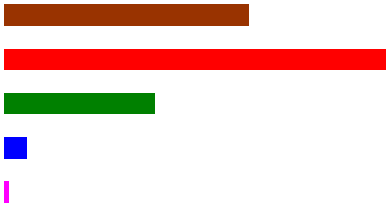
22. Evaluation on the basis of assignments, online test and involvements in other activities was appropriate

Strongly Agree:	48 (47.52 %)
Agree:	46 (45.54 %)
Undecided:	6 (5.94 %)
Disagree:	1 (0.99 %)
Strongly Disagree:	0

23. The time and day of Initial and End test was suitable to me

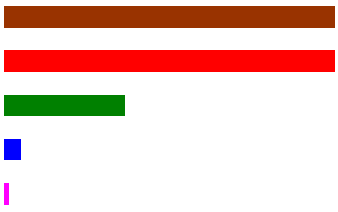
Strongly Agree:	33 (32.67 %)
Agree:	50 (49.50 %)
Undecided:	8 (7.92 %)
Disagree:	7 (6.93 %)
Strongly Disagree:	3 (2.97 %)

24. The time duration for initial and final test was sufficient



Strongly Agree:	31 (30.69 %)
Agree:	48 (47.52 %)
Undecided:	19 (18.81 %)
Disagree:	3 (2.97 %)
Strongly Disagree:	0

25. Conducting online test through website was appropriate



Strongly Agree:	41 (41.41 %)
Agree:	41 (41.41 %)
Undecided:	15 (15.15 %)
Disagree:	2 (2.02 %)
Strongly Disagree:	0

26. Items in the final test were related to the contents of the course

Strongly Agree:	23 (23.23 %)
Agree:	45 (45.45 %)
Undecided:	31 (31.31 %)
Disagree:	0
Strongly Disagree:	0

V. Feedback of participants on Video Program

27. Contents of videos provided in support of text was suitable

Strongly Agree:	47 (47.47 %)
Agree:	51 (51.52 %)
Undecided:	0
Disagree:	1 (1.01 %)
Strongly Disagree:	0

28. Concepts in video programs were clear to understand

Strongly Agree:	49 (49.49 %)
Agree:	46 (46.46 %)
Undecided:	2 (2.02 %)
Disagree:	2 (2.02 %)
Strongly Disagree:	0

29. The language of the video programs was easy to understand

Strongly Agree:	52 (52.53 %)
Agree:	45 (45.45 %)
Undecided:	0
Disagree:	2 (2.02 %)
Strongly Disagree:	0

30. The voice of expert in the video was audible

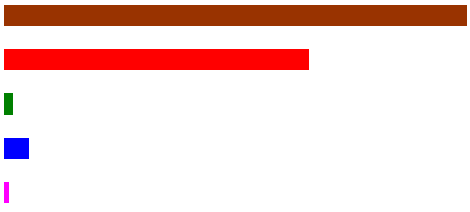
Strongly Agree:	55 (55.56 %)
Agree:	43 (43.43 %)
Undecided:	0
Disagree:	0
Strongly Disagree:	1 (1.01 %)

31. The speed of delivery of content was appropriate

Strongly Agree:	46 (46.46 %)
Agree:	52 (52.53 %)
Undecided:	1 (1.01 %)
Disagree:	0
Strongly Disagree:	0

VI. Feedback of participants on Duration

32. The time given for submitting the assignments was Sufficient



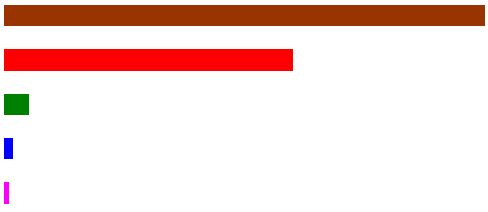
Strongly Agree:	58 (58.00 %)
Agree:	38 (38.00 %)
Undecided:	1 (1.00 %)
Disagree:	3 (3.00 %)
Strongly Disagree:	0

33. The entire duration of the curse was sufficient

Strongly Agree:	51 (51.00 %)
Agree:	44 (44.00 %)
Undecided:	1 (1.00 %)
Disagree:	4 (4.00 %)
Strongly Disagree:	0

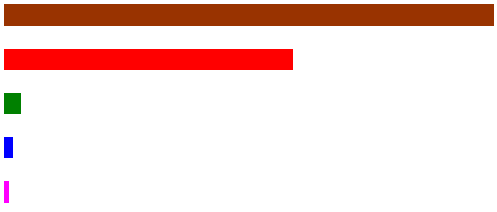
VII. Feedback of participants on Practicability

34. After doing this course, I will be able to conduct AR



Strongly Agree:	60 (60.00 %)
Agree:	36 (36.00 %)
Undecided:	3 (3.00 %)
Disagree:	1 (1.00 %)
Strongly Disagree:	0

35. The course allowed me to improve practice & capabilities



Strongly Agree:	61 (61.00 %)
Agree:	36 (36.00 %)
Undecided:	2 (2.00 %)
Disagree:	1 (1.00 %)
Strongly Disagree:	0

VIII. Feedback of participants on Proposed Fee Structure

36. According to me the fee for Government teachers/teacher educators should be

500:		26 (26.00 %)
1000:		51 (51.00 %)
2000:		11 (11.00 %)
3000:		7 (7.00 %)
5000:		5 (5.00 %)

37. According to me the fee for Private teachers/teacher educators should be

500:		29 (29.00 %)
1000:		35 (35.00 %)
2000:		16 (16.00 %)
3000:		12 (12.00 %)
5000:		8 (8.00 %)

B. Feedback through Open Remarks

1. Would you like to suggest any other thing about the course?

- This type of course should be undertaken in every school and various other institutions so that the researchers can review more systematically the various problems found in the different situations.
- The course needs to be conducted twice a year.
- All are good and well planned. No suggestions.
- A sample of action research projects worked out can be given for references.
- More contents are required. Power point presentation related with AR may be added.
- For data analysis techniques more information can be included.
- Course should be designed with details of the Topic with more challenging exercises and assessments.
- There should be some examples also on Action Research taken from various states from govt. and public schools, residential schools also.
- Previous years question paper should be given.
- Give more practice questions at the end of weekly course materials.
- Word limits for assignments should be increased.
- Synchronous meeting should be scheduled regularly.
- Synchronous meetings should be conducted in groups.
- The quality of the Synchronous meeting should be improved.
- There should be face to face program where interaction could take place.
- There was scope for discussion among participants of the Course; however, it was not happening. So, participants may be encouraged for discussion by assigning some weighted in assessment.
- After successful completion of the course, the participants may be given a chance to some face to face experience/ workshop/ real life exposure to action research conducted / continuing in NCERT.
- Responses provided through telegram and synchronous meetings are appreciable. But sometimes when it is not possible to connect through these modes, please guide or provide feedback through portal also.
- It could have been better if there is scope for evaluation of Action Research Report.
- I think that this course should be completed after the completion of research, not only research proposal. As a result, we can gain practical knowledge about action research.
- Communication should be done on weekends.
- Time lines should be flexible in a distance learning mode where everyone can make progress according to their own pace according to time and situation.
- The duration should be from July to Dec.
- Deadlines for submitting assignments/test must be adhered strongly. Extension of deadlines disturbs the whole planning of participants. Also, it dilutes the seriousness of submitting assignments on time.

- A candidate should allow only once extra time.
- Enough time for the modules.
- In my opinion, the course needs to be extended as per the pace of the participants.
- The course structure is very flexible. But for synopsis some more time should be given.
- A time frame of the overall course with expected dates of course line can be provided for the over clashing of the dates with other events. It will help the participants to get prepared for the various events in the course.
- Previously trained Govt. Teachers of KV or Navodaya or a greater number of expert/ mentors should be engaged as tutors for a lot of 25 participants because there are large number of participants. This will reinforce the training program and will ensure prompt and quality feedback to assignments.
- For preparing proposal more guidance and exemplars should be given. These exemplars can be on different types of action research.
- The NCERT can develop a repository of different studies/researches/proposals for the fellow participants or passed out candidates. This will allow the participants to access these studies and understand their action research problems more significantly.
- The time of assignments submission was appropriate but the last assignment of "project submission" needs more research time. So, for its submission more and proper time should be provided before extension of date.
- The action research should be for pupil teachers and students.
- Project Work is quite difficult for Primary School Teachers. It should be designed in such a way that it should be easy (MCQ based) instead of writing a detailed report, which may not be easy for primary teachers.
- If there is a scope for contact programme at RIE level, we can clear our doubts.
- Participants may be provided financial support to conduct action research if the topic he/ she selected has some potential value for school/ society.
- ये मेरा पहला ऑनलाइन कोर्स था, हिंदी में स्टडी मटेरियल पहले से मिलने पर हिंदी भाषी लोगों को अधिक आसानी होती।
- If possible, further take the course on methodology and statistics so that we all are able to apply appropriate methodology and statistics in order to know the status of the problem objectives.
- The videos were awesome and simple and easy to understand. More videos can be uploaded.
- Exam or online test timing may be conducted or scheduled on Holiday/Sunday.
- Online test after every module can be conducted.
- The server needs to be upgraded to conduct online end test for a number of participants.
- AR may be in association form of DIET or other institutions.

2. What are your views on quality of content of the modules of this course?

- The quality of each and every material is excellent and sufficient information is given.
- It was very useful and provided in appropriate manner. Thank you to course coordinator for providing quality content through each module.

- Content was good and excellent and easy to understand.
- NCERT should develop own material through workshop. It should be done with the help of field workers under the guidance of professor of NIE/RIE. The booklet developed by NIE/NCERT by Prof. Panda is not very practical.
- The quality of contents of the modules of this course was appropriate, well structured, satisfying without any doubt.
- There are certain basic doubts among the teachers on the reporting of action research. Many teachers and teacher educators are engaging themselves in action research but are not reporting due to lack of skills for doing it. One module can be step by step guide to prepare report right from the first step of identifying and stating the problem. The step wise reporting will help practitioners to document the process there by encouraging them to report and share it in the appropriate forum.
- Quality of the content may be improved.
- It was sensibly designed with great output possibilities.
- The course helps to explore information more innovatively.
- Content was qualitative.
- These modules are of good quality.
- Module or books should be from Indian Authors.
- Content are not so good. Discussion should be completed. More theories should be given there.
- Quiz based assessment can be done after each module. Grading should be done as soon as it is submitted so that next assignment can be prepared accordingly.
- All the contents supplied during the course module were very much appreciative.
- AR की पहले से जानकारी थी, लेकिन इस कोर्स द्वारा गहराई से समझने का अवसर मिला।
- The content was appropriate catering the needs of the participants. It was well synchronized with the theme of the week.
- I was able to understand it and apply it to the practical situation.
- Give some examples about action researches for writing proposal.
- The quality of content of the modules is quite comprehensive.
- The language was easy to understand and very rich inputs were there.
- Videos are appropriate and self-explanatory. It helped us a lot in understanding the concept in detailed manner.
- Videos are really good and relevant.
- Content of modules were readable, easy to comprehend and relevant.
- We got many references related to the content of modules.
- Quality of content of the modules was sufficient and easy to comprehend the concept.
- कोर्स की अध्ययन सामग्री व कोर्स कंटेंट बहुत अच्छा है सभी निर्देशकों ने हमको समय समय पर सही दिशा निर्देश दिए है ।। इसके लिए आप सभी हमारी ओर से सम्मान के पात्र है ।। आपका आभार हम प्रकट करते है ।। कोर्स कंटेंट की गुणवत्ता बहुत अच्छी है ।।और मॉड्यूल्स भी ।।
- More case studies and real classroom example should be included in the modules
- Students need to explore more about this area from other sources.

- More focus on practice should be given.
- Quality of content may be updated as per international standards.

3. How would you comment on the process of conducting online course on Action Research?

- There is always immediate response from the authorities and other concerned faculty members in case of any queries or information needed.
- Conducting online course is appreciable, but more guidance is needed.
- Online courses on ICT should be conducted for teachers.
- It is really very useful for improving our teaching practice. Course doesn't need special time to complete it.
- Lecture on action research should be given in different heading.
- Process was good, easy and suitable as it was comfortable for working professionals
- Amazing experience, I enjoy the course.
- The process of the online course went on smoothly and well conducted, organized and executed.
- It was a synchronous process. But it should be more in depth.
- The course provides knowledge about action research and increase confidence level to solve various education related problems.
- It is really a nice platform for enrichment of teachers.
- I would say that it is remarkable I had a great experience with the course. I think it is very convenient for the participants who are working full time to take this course. Yes, there is a lot of reading material but the good thing is that you do not have to waste all those times driving back as video are also there to guide you.
- It helps me to face and solve some real problem in my class room teaching.
- It is a good attempt to learn something going online as it saves time.
- Lots of good reading material provided and assignments makes you sincere.
- The website is not responding many a times.
- Due to extension of assignment deadline, it takes more time to end the course.
- It is better for the service persons. I gain many things from this online course.
- It's a nice initiative by NCERT. More similar courses may be planned.
- The process of conducting online course on Action Research is commendable.
- It was really a great learning experience and the way things were answered instantly is really appreciable. Content in easy language, video conference meeting and telegram all the things helped us a lot in clearing our doubts.
- Supportive actions and well guided course by eminent mentors.
- It's my first online experiences and it's very useful but synchronous meeting should be held more than 2 times.
- I request NCERT to bring more such courses online which can help teachers to meet the day to day challenges.

- It was systematic but the extension given repeatedly for assignment submission is not fair for those who submit it within the time limit before the extensions.
- This is good initiative for enhancing the classroom problems and some other specific problems.
- आपके द्वारा संचालित व निदेशित क्रियात्मक अनुसन्धान बहुत अच्छी प्रकार से हम क्रियान्वित कर रहे है ।। आपने हमको जो भी स्टडी मेटीरियल दिया है उससे हमको बहुत सहायता मिली है ।। यह कार्यप्रणाली व ऑनलाइन कोर्स संचालन बहुत लाभकारी है।
- It is a wonderful attempt, needs to advertise it more.
- We can learn anywhere anytime within the given duration.
- It will be better if we start the course in April so that teachers can complete their research in a proper manner.

4. Give comments on evaluation procedure of this course

- Yes, the feedback for the assignments was on time. And appropriate assignments were given to the participants.
- Feedback helped me to improve my next performance.
- Assignments and online test are a good way of assessment.
- Enough time was given and was appropriate for recapping all the steps of action research.
- The evaluation procedure of this course is very good, excellent and satisfactory.
- Evaluation is good, but Project Work/Proposal should be optional in order to make everyone to pass the course. Instead of Proposal/ Report writing, there should also be an option to write MCQ exam. It is quite difficult for Primary Teachers who are engaged in teaching - learning process.
- Evaluation was very static and simple.
- The feedback system is really appreciative.
- Beside one end test one more exam is necessary.
- Evaluation should be done regularly and grades should be given before another assignment.
- The evaluation process of this course is designed effectively and efficiently and it fulfills the very purpose of the course.
- The feedbacks are quick, to the point and positive.
- There should be online quiz after each module.
- आपके द्वारा संचालित व निदेशित क्रियात्मक अनुसन्धान बहुत अच्छी प्रकार से हम क्रियान्वित कर रहे है ।। आपने हमको जो भी स्टडी मेटीरियल दिया है उससे हमको बहुत सहायता मिली है ।। यह कार्यप्रणाली व ऑनलाइन कोर्स संचालन बहुत लाभकारी है। मूल्यांकन प्रक्रिया एक दम सही है ।।
- There could have been more time slots available for online test.
- Grades should be provided immediately after the submission of assignments.

- The evaluation procedure should not include the participation of students in interacting session as everywhere there may not be availability of net at that time.

5. Your remarks on video in support of text

- The videos were simple, remarkable and understanding.
- Videos which provided in different module were very useful and excellent.
- The videos are clearly visible and audible.
- Just make sure about good accent of spoken language in the video.
- The video should also be available in Hindi language for participants.
- Videos in the modules helps me to understand the matter very accurately.
- Videos are more concepts clearing than the text.
- The information provided is only covering the basics of action research. The videos can be included that talk and discuss on some action research that is carried out, the challenges, the satisfaction and use of doing such activities in the regular practices.
- There can be a video on few experts and few learners talking about the procedure and reporting of the research done.
- It acts as audio - visual TLM that is effective support for me.
- More video program should be launched.
- Videos are good but if at least five to six action research examples should be discussed.
- There should be change in video presentation at each module. It should be energetic.
- Teaching which was confined only in the classroom has now moved online. After watching the videos, I came to know the variety of methods to be used in Action Research.
- The videos are easily downloadable, understandable and able to clarify the doubts.
- वीडियो बहुत अच्छे हैं, लेकिन बफरिंग बहुत होती थी।
- Videos were conceptually well designed, audible, logical and appropriate with the theme under study.
- Videos' voice was audible, Text was visible and content was informative.
- Video should be provided along with the transcription.
- The video programs are very supportive in nature and anyone can understand the contents of video.
- आपके द्वारा संचालित व निदेशित क्रियात्मक अनुसन्धान बहुत अच्छी प्रकार से हम क्रियान्वित कर रहे है ।। आपने हमको जो भी स्टडी मेटीरियल दिया है उससे हमको बहुत सहायता मिली है ।। यह कार्यप्रणाली व ऑनलाइन कोर्स संचालन बहुत लाभकारी है। वीडियो मेटीरियल बहुत अच्छा है ।
- The videos should be in dialogue mode. At least 2-3 people should be engaged for discussion on the topic.

- The clarity of words, pace diction content and organization of the content were praise worthy.
- The difficult concepts are delivered in simple language.
- It helped me to understand the concept and procedures.

6. Give your comments on use of telegram during the course

- Telegram is easy and simple way for communication.
- Telegram is user-friendly and a good social media platform.
- It is easily accessible and helpful in finding solutions of queries raised and impressive to keep in touch with all.
- It is highly secured and a good way for solving any type of problem and all information about action research.
- I think telegram is not a good idea, better be having an option for online chat on the portal.
- It is actually informative one.
- Please encourage every participant to get enrolled in the group and interact actively.
- Telegram has more potential than other messaging platform.
- Good but interaction with everybody is not possible.
- Telegram is a great alternative to any of the leading messages app, I used the telegram for communicating with all the participants in Action Research. Through telegram I got all the information at right time because I missed information due to my busy schedule.
- The information provided through telegram was correct, accurate and reliable. Telegram also reminded me frequently to submit all my assignments in time. Telegram was a perfect platform to share our resources and to discuss among the peers.
- Used for first time, but was easy to receive and send the information.
- It provided important information relating to course and views of others about the course.
- WhatsApp/ Facebook are better option than Telegram. Many features lack in Telegram.
- It was the most helpful app in this course. When I post my problems, it was solved suddenly.
- I like telegram more than WhatsApp.
- I found it just similar to any other such mode of communication
- बहुत लाभकारी ।। निर्देशन का उचित माध्यम ।।
- It is better initiative as one can instantly ask about queries. I am using telegram for the first-time being student of this course.
- Too much conversation sometimes
- I think WhatsApp could be a better option.
- It is suitable for larger group and participation of candidates is good.
- Group member keeps on asking and answering the same thing without referring to the previous messages.

7. Your open remark on any other aspects of the online course on Action Research

- I am very proud and lucky to participate in AR course. I heartily thankful for entire AR team administrators and mentors for each and every moment for guiding me. This course is my first online study. I am motivated to continue and study many useful courses through SWAYAM. This course was very useful and I want to do another course under the guidance of Mr. Rajendra Pal sir.
- Whatever content and material provided in course, it was very meaningful and useful. I will try to improve my teaching way with the help of Action research course knowledge. I am really thankful for selecting me for online action research course. I want to do many more courses with NCERT.
- Overall it was the best attempt by NCERT for conducting action research
- Simply big thanks to all who supported us in continuing our quest to refresh our learning and adapting it in our learning environment. A big salute!
- Use some tutors from trained people to address the problems of the people because you people have many other duties. So those who got subsidized training must help to increase the trained man power.
- First time I am pursuing Online course. I am fully satisfied about the conduction and content of the course. After this course, I shall use Action Research for my professional development as well as to strengthen the teaching learning process.
- The action research should be compulsory in all course or curriculum.
- Alternate Option to be provided for Report Writing/Proposal Writing for different levels of teacher educators basically for Primary Teachers
- Alternate Options to be provided for Teachers who left their jobs during this course and could not be able to complete all levels of assignments
- Certificate of Participation should be given to all Participants based on Minimum Criteria.
- It helped me to develop my individual quality to understand the situations and problems of the students and to solve it.
- It will be my pleasure to work with the team in future; it will be your greatness if you keep my credential in your data bank and keep giving me opportunity to work in team for evolution of the country's prime activity in the field of education, research and training.
- Course should be designed with more levels. The course is giving the parameters but not enhancing the competencies. I am not too confident in conducting it. Practically I still feel apprehensive.
- Follow up on the course after six months can be included to encourage the participants to take up the proposal and publish in NCERT journal. There can be a new journal for action research to publish the best practices that are documented. This may be guided to prepare articles and edited.
- The bandwidth of the course platform should be enhanced so that it should work efficiently when it is much needed.
- Feedback comments are motivational to do more good work.

- Course was designed to have basic idea of action research. Advance level course in Action Research may be organized if possible.
- Some more real-life problems must be given for reading purposes.
- It is a very good course for Govt. employee as a teacher educator and to solve any education related problem. Teachers can research on new methodologies of teaching.
- AR should also be carried out on positive/creativeness/ innovativeness.
- Everything should be on time and evaluation of assignment should be given regularly.
- It's better to have quiz based on each module regularly
- In academic year online guidance courses should be conducted on teaching content of NCERT books.
- Duration of the course should be longer.
- Every interested teacher should do it.
- Good assignment but further be extended up to report writing
- Research makes sense to a person conducting it and action research is very helpful in the context. A teacher, while dealing with the students confronts problems associated with teaching learning and action research helps him to get out of it with possible solutions.
- The AR topics found to be useful, should be promoted further to be taken up in real life situation and the results should be put forth otherwise many could remain only on papers.
- आपके द्वारा संचालित व निदेशित क्रियात्मक अनुसन्धान बहुत अच्छी प्रकार से हम क्रियान्वित कर रहे है ।। आपने हमको जो भी स्टडी मेटीरियल दिया है उससे हमको बहुत सहायता मिली है ।। यह कार्यप्रणाली व ऑनलाइन कोर्स संचालन बहुत लाभकारी है।
- Action research is empowering for teachers. But the mode of communication selection for an online course should be the one that is already being used by the teachers.
- More interaction is required from participants
- Congratulations to NCERT and CIET.
- It should be continued. It helps everyone in the field of education.
- Kindly change the pattern for online exam. All information related to exam must be available on website rather than on telegram app. Only admin can message on telegram app rather than applicant also.
- I request to increase the intake and involve more teachers (Participants). Afterall “Sab ka Saath, Sab ka Vikaas”.
- Please share the final reports of all participants on your website so that we can get new ideas from others.
- Content, Assignments, Live Interactions and Quiz are nice
- I thank NCERT for providing such a great platform for teaching and bringing people from all corners of the country together.

- Such types of courses should be developed frequently for the greater benefits of the students and teacher.
- Being a teacher, I just want to equip myself with Action research process. I will be able to conduct it easily, don't take it as another big task to be done. Till now the material is good. I think regular guidance regarding the way we take our research further is needed. Even after reading all the things, I find many queries to take my research further. And being government employees, we don't get many opportunities to learn such things. It's prestigious to be the part of this course as it is being conducted by NCERT. This time the group of participants is very big and diverse, so personal guidance might be delayed. I seek more guidance for the next few months to take my research further.
- Action Research course is one of the major contributions of NCERT
- It increases my skill to solve any problem easily in the class room.

8. Any other suggestion/s related to fee structure.

- It's worth Rs 1000/- for Govt. employee.
- The fee structure is quite reasonable and nominal.
- The fee structure should be same for the govt. as well as the private teachers.
- I think fee should be less for private sector participants.
- The fee can be kept minimum to encourage teachers both government and private schools to enroll in large numbers.
- Fee structure for the course is adjustable. It was appropriate not so costly. All teachers can afford the fee structure of this AR.
- Fees should be structured according to Level of AR being undertaken.
- Fees for private teachers may be less and that for govt. teachers and NCERT employees may be comparatively high. As a maximum of private teachers is not getting a good salary, so taking more fees from them may discourage them. However, in my opinion, there should be no fees for all types of participants.
- It should be free for Govt. teachers as SWAYAM is doing.
- The Course should be offered free of the cost. We are moving towards the open educational resources.
- फीस की राशि सभी प्रतिभागियों के लिए समान ही रखी जाए 1000/- रु । इतनी अवधि के कोर्स के लिए यह फीस उचित है जो न तो बहुत कम है न ही ज्यादा ।।
- I find present fee structure Okay. But keeping in mind the energy and effort of NCERT faculty, fees can be increased. Sometimes students don't take the course seriously because the course is available in lesser fees.

ANNEXURES

Participants Proposal

Annexure A. Participants Action Research Proposals

1. Improvement of skill in solving word problems of Class-III students of Tulasichoura Primary School, Baripada, Mayurbhanj, Odisha.

Mr. Abhimanyu Behera
Teacher Educator, DIET, Mayurbhanj

I: INTRODUCTION

(A) Introduction/Background

Education has its own importance in the life of human being. It helps for the attainment of general objectives of life. It helps people to acquire skills to solve daily life problems. Mathematics is an important subject through which one can acquire problem solving ability in day to day life situation. Mathematics education impacts a lot in the life of a person as well as on a society as a whole, for which it has been included as an important subject in school curriculum. However, before a student can successfully solve a problem, he has to possess good reading comprehension, as well as analytical and computational skill. Without proper comprehension of a mathematical problem one can't solve it.

During the supervision of internship programme of D.El.Ed. course under DIET, the researcher found a common problem in school students from class-II to V that, they could not solve the word problems related to four Mathematical operation like addition, subtraction, multiplication and division though they were well known about those operations. The students could do successfully the different operations in Mathematics, when they are given only numbers. But when word problems were given, so many students faced difficulty to solve. This leads to conduct an action research regarding the problems of solving word problems related to four fundamental operations in Mathematics.

(B) Purpose/Need of the study

Generally, students learn different operation like addition, subtraction, multiplication in Mathematics. To solve Mathematical problems students, have to apply these operations and at this point they face difficulties to know "which operation has to apply?". Problem solving in Mathematics and reading comprehension goes hand in hand. If the students do not comprehend the problem, they will do mistake by applying wrong operation. Solving Mathematics problems entails the students to apply two skills i.e, reading & comprehension and problem solving at the same time. So, the skills of the students to solve word problems must be improved, otherwise it may lead to a lifelong problem. In this context, the researcher takes this study as Action Research to solve the problem.

(C) Explanation of Terms

Word Problems in Mathematics: Word problems in Mathematics means the problems where significant background information on the problem is presented as text rather than in mathematical notation. Problems are given in sentences that students have to read entirely to get a feel for the whole problem. After reading and comprehension of the problem students can know "what has been given", "what has to be found out" and then try to solve it.

Word problems can be taken for different mathematical operations like addition, subtraction, multiplication and division, factors, multipliers, LCM, HCF, fraction, average, percentage, algebra etc. In this study, the word problems related to four basic Mathematical operation has been taken.

(D) Review of related research and literature on the study topic

According to the National Achievement Survey-2017 (NAS-2017), the achievement level of elementary school students is not satisfactory. In particular, the problem-solving ability of student is very poor. Mathematical problem solving is an important attribute of a students' Mathematical development (Sutherland, 2008). A word problem requires mathematical skills, concepts, or processes be used to arrive at the intended goal. Disappointingly, most students do not master problem-solving skills (Bernando, 1999). Research shows that a number of factors are there which influence the performance of students at the time of problem solving. The factors are: influence of general structure features of the problem, semantic structure of the problem, and problem-solving process. A general structure feature is referred to how a word problem is formed. The influences in general structure features include the average word length, number of arithmetic operations, and number of sentences in the problem, average number of words in each sentence and the frequency of nouns, verbs and conjunctions. Research shows that while solving word problems, students have difficulties and are not able to comprehend or solve these math problems because problems are too long and or require multiple operations. According to Kintsh & Greeno,1985, students have more difficulties while problem solving as the number of words between the numerical features of the problem increases.

(E) Objectives of the Study

i. To improve the vocabulary and enhance reading comprehension skill of students;

ii. To improve the skill in solving word problems of students in Mathematics.

(F) Hypothesis

If the teacher practices students to solve word problems from the very beginning, then the students will improve.

(G) Assumptions

i. The students participating in the study will use problem-solving strategies given prior & and during the lesson.
ii. The students will use vocabulary words in mathematical problems that will help them understand what they are being asked to do in order to solve a mathematical word problem.
iii. The students participating in the study will provide accurate responses to a pre/posttest on mathematical abilities.

II: RESEARCH DESIGN

(A) Research Method

This action research will be experimental in nature and will use pre-test and post-test results to address the problems of students.

(B) Sample

All students of Class III of Tulasichoura Primary School, Baripada, Mayurbhanj, Odisha be taken up for Action Research.

(C) Tools for data collection

i. Pre-test
ii. Post-test
iii. Semi-Structured Interview Schedule (It will be used for the pupil-teachers for collecting data regarding the intervention)

(D) Design of the study

S No.	Activities	Data to be collected	Statistical technique to be used
1	Administer of the pre-test	Result of the pre-test	Percentage
2	Conduct test on Mathematics vocabulary twice a week	Result of the test twice a week	Percentage
3	Conduct weekly test on Problem-solving	Weekly test result	Percentage
4	Weekend Interview	Students difficulties/ thinking while solving problems	Data analysis
5	Administer the post-test	Result of the post-test	Percentage

(E) Statistical techniques for data analysis

i. Percentage
ii. Average
iii. Graphical figure

(F) Procedural steps for conducting research

i. A Pre-test of 30 marks will be administered. It will be prepared on the basis of three perspective: vocabulary skills, computational skills, general information. It will consist 10 items from each category.

ii. On the basis of the analysis of data from pre-test, activities will be done for improvement of vocabulary and comprehension skill of students. For this the following activities will be undertaken-

For vocabulary-

- Use of a list of synonym words for a particular word related to mathematical operation like addition, subtraction, multiplication, division.
- Ask the question by using another word for a given a word.

For Comprehension and problem solving-

- Use of day-today words in comprehension
- Act it out
- Use of real objects for mathematical operation
- Draw a diagram/ picture
- Make a chart/ list
- Guess and Check
- Make it simpler,
- Find a pattern.

iii. For development vocabulary & comprehension skill and problem solving ability activities will be conducted in whole to part approach. For every activity both problem solving and vocabulary will be focused.

iv. Vocabulary test will be conducted twice a week to know their improvement.

v. Weekly test will be conducted to know their improvement and according intervention will be provided.

vi. After two months a post-test of 30 marks will be administered to know the problem solving ability of the student.

vii. The data will be analyzed with the given statistical techniques and report will be prepared.

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2. Impact of ICT on teaching Educational Psychology to D.El.Ed. Students of Govt. DIET, Pallipadu of SPSR Nellore District

Mr. Banka Srinivasulu
Lecturer, DIET, Pallipadu

I: INTRODUCTION

(A) Introduction

One of the most important concerns all over the world is "Education". The impact of education is unquestionable, but another important concern is related to the teachers in these educational systems. The impact of any educational system can only be as powerful and effective as the teachers or the educational leaders who actually perform this profession. The lives of all learners are shaped by the teachers. A teacher can easily become an educational leader; can create positive change in the classroom and in the lives of his/her students and can shape the environment, or even the future of the country. How should these role models be educated and trained then? This has long been debated and no perfect answer was found to solve this argument. Even if there are good programs or curricula to prepare future teachers, there is always room for improvement.

Teachers and schools need to keep up with the recent developments in the field of teacher education and training in order to be able to improve their programs and the quality of teaching and learning process. The teacher educators must know the recent trends in the area of teacher education and training with its practical applications and implications in the teaching and learning process.

Information and Communication Technology (ICT) in education is the mode of education that uses information and communications technology to support, enhance, and optimise the delivery of information. ICT has become commonplace entity in all aspects of life. Across the past twenty years the use of ICT has fundamentally changed the practices and procedures of nearly all forms of endeavor within business and governance. Education is a very socially oriented activity and quality education has traditionally been associated with strong teachers having high degrees of personal contact with learners. The use of ICT in education lends itself to more student-centered learning settings. But with the world moving rapidly into digital media and information, the role of ICT in education is becoming more and more important and this importance will continue to grow and develop in the 21st century.

(B) Purpose of the study

Education is one major sector which has undergone the influence of innovations in ICT. Starting from providing online content service, platform for organizing learning experiences to managing learning and assessment has been changed greatly by ICT developments. Students,

teachers and educational administrators and every stakeholder in education have been benefitted by the integration of ICT in education. Information and Communication Technology (ICT) in education is the mode of education that uses information and communications technology to support, enhance, and optimize the delivery of information. Worldwide research has shown that ICT can lead to an improved student learning and better teaching methods. The appropriate application of ICT can yield good results in the field of education. The usage of ICT can assist the teaching and learning process. Teaching through ICT can enhance the students' knowledge, skills and easy understanding of Educational Psychology and engage in higher-order thinking skills. ICT can provide diverse options for taking in and processing information, making sense of ideas, and expressing learning. Over 87% of students learn best through visual and tactile modalities, and ICT can help these students 'experience' the information instead of just reading and hearing it.

(C) Explanation of Terms

ICT: Information and Communication Technology: Information and Communication Technologies are defined as all devices, tools, content, resources, forums, and services, digital and those that can be converted into or delivered through digital forms, which can be deployed for realizing the goals of teaching learning, enhancing access to and reach of resources, building of capacities, as well as management of the educational system. These will not only include hardware devices connected to computers, and software applications, but also interactive digital content, internet and other satellite communication devices, radio and television services, web-based content repositories, interactive forums, learning management systems, and management information systems. These will also include processes for digitization, deployment and management of content, development and deployment of platforms and processes for capacity development, and creation of forums for interaction and exchange.

Educational Psychology: Educational psychology is the branch of psychology concerned with the scientific study of human learning. It involves the study of how people learn, including topics such as student outcomes, the instructional process, individual differences in learning, gifted learners, memory, conceptual processes, educational technology, curriculum development, organizational learning, classroom management, student motivation and learning disabilities. It involves not just the learning process of early childhood and adolescence but includes the social, emotional, and cognitive processes that are involved in learning throughout the entire lifespan. It incorporates a number of other disciplines, including developmental psychology, behavioral psychology, and cognitive psychology. Educational psychology has been built upon theories of operant conditioning, functionalism, structuralism, constructivism, humanistic psychology, Gestalt psychology, and information processing.

Diploma in Elementary Education (D.El.Ed.): D.El.Ed. is Diploma in Elementary Education. D.El.Ed.is a two years pre-service primary teacher training course conducted through DIETs recognized by National Council of Teacher Education. The admissions are made through DEECET. The educational qualification required is 10+2 (Intermediate).

District Institute of Education and Training (DIET): District Institute of Education and Training (DIET) is a nodal agency for providing academic and resource support at the district and grassroots levels for the success of various strategies and programmes undertaken in the areas of elementary education. Until the adaptation of NPE 1986, academic and resource support in the area of elementary education was being provided largely at national and state levels only by institutions like NCERT, NIEPA (NUEPA) and SCERTs. Below the state level, there were elementary teacher education institutions. The NPE and PoA envisaged addition of a third district-level tire to the support system in the shape of District Institutes of Education and Training (DIET). DIETs were established with the financial support from the Central Government in pursuance of NPE 1986.

(D) Review of related research and literature

A project involving the outreach work of Monkseaton High School to local primary schools was mentioned. Results of a research study conducted by Durham University showed that the primary school pupils progressed up to 80% faster when taught French with the aid of a set of ICT resources (Word worksheets, IWB PowerPoint presentations, audio files, etc.) compared to those who learned using traditional methods. 1000 pupils were split into two groups for the purposes of the research study. Paul Kelly, head teacher of Monkseaton High School, is reported as saying: "The pupils who used computers improved by between 0.5 and 0.8 of a level more than those who used books. That can be translated into an improvement of up to an 80% cent with computers. They almost doubled the speed at which they were learning". Worldwide research has shown that ICT can lead to an improved student learning and better teaching methods. A report made by the National Institute of Multimedia Education in Japan, proved that an increase in the use of ICT in education with integrating technology to the curriculum has a significant and positive impact on students' achievements. The results specifically showed that the students who are continuously exposed to technology through education has better 'knowledge', presentation skills, innovative capabilities, and are ready to take more efforts into learning as compared to their counterparts.

(E) The benefits of using ICT

- Choosing software carefully is a priority, as one teacher put it: "sensible and realistic software, preferably programs for which we can author materials that tie in 100% with the units that the pupils are studying".

- Integrating ICT materials into the curriculum and frequency of exposure of pupils to ICT were mentioned as keys to success.

- Staff must be familiar with using ICT and confident and interested in using it.

- It was pointed out that ICT can go beyond drill-and-practice, offering access to authentic materials on the Web and the opportunity for authentic communication.

- The advantage of ICT in delivering repetition and memorisation activities was pointed out. As one teacher put it: "What would be boring in class can become obsessive with an ICT style game or challenge. Plus the idea of spot-on accuracy becomes much more important in this situation."

(F) Objectives of the study

- To find out the impact of ICT on teaching Educational Psychology to D.El.Ed. students
- To compare the achievement of the D.El.Ed. students in Educational Psychology

(G) Hypotheses of the study

- There will be no significant difference in the achievement of boys and girls.
- There will be no significant difference in the achievement of English medium and Telugu medium students.

II: RESEARCH DESIGN

(A) Research Method

The Experimental Method is the best method to conduct this action research. I will conduct Pre-test and Post-test on D.El.Ed. Students and collect the data.

(B) Sample

The sample is 100 D.El.Ed.Students of DIET, Pallipadu of SPSR Nellore District. The sampling technique is purposive random sampling. I will collect the data from 50 Telugu Medium students and 50 English Medium Students.

(C) Tools for data collection

I will prepare the Pre-Test and Post-Test for Educational Psychology. And also, I will collect the data through a standardized ICT Questionnaire from D.El.Ed. Students.

(D) Statistical techniques for data analysis

There are many statistical techniques. But I will use the following statistical techniques for my Action Research.

- **Descriptive statistics:** Percentage, Mean, Standard Deviation, Median, Percentile Rank
- **Inferential statistics:** t-test

(E) Procedural steps for conducting research

- Conducting Pre-Test on D.El.Ed. Students and Collecting Data
- Teaching to D.El.Ed. Students Educational Psychology through ICT (Videos, PPTs, PDFs, Docs, Animations and Simulations etc.)
- Conducting Post-Test on D.El.Ed. Students and Collecting Data
- Collecting Data from D.El.Ed. Students through ICT Questionnaire
- Data Analysis of Pre-Test and Post-Test
- Data Analysis of ICT Questionnaire
- Findings and Reflections
- Review

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3. Enhancing Understanding of Nature of Mathematics with the Help of Self-Reflection Among B.Sc. B.Ed. 5th Students of RIE, Bhubaneswar

Mr. Gautam Kumar
Assistant Professor, RIE, Bhubaneswar

I: Introduction

(A) Introduction

The aim of any educational intervention is to ensure that the targeted beneficiaries participate in the programme and achieve the expected literacy, numeric skills, and higher order mental skills related to thinking and reasoning abilities; life skills, values and develop emotional intelligence (Sankar, 2010). Mathematics constitutes one of human's ancient and noble intellectual traditions. It is the pivot of all civilizations and contributing factor in the prosperity of human race. Sinha et al. (2007) reported the words of Bertrand Russell; 'Mathematics possesses not only truth, but supreme beauty – a beauty, cold and austere, like that of sculpture, without appeal to any part of our weaker nature sublimely pure and capable of astern perfection such as only the greatest art can show'. Chambers (2010) expressed his mathematics philosophy that mathematical truth is certain, that is incontestable and entirely objective. It is an all embracing and all-pervading discipline for all of science and technology, providing powerful tool for analytical thought and the concepts and language for creating precise quantitative descriptors of the world. Mathematics, as an emancipatory way that lead to social, political, and or economic empowerment (Friere, 2006) is a dynamic discipline that continues to produce new knowledge. Even nature embraces mathematics. It is regarded as a powerful tool for interpreting the world and therefore should ideally be rooted in real experience across the whole curriculum.

The National council of teachers of mathematics (NCTM, 2000) says that in this changing world those who understand and do mathematics will have significantly enhanced opportunities and option for shaping his/her future. A lack of mathematical competence keeps those doors closed. (As cited by Solomon, 2007).

In the context of the above discussion, it is evident that mathematics has very important place in our day to day life in particular and in human civilization in general. Further, most of the mathematical concepts are abstract in nature which usually hinders the learner to visualize and understand mathematical concept holistically. Understanding the nature of the mathematics may help the learner as well as mathematics teacher in order to visualize and understand it properly.

(B) Purpose/Need of the study

Understanding the nature of a discipline is the key to understand the discipline in a holistic manner as it makes a path to have insight of the knowledge domain. As the students of B.Sc. B.Ed. course, they must have the insight of the domain of knowledge, so that when they enter in the teaching profession their insight will help the students they are teaching.

The act of reflecting is one which causes us to make sense of what we have learned, why we learned it, and how that particular increment of learning took place. Moreover, reflection is about linking one increment of learning to the wider perspective of learning. Learning is a network of co-existing ideas (Moon, 1999). Learners construct their own meaning about situations drawing on both their cognitive skills (reasoning, knowledge) and metacognitive skills (intuition, self-awareness). A structured reflection provides scaffolding for the individual to make sense of experience and make connections.

Furthermore, Boud, D., Keogh R., & Walker, D. (1985); Kember et al., (1999); Thorpe, (2004) as reported by Bell et al. (2010) claimed that the ability to reflect on one's learning and to learn from reflecting on experience is a fundamental skill necessary for learning and decision making. They added that developing student's capacity to engage in reflective practices has been recognized as an essential goal for learning and transformation in higher education and for preparing students effectively for their professional contexts.

(C) Theoretical Background of the Study

Kolb's Theory of Experiential Learning:

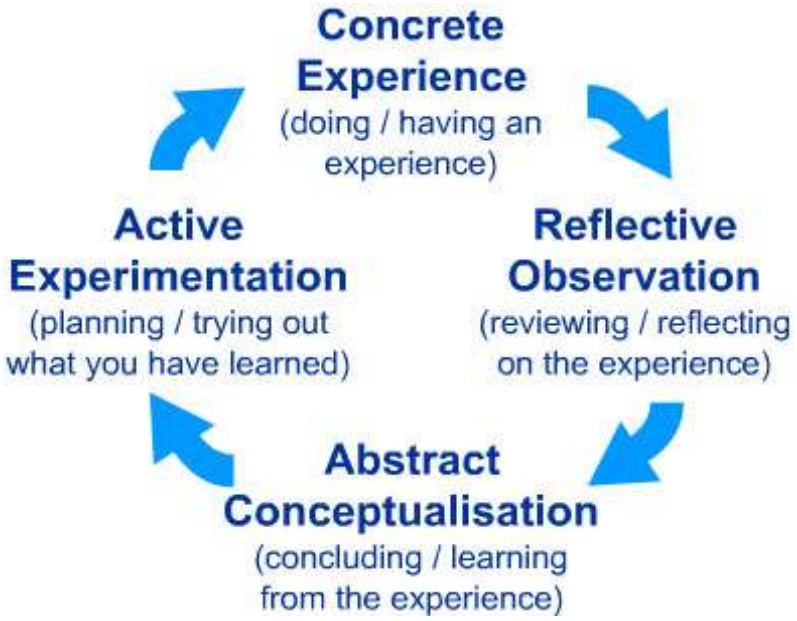
Learning never happen in isolation or in fragmented way, it is sequential combination of experiences, ideas, schemas and co-existing ideas. Mastering expertise is a continuous process of experience, reflection, conceptualization and experimentation. Effective learning is the process whereby knowledge is created through the transformation of experience (Kolb, 1984) and it is viewed as an integrated process with each stage being mutually supportive of and feeding into the next (Kolb, 1974).

Learning occurs when someone creates knowledge through experiential transformations (Kolb, 1984). Experiential learning is the process of learning through experience, and is more specifically defined as "learning through reflection on doing" (Felicia & Patrick, 2011). The theoretical model of Experiential Learning is grounded in the humanistic and constructivist perspective, proposing that we are naturally capable to learn, and that experience plays a critical role in knowledge construction and acquisition. In other words, experience-based learning helps establish lasting behavior change.

Learning through experience is not a new concept. Notable educational psychologists John Dewey (1859-1952), Carl Rogers (1902-1987), and David Kolb (1939) have provided the groundwork of learning theories that focused on "learning through experience or "learning by doing." Dewey popularized the concept of Experiential in Education which focuses on problem solving and critical thinking rather than memorization and rote learning.

The focus of Experiential Learning is placed on the process of learning and not the product of learning (UC Davis, 2011). Proponents of experiential learning assert that students will be more motivated to learn when they have a personal stake in the subject.

Figure 01: *Kolb's Experiential Learning model*



The steps of the Kolb's Experiential Learning are depicted in the figure below:

1. **Concrete Experience** - (a new experience or situation is encountered, or a reinterpretation of existing experience).

2. **Reflective Observation of the new experience.** (of particular importance are any inconsistencies between experience and understanding).

3. **Abstract Conceptualization** (reflection gives rise to a new idea, or a modification of an existing abstract concept).

4. **Active Experimentation** (the learner applies them to the world around them to see what results).

(D) Objectives of the Study

Since the study is a mixed method study where in both quantitate and qualitative data will be collected and analyzed. Hence in place of hypothesis for the proposed study, objective of the study is presented.

The proposed study will be mainly focused on attaining the following objectives:

i. To assess the Reflective thinking level among students of B.Sc. B.Ed. 5th semester.

ii. To empower students for using self-reflection in regulating their study.

iii. To illustrate the enhancement in understating of Nature of Mathematics by using self-reflection of students.

II: Research Design

(A) Research Method

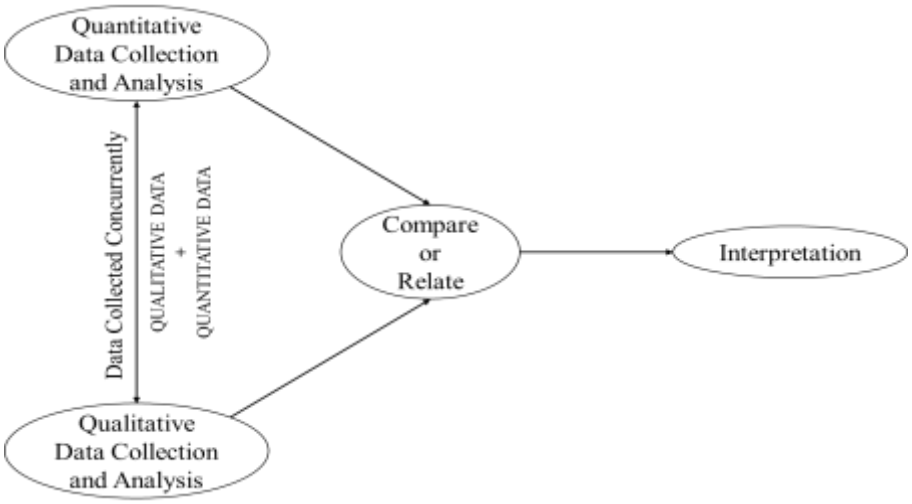
One group pre-test post-test quasi-experimental design seems to be most appropriate design for the proposed study to assess the outcome of the self-reflection to enhance understanding in Nature of Mathematics.

Pre-Test	Treatment	Post-test
XO_1	Reflective Learning Strategy ▪ Reflective Journaling ▪ Problem Based Learning ▪ Mind Mapping	XO_2

Where, **XO_1** and **XO_2** are pre-test and post-test scores respectively.

Furthermore, for collection of data and its analysis, concurrent convergent parallel mixed method design will be used; as to assess outcome of the intervention requires both quantitative and qualitative data to be collected and analyzed concurrently.

Figure 02: *Concurrent convergent parallel mixed method design of data analysis*



(B) Sample

As the problem identified for proposed Action Research is to enhance understanding of Nature of Mathematics of B.Sc. B.Ed. 5th semester students of RIE, Bhubaneswar. So, 48 students studying in B.Sc. B.Ed. 5th of Regional Institute of Education, Bhubaneswar will be selected as sample for the proposed study.

(C) Tools for data collection

Proposed study in intended to enhance understanding of nature of Mathematics by the meaning of using students' self-reflection about their own learning and achievement. To serve the purpose 1. Achievement Test in Mathematics, 2. Scale of Reflective action, 3. Rubric for assessing mathematics proficiency, and 4. Reflective Dairy – for structured reflection will be used as a research tool for data collection.

The nature of proposed study suggests that both qualitative and quantitative data will be required in order to have substantial data and to understand the process of enhancement.

(D) Statistical techniques for data analysis

As the proposed study suggests that both quantitative and qualitative data will be required. Hence for its analysis both quantitative and qualitative data analysis techniques will be utilized. For analyzing qualitative data thematic content analysis will be done, however for quantitative analysis of pre-test and post-test data mean, SD and percentage will be calculated and will be analyzed together by taking both types of data.

(E) Procedural steps for conducting research

Proposed study will have three phases namely, pre-intervention phase, intervention phase and post-intervention phase. In intervention phase achievement score of students in 1st internal assessment will be taken as pre-test score. Intervention phase will consist planned intervention to address the problem in hand. Similarly, achievement score of score in 2nd internal assessment will be taken as post-test score.

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4. Effectiveness of Digital Classroom Content of Chemistry in terms of Achievement in Physical Science of Class X Students of A.P.T.W.R. School of Excellence (B), Srisialam

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(A) Introduction

With the result of explosion of information and communication technology student learning enhanced by supplementing classroom teaching with the help of K-YAN, MANA TV, Internet, Digital Classroom Virtual Class Room, e-tutorial etc. In this study digital classroom content in Chemistry is to be exposed to students of X class to enhance their learning and achievement.

(B) Need of the Study

When compared to other subjects, a smaller number of students of X class securing A1 Grades in SSC Public Examinations for the past three years at Institution Level as well as State Level. On verification of answer scripts of test papers, it is noticed that students are not having conceptual clarity in certain topics of Chemistry where the content is abstract in nature. So, it is felt that there is a need to supplement classroom teaching with digital classroom content which provides visualization animation and sustained attention and interest of the students.

(C) Statement of the Problem

The Present study is on "Effectiveness of Digital Classroom content of Chemistry in terms of achievement in Physical Science of Class X students of A.P.T.W.R. School of Excellence (B), Srisailam".

(D) Objectives of the study

The objectives of the study are as follows:

1) To find the effectiveness of digital classroom content of Chemistry in achievement in Physical Science of Class X.

2) To compare the mean scores of achievements in Physical Science at pre and post stage of teaching through digital classroom content in Chemistry.

3) To enhance student's classroom experiences by diversifying learning activities through digital classroom.

(E) Hypotheses of the study

Digital classroom content in Chemistry will have significant effect on achievement in Physical Science of Class X Students.

(F) Research Methodology

This is an experimental study with pre-test, post-test, single group design by using digital classroom content in Chemistry as an intervention.

(G) Sample

43 Schedule Tribe students studying in Class X at A.P.T.W.R. School of Excellence (B), Srisailam, Kurnool district of Andhra Pradesh will be the intact group of the study.

(H) Intervention

In this study students of Class X will be subjected to digital classroom content in Chemistry daily one period for one month on the following topics where the students find difficulty in understanding.

Sl. No.	Name of the Topic	No. of periods allotted
1.	Atomic Structure	6
2.	Chemical Bonding	6
3.	Chemistry of carbon and its compounds	12

The researcher introduces the topic at the beginning of the digital class and observe the students while digital class is going on and at the end clarify the doubts raised by the students and obtain feedback from the students.

(I) Data Collection Procedure

At the beginning of the study a pretest will be conducted to know the level of achievement in Chemistry. Soon after completing the course of intervention post-test will be conducted.

(J) Tools of Data Collection

A teacher made achievement test in Chemistry is used as a tool for data collection for pre-test and post-test. Objective type test for 50 marks will be constructed in the following chapters.

Scoring Key will be prepared in which one mark for correct response and zero mark for wrong response will be awarded. All sub topics of the three chapters will be covered in Testing.

Sl. No.	Name of the Topic	Marks
1.	Atomic Structure	10 Marks
2.	Chemical Bonding	10 Marks
3.	Chemistry of carbon and its compounds	30 Marks

(K) Variables

Independent Variable: Achievement in Physical Science
Dependent Variable: Digital Classroom content in Chemistry.

(L) Analysis of Data

In this study descriptive statistics like mean, standard deviation, graphical representation and inferential statistics like t-test will be used for the analysis of the data.

5. Improving ability to solve the word problems of linear equations class VIII among students of Borij Primary school at Borij, Gandhinagar.

Mr. Hirenkumar Pravinchandra Pandya
Lecturer, GCERT

I: INTRODUCTION

1.0 Introduction

According to The National Policy on Education (NPE) 1986, Mathematics should be visualized as the vehicle to train a child to think, reason, analyze and to articulate logically. The National Curriculum Framework for School Education (NCFSE) 2000 document echoes such sentiments as well. In the National Curriculum Framework (NCF) 2005, one vision statement is stated as: school mathematics takes place where Children pose and solve meaningful problems. Considering that this is an ability of use in all of one's life, techniques and approaches learnt in school have great value.

During the practices related to school education, researcher seen a sense of fear and failure regarding mathematics among a majority of children. But Mathematics is very easy and wonderful subject if basic concepts are clarified from the primitive stage of learning of Mathematics.

1.1 Purpose/Need of the study

In teaching of mathematics, majority of schools have done very less practice for word problems of any concept. Word problems related to any concept of mathematics have very important relation to our day to day life experiences and problems too. So, ability to solve the word problems should be developed in students during the teaching learning process of mathematics.

In the past researches of mathematics content instructional material, self-learning material, worksheets etc. are developed in many quantities for different contents. Particular in the content of linear equation regarding word problems, this research will develop useful remedies for improving ability to solve the word problems of linear equations among class VIII students of primary school.

1.2 Explanation of Terms

Following are the major terms for this action research:

- **Word Problem: -**A word problem is a mathematical exercise where significant background information on the problem is presented as text rather than in mathematical notation. Word problems can be examined on three levels.

  Level A: the verbal formulation

  Level B: the underlying mathematical relations

  Level C: the mathematical expression

- **Linear Equation: -**It refers to an equation containing linear expressions. The linear expression of the form ax+b where x is variable and a and b are constants; or in more variables, an expression of the ax+by+c, ax+by+cz+d etc. Thus ax+b=0 is the linear equation. Linear equation is the content of algebra, the branch of mathematics.

1.3 Review of related research on the study

Study: 1

The Constructivist Approach of solving Word Problems involving Algebraic Linear Equations: The Case Study of Mansoman Senior High School, Amansie West District of Ghana

Researchers: Emmanual Appoh Andam and Others

University: University Of Education, Winneba , Ghana

Year of Publish: 2015

Review: This paper is an action research. The study was aimed at using the constructivist approach to enhance students' competence in solving word problems involving algebraic linear equations. Comparatively, the result obtained from the pretest and post test showed that a significant improvement on the students' ability to solve the equations.

Study: 2

A Study of Problem Faced by 7th Std students while Solving Mathematics Problem

Researcher: Alamelu P. Iyer

Institution: R.B.T. College of Education,Dombivali, Mumbai

Year of Publish: 2017

Review: This Project is an action research. The study was aimed to investigate students' ability in solving fraction word problems. Questionnaire was prepared by researcher. In conclusion students were satisfied with questionnaire's questions.

1.4 Objectives of the study

Following are the objectives of this study.

1. To study the problems faced by the students of std VIII while solving word problems of linear equation.

2. To find out the problems faced by the students of std VIII while solving word problems of linear equation.

3. To suggest remedies for improving ability to solve the word problems of linear equation for the students of std VIII.

1.5 Hypotheses of the Study

Following is the null hypotheses for this study.

There is no significance difference in the mean scores the pre-test and the post-test of the students at 0.05 level of significance.

2. Research Design

2.1 Research Method

Mainly Four research methods are often use by researcher.

1. Historical Research Method
2. Descriptive Research Method
3. Experimental Research Method
4. Comparative Research Method

Here researcher will use combination of descriptive research method and experimental research method for this study. This research problem is related to current situation so researcher will use this combination.

2.2 Sample

The students of class VIII of Borij primary School will be the sample of this study.

2.3 Tools for data collection

The major tools of research in education can be classified broadly into the following categories.

A. Inquiry forms

- Questionnaire
- Checklist
- Rating Scale
- Opinionnaire
- Attitude Scale

B. Observation

C. Interview

D. Sociometry

E. Psychological Tests

- Achievement Test
- Aptitude Test
- Intelligence Test
- Interest Inventory
- Personality Measures etc.

Here researcher will use Pre-Test and Post-Test tools for conducting this study and it involves different set of questions on linear equation word problems. Interview (open discussion mode) will be used to find out causes of research problem. Some intervention activities will be prepared for improving ability of students.

2.4 Statistical techniques for data analysis

Here descriptive statistics such as Percentage, Mean and Standard Deviation will be used. Wherever for inferential statistics t-ratio will be used.

2.5 Procedural steps for conducting research

Following are the procedural steps in conducting research study.

1. Conducting Pre-Test on sample Group
2. Find out causes of Research Problem based on Pre-Test and open discussion with students.
3. Implement of Intervention Activities
4. Conducting Post-Test on same sample Group
5. Data analysis and Results
6. Discussion and Conclusion

3. Bibliography

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6. Effectiveness of Gamification as a Tool of Active Classroom Learning to Enhance Science Pedagogy among B.Ed. trainees of Babasaheb Bhimrao Ambedkar University at Lucknow

Dr. Victoria Susan Ijjina
Assistant Professor, Babasaheb Bhimrao Ambedkar University

Introduction

Education System is changing at a very rapid pace. Academic revolution taken place in India in the past half century is marked by a paradigm shift in scope and opportunity. Education is the process of helping the child to adjust to this changing world. One of the main aims of education in a modern society is to keep pace with the advances in knowledge and technology. In such a society knowledge cannot be received passively. The main purpose of education is awakening of curiosity, stimulation of creativity, development of proper interests, attitudes and values and building of essential skills like capacity to think and judge for oneself. The role of present-day teacher has become very challenging, complex and multifaceted. Pedagogy is hinged on the imagination and activism of the teacher. Engaging students in the learning process increases their attention and focus, motivates them to practice higher level critical thinking skills and promotes meaningful learning experiences. The present study focuses on active classroom learning to enhance the knowledge of students.

Need of the Present Study

Globalization and advances in information and communication technology brought major changes in information and communication technology. The modern teaching endeavor must meet the needs of the fundamentally changing learning environment. The role of the present-day teacher has become very challenging, complex and multifaceted. Teacher Education programs must now train teachers to work in environments that will demand increasingly complex skills and knowledge with greater accountability and teaching effectiveness. It is observed that teachers enter the academic arena with deficiencies in communication skills, classroom management and instructional delivery (Ferber & Nillas, 2010). They stand in front of their students with looks of uncertainty and doubt in their teaching capabilities and competence (Solas, 2015). With lack of confidence they can easily withdraw from the challenge, and in due course, quit teaching. The skills in lesson planning, classroom management and communication skills are behavioral skills that cannot be totally developed through knowledge-based training methods alone. They can be acquired best through practice. (Solas, 2015)

Teaching Practice is a significant area in educational programs. Micro teaching and simulations are teacher training techniques for learning teaching skills and get deeper knowledge on art of teaching. Teaching Practice is a significant area which serves as a bridge between professional preparation and practice which aims for the practical application of knowledge, learning principles, skills and techniques of teaching. Practice teaching is a long respected educational component which allows student build their classroom knowledge, skills

and confidence before taking full responsibility for classroom teaching. Gamification is a recent powerful technique to engage and motivate students to acquire required skills. Gamification technique can be applied in practice teaching to motivate pupil teachers to acquire required skills.

Explanation of Terms

Gamification:

"The use of game-design and game psychology in non-game settings to engage the target audience and motivate specific behaviors" - Marczewski (2014)

Gamification involves the application of game design elements like conceptual building blocks integral to building successful games to traditionally non-game contexts (Kapp, 2012). Gamification started to become a worldwide trend around 2010. The notion of gamification began with the idea that because video games can capture significant attention and engagement for long periods of time, the application of game design elements to non-game phenomena should also increase attention and engagement Deterding S, Dixon D, Khaled R, Nacke L (2018)

Games, challenges and competitions are a part of the human character and thus constitute a significant aspect of human society. In education, gamification may translate in an improved student learning experience and motivation reflected in better retention and student experience reports Rogers (2013). Gamification has the potential to revolutionize human competencies and human-system interfaces opines Zichermann, G (2013).

Review of Related Literature

Noran (2016) in his study "on Gamification in Action Learning" opines that through gamification the quality of teaching can be enhanced by aligning objectives, teaching styles and milestone deliverables, research implementation, action and reflection leading to this alignment must be ongoing. The study presented phases of a research cycle spanning a teaching semester, comprising the identification of potential improvements based on the learning and teaching and gamification bodies of knowledge, teaching the gamified course, feedback gathering and reflection on the results.

Routledge et. al (2019) expressed that research priorities in gamification should explore how and under what conditions gamification is likely to be effective. Selective and purposeful gamification that aligns the learning goals has the potential to increase learner motivation and engagement and learning. In line with self-determination theory game design elements can be used to enhance learner feelings of relatedness, autonomy and competence to foster learner's intrinsic motivation.

Majuri, J., Koivisto, J., Hamari, J (2018) in their study indicate that research should pay more attention to the contextual factors affecting the gamification as potential source for varying

results and future research should seek to focus more on inducing social interaction with gamification solutions.

Swacha, J. (2018) in his study "Representation of Events and Rules in Gamification System" addressed by proposing a simple representation of events exposing their key properties of relevance for gamification (e.g. context, actor, action, object, location and time) upon which a new, effective notation for specification of rule requirements and results is developed. The verification of the proposed notation requires its practical implementation in a complex gamification system. Such work is envisaged as a part of effort on the development of a tourism gamification system intended to connect multiple tourist attractions offering to their visitors.

Al-Hadithy, T & Ali, S. (2018) in their study "Gamification in Learning for Academic Purposes: Designing Assessment for Learning using Kahoot with UAE undergraduate Law students" identified that students seek excitement in their learning and Kahoot provides them with this opportunity as it triggers their intrinsic motivation. The researcher noticed that playing kahoot resulted in sparking discussions among students. It was a safe haven for the shy students and an opportunity to shine for the more challenge driven students. Kahoot provides for real time feedback without the strains of teacher student exchanges.

Glover (2013) came out that Gamification is a concept that can be used to make learning more engaging. There are many opportunities to implement the concepts of gamification within learning, both in traditional learning environments and also their electronic counterparts.

This study positions gamification as a powerful tool for educators teaching at all levels within the education system. As with the specific example presented in this paper, most gamified learning interventions tend to be web-based, scalable and asynchronous. This makes them particularly useful in educational contexts, such as online learning. Gamified learning activities could become an integral part of flipped teaching environments (Bergmann & Sams, 2012). Their social, asynchronous nature can be used to prompt students to engage with pre-prepared content, while gamified learning activities can be used in the classroom to prompt student interaction and participation.

General Objectives

- To investigate the effect of gamification in active classroom learning to enhance science pedagogy in B.Ed. trainees of BBAU

Specific Objectives

- To study the impact of gamification in active classroom learning to enhance pupil teacher's science pedagogy of BBAU
- To find out the impact of gamification in active classroom learning to enhance pupil teacher's Science Pedagogy with respect to gender

- To find out the impact of gamification in active classroom learning to enhance pupil teacher's Science Pedagogy with respect to medium of instruction.

Hypothesis

- There will be no significant difference between pretest scores and posttest scores of pupil teachers of Science Pedagogy of BBAU
- There will be no significant difference between pretest scores and posttest scores of pupil teachers of Science Pedagogy of BBAU with respect to Gender
- There will be no significant difference between pretest scores and posttest scores of pupil teachers of Science Pedagogy of BBAU with respect to medium of instruction

Research Method

Single Group Experimental Design

Sample of the Study

Intact group of B.Ed. II Semester (2018-2020) Science Pedagogy students of Babasaheb Bhimrao Ambedkar University, Lucknow will be taken up for Action Research.

Research Tool

- Gamification of Micro Teaching Skill Practice

  All the students will be divided into four groups named as Team A, Team B, Team C, Team D. Each group consists of 10 members.

  Rules:

  1. The game consists of two rounds.
  2. Total 10 questions will be given to each Team
  3. Each member of a Team can participate/present only once. Thus, all the 10 members of the team get one chance each.

  Round 1:

  - **Task:** The team will be asked to present on a given Micro Teaching skill. On successful presentation each team will be given a  star per skill. A **t**otal 5 skills will be given to each team respectively.
  - If any team fails to present a skill properly or unsuccessful then no stars will be given for that skill and the question is not passed to other team.

Round 2:

- **Task:** Content will be given and the students have to choose suitable Micro Teaching Skill and give the presentation. On successful presentation each team will be given a ★ star per skill. A total of five topics will be given to each team for presentation

- If any team fails to present a skill properly or unsuccessful then no marks will be given for that skill.

Badge: The team with highest number of points will get a badge

- Gamification of simulated Lesson Practice

  - Task: Every student has to present a simulated lesson of his choice for 15 to 20 minutes. The presentation is presented before all the students
  - Peer Voting: All the students vote the performance of the students as 'yes' or 'no' considering the suitability of the content and the skills used.
  - Stars:

Score	Number of Stars
Less than 50%	★
50% to 80%	★★
More than 80%	★★★

- Gamified Quiz on Methods of Teaching Science

An online quiz will be given to students on Methods of Teaching Science. The quiz consists of 10 questions. Each question carries one mark each.

Score	Number of Stars
0-3	★
3-5	★★
5-6	★★★
7-8	★★★★
9-10	★★★★★

Individual: A student with highest number of stars

Team: The Team with highest number of stars

- Achievement Test in Science Pedagogy

Statistical Techniques for Data Collection

- Descriptive Statistics: Mean, SD
- Inferential Statistics: 't' test

Procedural Steps and Plan of the Study (Tentative)

Pretest	11-03-2019
Micro Teaching Concept	12-03-2019 to 15 - 03 – 2019
Micro Teaching Skill Practice (Game Based Environment)	18-03-2019 to 19-03-2019
Methods of Teaching Physical Science	25-03-2019 to 27-03-2019
Simulated Lesson Plan Concept	28-03-2019 to 29-03-2019
Simulated Lesson Practice (Game Based Environment)	01-04-2019 to 10-04-2019
Quiz on Methods of Teaching	11-04-2019
Post test	12-04-2019
Data Analysis and Report Writing	13-04-2019 to 22-04-2018
Final Draft	23-04-2018 to 26-04-2018

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7. Improving Skills of Writing Balanced Chemical Equations of Class IX Students of Seventh Day Adventist High School at Lucknow

Dr. Dipita Bhattacharya
Project Consultant, NIEPA

Introduction

Researcher experiences as a Chemistry Teacher, found that most of the students in class IX have problems in writing balanced chemical equations. Furthermore, students were not able to solve problems based on the chemical equations. On further investigation and discussion with individual students it was found that some students lack the knowledge of chemical symbols, concept of valency. Others students have problem in framing chemical formula using chemical symbols and valency. Thus, the students were not able to write balanced equations and problems based on chemical equations. The balanced chemical equation in the domain of chemistry reflects consistency with the law of conservation of matter, permits quantitative examinations of the relationships between reactants and products in an equation and is at the heart of chemistry. The ability to correctly balance chemical equations is a fundamental requirement of any chemistry curriculum **(Grimes, 2002)**.

Need of the study

Ugvu (2014) quoted **Ausubel (1968)** who laid the basis for understanding how meaningful learning can occur in terms of the importance of being able to link new knowledge on the network of concepts, which already exist in the learner's mind. Concepts develop no new ideas are linked together and the learner does not always correctly make such links. This may well lead to misconceptions. Conception or pieces of intellectual thought either reinforce each other or act as barrier for further learning. Gagne (n.d.) suggests that learning tasks for intellectual skills can be organized in a hierarchy according to complexity: stimulus recognition, response generation, procedure following, use of terminology, discriminations, concept formation, rule application, and problem solving. The primary significance of the hierarchy is to identify prerequisites that should be completed to facilitate learning at each level. Prerequisites are identified by doing a task analysis of a learning/training task. Learning hierarchies provide a basis for the sequencing of instruction. Thus, it is important for learners to acquire skill of balanced chemical equations to attain the different concept of chemistry in hierarchical order.

Martinez & Torregrosa (2014) emphasized that the human drive for improvement, the attitude, the willingness to contribute, and the desire to help solve problems is at least as important as having the right tools. Therefore, investment in education is also an essential component of any attempt to build a better and more sustainable future, as education interconnects the human desire to help with the science that creates solutions. Therefore, as a Chemistry teacher, developing skill of writing balanced chemical equation among students has

great importance and is one of necessary step to enhance student's achievement in Chemistry. Thus, as a practitioner, improving students' skill of writing balanced chemical equations should be of prime importance and related study to be undertaken.

Definition of Key Terms

Writing Skill: Writing skills is the ability of an individual to put their ideas, feelings etc. on paper in an organized and logical manner. In this study the writing skills is limited to writing balanced chemical equation.

Balanced Chemical Equations: A chemical equation that represents, using symbols and formulas, the identities and relative amounts of the reactants and products in a chemical reaction where number of atoms of an element in reactants is equal to number of atoms of an element in the reaction's product. In this study, the balanced chemical equation related to following chemical reaction will be considered:

1. Synthesis reaction
2. Decomposition Reaction
3. Single displacement reaction
4. Double displacement reaction
5. Combustion reaction.

Review of Related Research and literature

The related literature of the study was done and categorized under following head:

a. Related to difficulties in balancing chemical equations.
b. Related to methods for improving skills of writing balanced equations

Ugvu (2014) carried out a cross sectional developmental survey to analyze and classify the students' learning difficulties in the writing and balancing of chemical equation. The findings of the study revealed that student have difficulty in writing and balancing of chemical equation at the various class levels of senior secondary school due to lack of knowledge of valency of atoms in the formula of compounds reacting, correct formula of compounds, poor knowledge of rules guiding the balancing of equation etc. **Geleta (2014)** conducted action research intended to improve students' abilities to write chemical symbols and formulas correctly while studying Chemistry in the college. It was observed in the study that after intervention and student long practice, student could symbolize elements and write formulas of compounds and creditable improvement was observed in posttest. **Naah (2012)** in a study identified students' misconceptions in writing balanced chemical equations for dissolving ionic compounds in water and using multiple choice questions at the symbolic and particulate levels to confront these misconceptions. The study provided a list of common students' misconceptions along with discussing the possible sources of these misconceptions and suggesting instructional interventions that will help dispel some of these misconceptions.

Charnock (2016) conducted a study to determine the most effective method to teach the skill set needed to perform the task of chemical reaction balancing in the secondary education setting as measured by performance on a teacher-made summative assessment. The results clearly indicated that the algebraic approach to balancing both simple and advance chemical reactions typically encountered in the secondary chemistry classroom is superior to that of the inspection method. **Bilek, Nodzynska, Putala, Piekarczyk (2018)** examined whether using computer simulations can help younger children to balance chemical equations before they start to learn chemistry by using the psychological theory of transfer. The obtained results proved that the balancing of simple chemical equation was mastered by over 50 percent of the children. **Chamundeswari & Meera Bai (2014)** in their study envisaged learning and understanding of chemical equations among students through simple teaching methods. The results of the statistical analyses showed a significant difference between experimental and control group students pertaining to academic achievement in Chemistry. The gain scores of students in experimental group pertaining to academic achievement in Chemistry were found to be significantly higher than the students in control group.

It can be concluded that students face different types of barriers in writing balanced chemical reactions and various types of teaching methods can be used to remediate the problems of writing balanced chemical equations.

Objectives of the study: The objectives of the study are as follows:

1. To find out students' difficulties in writing balanced chemical equations.
2. To find out the difference in pre & post diagnostic test mean score.

Concomitant Objective: The concomitant objectives of the study:

1. To construct interview schedule and observation schedule.
2. To prepare activity-based lesson plan.
3. To construct pre & post diagnostic test for assessing students' ability to write balanced chemical equations.

Hypothesis of the study

H1: There will be difference in the mean score of pre & post diagnostic test

Research Design

Research Method

This study follows qualitative and quantitative research approach to examine the research questions. It is qualitative in approach since data gathered will be in the form of verbal and symbolic behavior. Those data will indicate what people have said in their own words about their experiences, opinions, feelings, knowledge in natural settings. It is quantitative since data will be collected through the administration of diagnostic test on the sample.

The study is quasi experimental design where the intact group will be taken without any control group. This design has been chosen as in this study treatment will be given for writing balanced chemical equation similar to the case of experiment but will lack inclusion of control group, random assignment of participants and there will be pre-existing factors such as intelligence, home background, parental education etc. which cannot be manipulated.

Sample

Sample of the study is Class IX Students of Seventh Day Adventist High School at Lucknow. The sample is selected purposefully to solve the specific problems of the student's understanding.

Tools for data collection

Following tools will be used to conduct the study:

a. Interview Schedule: The researcher will make an interview schedule to know about students' difficulties in writing balanced chemical equations.
b. Observation Schedule: The researcher will make an observation schedule to know about students' difficulties in writing balanced chemical equations.
c. Diagnostic Test: The researcher will construct a diagnostic test containing variety of items focusing on synthesis reaction, decomposition reaction, single displacement reaction, double displacement reaction and combustion reaction. It will not only assess the ability of students in writing balanced chemical equation but also help in identifying the areas where students are going wrong or lagging behind in relation to the area of study.

Statistical techniques for data analysis

The quantitative data obtained will be analyzed through descriptive statistics such as mean, standard deviation and through inferential statistics such as t test and ANCOVA. The qualitative data will be analyzed through content analysis.

Procedural steps for conducting research

The study will be conducted through following steps

a. Phase I- Construction of Diagnostic Test and interview schedule
b. Phase II- Administration of diagnostic test to assess difficulties in writing balanced chemical equations. This will be done through observing exam paper, analysis of diagnostic test and interviewing students regarding their difficulties.
c. Phase III- Researcher will prepare activity-based lesson plan to deal with the academic problems related to writing balanced chemical equations.
d. Phase IV- Researcher will implement the implement the activity-based lesson plans.
e. Phase V- Administration of Diagnostic Test
f. Phase VI- Analysis of Pre-Post Diagnostic Test

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8. Improving the Understanding of Concepts at Higher Level through Cooperative Learning Groups among Class IX Students

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1: Introduction

Cooperative learning is a form of active learning where students work together to perform specific tasks in a small group. Each cooperative learning group should be carefully selected by the teacher so that a heterogeneous structure allows each student to bring his or her strengths to the group effort. The teacher then gives the students an assignment, often helping them to divvy up the work that needs to be done so that each individual in the group has a certain role to play. The end goal can only be reached when every member of the group contributes effectively.

According to David Johnson and Roger Johnson (1999), two of the leading authorities in the field, "cooperative learning exists when students work together to accomplish shared learning goals"

1.1 Purpose/Need of the study

Cooperative learning is a successful teaching strategy in which small teams, each with students of different levels of ability, use a variety of learning activities to improve their understanding of a subject. Each member of a team is responsible not only for learning what is taught but also for helping teammates learn, thus creating an atmosphere of achievement.

It improves academic achievement, improved behavior and attendance of students, increased self-confidence and motivation, and increased liking of school and classmates. Cooperative learning is also relatively easy to implement and is inexpensive.

1.2 Explanation of Terms

Cooperative Learning - Cooperative learning is an educational approach which aims to organize classroom activities into academic and social learning experiences. There is much more to co-operative learning than merely arranging students into groups, and it has been described as "structuring positive interdependence."

Cooperative Learning Groups - Cooperative Learning, sometimes called small-group learning is an instructional strategy in which small groups of students work together on a

common task. Individual and group accountability: Each student is responsible for doing their part; the group is accountable for meeting its goal.

1.3 Review of Related Research and Literature on the Study Topic

The review of related literature is an important component of the research process. The review of related literature involves the systematic identification, location and analysis of documents containing information related to research problems.

A research work is not meaningful without a thorough analysis of related works. Such related literature should be completed before proceeding with the actual conduct of the study. A Fabularity with the literature in a problem area helps the research to discover what is already known, what others attempted to find out, what method attacks have been promising and what problems remain to be solved.

Research on cooperative learning was scarce before 1970's, however since this date the amount and the quality of research on cooperative learning has greatly accelerated given its great appraisal and positive effects on education.

Numerous studies have stressed the positive effects that cooperative learning has on academic achievement (Jensen et al., 2002; Johnson et al., 1988; Gillies & Ashman, 1996; Rojas-Drummond, Hernandez, Velez, & Villagran, 1998; Ferguson-Patrick, 2007) and social interaction (Jordan & Le Métais,1997; Vasileiadou, 2009; Choi, Johnson, & Johnson, 2011) among other outcomes.

Lawrence Lyman and Harvey Foyle (1991) studied “Teaching Geography Using Cooperative Learning”. Fred John Brandt (1995) studied “The effects of cooperative learning on achievement and self-esteem of high school students with learning disabilities”, Hertzog and Lieble (1996) investigated “A Study of Two Techniques for Teaching Introductory Geography: Traditional Approach versus Cooperative Learning in the University Classroom”. Judith (1996) studied “Effects of Cooperative Learning among Hispanic Students in Elementary Social Studies”, Christine Kim-Eng Lee (1998) studied “Effects of cooperative learning structures on self-esteem and classroom climate in social studies”, Korkmaz (1996) studied “The Impact Of Blended Learning Model On Student Attitudes Towards Geography Course And their Critical Thinking Dispositions And Levels”, Melinda Karnes et. al. (1997) studied “Using Cooperative Learning Strategies to Improve Literacy Skills in Social Studies”, Don (1997) studied “Social skilling through cooperative learning”, Banerjee and Vidyapati (1997) studied “Effect of lecture and cooperative learning strategies on achievement in chemistry in undergraduate classes” Kluge, David. (1999) studied “A Brief Introduction to Cooperative Learning” Johnson and Stanne (2000) studied “Cooperative Learning Methods: A Meta-Analysis” Winston Vaughan (2002) studied “Effects of Cooperative Learning on Achievement and Attitude”. Adeyemi (2003) studied “Effect of Cooperative Learning and Problem Solving on Junior Secondary School Students Achievement in Social Studies” Iqbal (2004) studied

"Effect Of Cooperative Learning On Academic Achievement Of Secondary School Students In Mathematics" Julie Bullard and Bullock (2004) studied "Building relationships through cooperative learning" Linda Wilson-Jones, Marlene Cain Caston (2004) studied "Cooperative learning on academic achievement in elementary African American males" Mentz and Van Der Walt (2008) studied "The effect of incorporating cooperative learning principles in pair programming for student teachers" Thurston et. al. (2010) studied "Cooperative Learning in Science: Follow-up from primary to high school" Huiping Ning (2010) studied "The effectiveness of cooperative learning in teaching English to Chinese tertiary learners" and Huang (2010) investigated "Study Of Teaching Model Based On Cooperative Learning". Howell. (2013) studied "Introducing Cooperative Learning into a Dynamics Lecture Class". Co-operative learning has become such a widely used instructional procedure in all educational contexts that it is even difficult to find instructional material that does not refer to this methodology (Johnson, Johnson & Stanne, 2000). As of 2018 more than 1,200 research studies had been conducted on cooperative learning, and a significant amount of those studies focused on the effects of cooperative learning on achievement in comparisons to more traditional, individualistic or competitive instructional methods (Johnson & Johnson, 2009).

However, even though a vast amount of studies have corroborated the positive effects of cooperative interventions, there have also been studies (Galton, Simon & Croll, 1980; Baines, Blatchford, & Kutnick, 2003; Veenman, Van Benthum, Bootsma, Van Dieren, & Van der Kemp, 2002) which have diminished the positive appraisal of cooperative interventions, arguing that pupils often sit in small groups but are rarely assigned to real collaborative tasks.

Individual studies on cooperative learning have provided relevant and sometimes contradictory information about its effectiveness. Petticrew and Roberts (2006) have pointed out that individual studies in a given domain often contradict among each other; consequently, it is better to understand a problem by examining and comparing data from different sources in the same domain.

Literature reviews, systematic reviews, and meta-analysis are research methods that allow researchers to critically appraise the individual contributions of different studies in order to allow a better understanding of a problem. Literature reviews and meta-analysis conducted on cooperative learning have provided relevant information about the effectiveness of different cooperative learning methods (Johnson, Johnson, & Stanne, 2000), the effects of cooperative learning on the academic achievement of students with learning disabilities (Nyman & Fuchs, 2002), the effects of cooperative learning on achievement in comparison to competitive and individualistic methods (Johnson, Maruyama, Johnson, Nelson, & Skon, 1981), and the effects of cooperative learning on specific subjects in higher education (Bowen, 2000).

These reviews and literature on Effects of cooperative learning on academic achievement of secondary students, a systematic review have appraised the individual contributions of studies and have increased the knowledge that investigators and educators have about the overall effectiveness of cooperative and collaborative interventions. However, despite their relevance,

no literature or systematic reviews that exclusively analyze about improving the understanding of concepts at higher level through cooperative learning groups among class IX students. The absence of reviews triggers questions about the effectiveness of cooperative learning on secondary education, where students may or may not have developed group-work skills. Consequently, in an attempt to provide some explanations on this topic, the present research will find the effect of cooperative learning how it will helpful to improve the understanding of concepts at higher level among IX class students.

There is prime need to conduct studies so as to explore the usefulness of various kinds of cooperative learning for different subject areas at different levels of education. In fact, secondary level is the most critical level of education requiring modern methods to improve its quality.

1.4 Objectives of the Study

To find the effect of cooperative learning and how cooperative learning groups will helpful to improve the understanding of concepts at higher level among class IX students. The objectives of the study are as follows:

I. To teach the experimental group through cooperative learning and control group through traditional teaching methodology without cooperative learning.
II. To measure the achievement of experimental and control group after the experiment.
III. To compare the performance of the experimental group with control group.

1.5 Hypotheses of the study

Hypothesis is a tentative statement about the solution about a problem. It is the key to find out the solution of a problem that is to be verified. It is the base for planning and action in research to find out the truths. It gives direction to researcher, so it is called the heart of study.

Before starting a real study, related to research, the researcher makes an assumption called as hypothesis. Without hypothesis, an investigation is relatively aimless search. Hypothesis is particularly necessary in the search for the cause and effect relationship to help the researcher to collect the specific data without wasting the time and resource.

Following will be the null hypotheses for the present study:

1) There is no significant difference between mean pretest scores and mean posttest scores of the experimental group.

2) There is no significant difference between mean pretest scores and mean posttest scores of the control group.

3) There is no significant difference between the mean achievement scores of the control group on posttest and mean achievement scores of the experimental group on posttest.

1.6 Limitations of Study

1. The study is delimited to class ix students of Social Science Subject.

2. The study will be conducted in only one Kendriya Vidyalaya, so this will be the limitations of the study.

II: Research Design

2.1 Research Method

Random sampling technique will be used to select the sample of the study. The students of class 9^{th} in Kendriya Vidyalaya Viramgam will be taken as sample. Sample size will be 40 students. Majority of students will be from middle class background.

2.2 Tools for data collection

In order to measure the achievement of the sample students before and after the study, an achievement test will be designed. It will consist of 30 items. Test items will include matching and multiple choices. Thirty percent items will be related to the previous knowledge of the students in the subject. However, 70% items will be related to the content to be taught during the study. The total marks allocated to the test will be 30 and time duration will be 30 minutes. The test after its construction will be shown to the subject specialist for its content validation and expert opinion for its improvement. After the approval with certain modification like change of place of right answer from its earlier position, the instrument will be used for measurement purpose.

2.3 Material

The material used in the study consisted of five lesson plans, five work sheets and five quizzes. The material as mentioned above will be prepared in the light of literature available on cooperative learning.

2.4 Statistical Techniques for Data Analysis

The design of the study will be pretest posttest control group design, which is true experiment design. This design will be selected because it controls many variables inflecting its external and internal validity.

2.5 Procedural Steps for conducting Action – Research

The following procedure will be adopted for experimentation and data collection:

Researcher will find out the chapter which is continuing by the teacher in class in the subject Social Science. On the same day, the marks obtained by the sample students in there recently held examination will be obtained from the exam department. The pretest will be administered to the sample during their class period of Social Science. The test will be unclear and student will not be aware about it before hand. Before the test administration the students will be told that the test will be taken to see how far they understood the content of Social Science. They will be ensured that the test results will nothing to do with their promotion or school examination. The pretest results will be preserved for data analysis from the total strength of sample students who will 40 in numbers, 20 students will be assigned control group while the same strength of students will be assigned to experimental group. Both groups will almost equal in their understanding of Social Science; they will randomly name as experimental group and control group. The experiment will start from the following day onwards. The experimental group will be taught in the actual classroom, especially arranged for them. Experimental group will be taught through cooperative learning by researcher and the control group will be taught by Social Science teacher of the same class. After delivering the first lesson, the experimental group of 20 students will be divided in to five cooperative groups with each group consisting of four members.

The grouping will be done on the basis of jig saw method. The next day researcher will formulate two copies of work sheet which will be given to each group and students will be instructed and encouraged to help each other and learn from each other. In completing the work sheet after engaging the students, each group will give the answer sheet so that they know whether they answered the question on the work sheet correctly. The completed worksheets along with answer sheets will be collected from groups at the end of period.

10 items quiz administered to the experimental group on the following day during the Social Science period. The subjects will be individually tested which will insured by seating them at a distance from one other. The papers will be scored the same day and result will be announced in the class before starting the lesson.

The subjects will be informed about their individual marks as well as the group marks. The group scores will be calculated by converting obtained marks of each student into percentages. The process of calculating the group score will done strictly according to the scheme given by Slavin (1995). The same procedure as given above will be used for the remaining lessons till the completion of experimental treatment. On the last day the posttest will be administered to both experimental group and control group in the same room and the same time where pretest will be held, the posttest will be scored in order to obtain the posttest scores of each subject of experimental group and control group.

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9. Effectiveness of Language Games on Improving English Vocabulary among VI Standard Students in Indira Gandhi High School, Peth Vadgaon, Kolhapur

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1. Introduction

English is an abstract subject which needs continuous practice and comprehensive work to understand. As it is known that, "English is the key to the storehouse of the knowledge." English language is necessary in our Indian schools as well as day to day life.

English language is the lingua franca of the world. In our multilingual country English language is the official language and unifying power both of the center and at the state English continues to be important as a source language since almost all the advanced knowledge as well as information is available in English and so is a treasure of literature. Much of our inter-state communication is through English, so it is realized that English is indispensable in today's computerized world for Education, Commerce, Science and Technology, etc. But in the present context computer and internet bring the world together. So, there is a need to learn this language. Even in China and Japan people have started learning English.

English as a subject is very easy to understand but very difficult to practice in day to day life with correct grammatical pronunciation. So, an alternative method of teaching English is through various games, which is innovative for teaching and learning English. Here the matter to be presented will be given to the student in the form of various games and the learner will go on learning with interestingly and there will be every scope for self-improvement. Such techniques are gaining greater popularity among the initial learners.

Learning English through Games

Learning English through games is an effective and interesting way that can be applied in any classrooms. Games are used not only for fun merely, but more importantly for the useful practice and review of language lessons to improve learners; communicative competence. When a game is to be conducted, the factors such as number of students, proficiency level, timing, learning topic and the classroom settings should be considered.

Advantages of Language Games

1. Learners are motivated to learn the language when they are in a game.
2. Games are student focused activities requiring active involvement of learners.
3. Learners are encouraged to take active role in their learning process.

4. By using games, teachers can create contexts which enable unconscious learning because learner's attention is on the message, not on the language.
5. Games bring real life situations to the confinement of the classroom which provides learners with an opportunity to use the language.

McCallum (1980) explains that there are many advantages of games such as the fact that they:

1. Focus student's attention on specific structures, grammatical patterns and vocabulary items.
2. Can function as reinforcement, review and enrichment.
3. Involve equal participation from both slow and fast learners.
4. Contribute to an atmosphere of healthy competition, providing an outlet for the creative use of natural language in non- stressful situation.
5. Can be used in any language teaching situations and with all skills areas (reading, writing, speaking or listening).
6. Provide immediate feedback for the learner.

2. Reviews of Related Literature and Researches

A. Reviews of Related Literature

R. Maghanathan (August, 2001) had written article 'Developing Language Skills through Newspapers.' He said that in normal school exams The Maxim 'pen is mightier than the Sword' reflected the power of the fourth Estate. English newspapers, can be used by the teacher as an effective tool to develop the language skills of listening, speaking, reading and writing (LSRW) by viewing different forms of news reporting report writing the teacher can ask a child to read a new report louder. The teacher can ask the student to write another report giving an input question. Weather report all newspapers publish weather report of the day or the day before. It can be used by geography teacher report. Generally, student is interested in sports and games. If not playing, at least talking about it helps the learners makes the report attractive. This could be an effective way to make the learner develop writing skill.

Aarti Chandola (August, 2002) had written the article, 'Developing oral communication skills.' He said that the main objective of teaching any language at school level is to develop in the 5 student four. Fundamental skill of listening, speaking, reading and writing of these the one most often neglected in our classrooms is the development of oral skills Activity 1: Guessing Game. Use of such words would enable the student to easily speak about the things written or drawn on the blackboard, thereby ensuring that most students are able to participate in the activity. Activity-2 Interviews. In this activity every time the set of questions to be asked should be changed so that all the students get a chance to speak and the activity does not become monotonous. Otherwise, the students would lose their interest. They will not actively participate and this will defeat the very purpose of the activity.

Meera Balachandran (August, 2002) had written the article, 'Diary writing for Effective Teaching.' He said that in most schools, diary writing is a task taken with a great deal of

seriousness. Record of work done and of work to be undertaken is maintained in conformity with patterns laid down by the concerned institutions. Diary writing here are a few suggestions for making our diary a special venture: our diary is a planner: Teacher could view her work at school as an integrated whale; our diary should record deviations from the original plan to the lesson: it then becomes a learning tool for a younger teacher and for us in future. Our diary should reflect the reading done on the topic to be taught: the advent of the Internet makes it easier for the teacher tub keep herself abreast of the latest happening, what better place to record it than her diary? Record of spy Attempts made for the bright and the weak students is indicative of a teacher who cares.

Meenakshi Sagar Mehta (August, 2002) had written the article, 'Word Games to judge 'Spelling' Competencies'. He said that the word games method of teaching and learning gives us, the teachers, sufficient scope for modification and experimentation. The little changes can make learning an interesting experience for the pupils at primary level. Teach through activities help the target group to learn faster and also has a higher retention level. This holds true in case of all the competencies of a language, especially spellings. These puzzles encourage the pupils to apply their brain to correct spelling once they have found answer to the puzzle, their sense of achievement gives them confidence and they tend to learn faster. Such activities very useful in finding out the actual level of achievement in spelling competency by pupils.

LI Charan (August, 2002) had written the article, 'Making English Language Accessible.' He said that teachers of English are often required to evolve innovative methodologies to teach 6 English as a language and to take care of the difficulties and errors committed by students in the class. I as a teacher, use the following innovative, yet simple methods, while teaching language to my student. Activity-1 Being the stepping stone in spoken and written English phonetics deserves special emphasis. Teacher should be very careful, for correct spelling pronunciation drill is very essential. Activity-2 once the students were comfortable with L. S. R. W. skill exercises to develop their answers in writing was taken up. Activity-3 Making Grammar lively and interesting. This way they come to know different adjectives. They enjoy learning. Activity-4 Words with different Meanings or spellings. The main thrust of an English teacher should be at main making the student learn English without feeling any burden on their minds.

Nguyen, Huyen and Khuat, Nga (2003) wrote the article on Learning Vocabulary through Games. They described as 'Games have been shown to have advantages and effectiveness in learning vocabulary in various ways. First, games bring in relaxation and fun for students, thus help them learn and retain new words more easily. Second, games usually involve friendly competition and they keep learners interested. These create the motivation for learners of English to get involved and participate actively in the learning activities. Third, vocabulary games bring real world context into the classroom, and enhance students' use of English in a flexible, communicative way. Therefore, the role of games in teaching and learning vocabulary cannot be denied. However, in order to achieve the most from vocabulary games, it is essential that suitable games are chosen. Whenever a game is to be conducted, the number of students, proficiency level, cultural context, timing, learning topic, and the classroom settings are factors

that should be taken into account. In conclusion, learning vocabulary through games is one effective and interesting way that can be applied in any classrooms. The results of this research suggest that games are used not only for mere fun, but more importantly, for the useful practice and review of language lessons, thus leading toward the goal of improving learners' communicative competence.

B. Reviews of Related Researches

Ghatage, B. S. (2010) has worked on 'Making Teaching English more communicative at primary level – A study.' for his Ph.D. thesis. The objectives of the study were: 1.To analyzes the English text- book of VI standard according to the views of expert essential for improving student's communication skills. 2. To observe the classroom teaching to find level of acquisition of language components essential for Teaching English communication skill to VI standard students. The findings of study were: 1. Only 1 (6.66%) teachers showed accurate time management in the classroom. 2. All teachers used bilingual method but 2 (13.13%) teachers showed high level acquisition in using bilingual method. 3. 2 (13.13%) teachers didn't use good quality picture and drawings only 1 (6.66%) teachers used good quality picture and drawings.

Iin Suryani (2010) had found that Improving Students' Vocabulary Using Card Game (An Action Research at the Fifth Year of SD Negeri Sedayu I Slogohimo). to improve the vocabulary mastery of the students is the main objective of the study. To describe the process of improving vocabulary mastery for needed students in SD N I Slogohimo Wonogiri specially using cards, and to know whether teaching vocabulary using cards improve the students' vocabulary mastery or not are the specific objectives of the study. The researcher found that there is significant improvement of student's vocabulary through using card games.

Sharma, R. (2011) has worked on 'Designing and Experimenting of English Instructional Materials for Facilitating Constructivist learning' for his Ph.D. thesis. The objectives of the study 1.To develop criteria for a framework for developing Instructional Materials for Facilitating Constructivist learning. 2. To design Instructional Materials for class VIII level within the developed framework in the light of selected objectives of teaching English as lay down by central board of secondary Education. 3. To experiment the developed Instructional Material on selected sample. The findings of study were: 1. Mean achievement of the students exposed to constructive learning is differed significantly higher than mean achievement of the students taught through traditional method. 2. IT implies that constructivist learning has a significant impact on the achievement of class VIII students in English.

Srinivasa, K. S. (2011) made an investigation into "Effect of language games in Teaching English among Elementary students with reference to their achievement in English." had the following objectives 1. To find out the difference between Experimental and controlled group in the pre- test scores of children studying in standard four. 2. To find out the difference between Experimental and controlled group in the post- test scores of children studying in standard four. 3. To find out the difference between the pre- test scores and post test scores of

Experimental and controlled groups of children studying in standard four.4. To find out there is no significant difference between pre- test and post test scores of controlled groups of children studying in standard four. The findings of the study were as follows: 1. language games have positive effect on the achievement in English among pupils of standard four. 2. Language games is significantly more effective than traditional method on Achievement in English among children of standard four. 3. Language games have equal effect on achievement in English among Boys and girls.

Nur Hidayat (2016) studied the subject as Improving Students' Vocabulary Achievement through Word Game. This paper is based on a study on students' vocabulary of grade seven in junior high school using word game. This study is conducted based on the preliminary study which indicated that the students faced difficulties in learning English because of the lack of vocabulary. The subjects were 38 students who consisted of 28 male, and 10 female students at seven grades of one of junior high schools in Gresik. The purpose of this study is to improve students' vocabulary achievement through word game. The data were collected by interview, observation, questionnaires and test. The data were analyzed by using triangulation. The research design of this study was Classroom Action Research (CAR) which consists of four steps: planning, acting, observing and reflecting. The results of this study show that word game could help students to memorize the vocabulary items easily, motivate students, and make them more interested in learning vocabulary.

Sondang Manik, May Christiani (2016) were studied Teaching Vocabulary Using Matching Word on Computer Assisted, Language Learning. Matching word on computer assisted language learning, was applied to improve the students' vocabulary mastery. This is a class action research, Students' score of the test is analyzed, the score of pre test, post test of cycles. The last test of cycle II was improved than the test of cycle I and also improved than the orientation test. In the last test of cycle II from 36 students, there were 22 students who got the score ≥ 75 point up and the mean was 78,72 and percentage 61,11%. In the test cycle I, there were 6 students who got the score ≥ 75 point up and the means was 70,91 and percentage 16,66%. While in the orientation test, there were only 3 students who got ≥ 75 point up and the mean was 60, 11 and percentage 8.33%. Based on the result of quantitative and qualitative data, it 9 was found that uses matching word in computer significantly improved students' vocabulary mastery.

Yee Bee Choo, and Harzuwani binti Wahab (2016) were studied An Action Research of Using Vocabulary Wheel to Improve Year 2 Pupils' Vocabulary in the Malaysian Classroom. This research was conducted to find out whether or not the use of Vocabulary Wheel could help to improve pupils' vocabulary. The data for the study were obtained from four pupils of a primary school in Johor. These pupils were targeted due to their low level of proficiency in English language. Vocabulary Wheel was used as the strategy as the pupils were lack of vocabulary thus affecting their language learning. This is an action research and three data gathering methods such as pupils' work, teacher's reflective journal and interview were used. The findings of this study proved that the use of Vocabulary Wheel helped to improve

the pupils' vocabulary as the pupils were able to remember the words longer and know how to use them in the right context. It also helped to encourage their participation and promote their interest. This study proposes the suggestion of using ICT to improve the implementation of the strategy.

Above review of literature and researches were helpful for identifying, describing and stating the research problem. These reviews were helpful for preparing plan and procedure of the research and provide clearly directions of preparation of all aspects of research proposal.

3. Statement of the Problem

Effectiveness of language games on improving English Vocabulary among VI Standard Students in Indira Gandhi High School, Peth Vadgaon, Kolhapur

4. Definition of the Terms

1. Effectiveness

A. Conceptual Definition

Adequate to accomplish a purpose; producing the intended or expected result.

- http://dictionary.reference.com/browse/effectiveness

B. Operational Definition

The term effectiveness will be considered here as producing a desired result of VI standard students in Indira Gandhi High School, Peth Vadgaon in English vocabulary using various English language games.

2. Language Games

A. Conceptual Definition

Language: A System of communication between humans through written and vocal symbols; speech peculiar an ethnic, national or cultural group.

- New Webster's Dictionary (Deluxe Encyclopedia Edition, 1972).

Game: Game is an amusement of pastime, a diversion in the form of chance, skill, endurance or a combination of these, pursued according to certain rules.

- New Webster's Dictionary (Deluxe Encyclopedia Edition, 1972).

B. Operational Definition

For the purpose of this research language games means games already prepared and used for improving English vocabulary. Vocabulary games, computer games, etc. will be used for VI standard students in Indira Gandhi High School, Peth Vadgaon.

3. Improving English Vocabulary

Operational Definition

English is a third language subject included in 'three language formula' at VI standard curriculum. Through this research, increasing capability of collection and storage of various words such as nouns, verbs, adjectives, emotional words, temporal words, put the words in alphabetical order, words with three syllables, words with prefixes or suffixes, etc. and appropriately used them in learning English subject.

4. VI Standard Students

Operational Definition

Male and female Students studying in VI standard a class which is after V and attached in higher primary level in Indira Gandhi High School, Peth Vadgaon.

5. Objectives of the Action Research

1. To find out the problems faced by VI standard students in using English vocabulary in learning English subject.
2. To find out various language games useful for VI standard students for improving their English vocabulary.
3. To implement various language games on VI standard students for improving their English vocabulary.
4. To study the effectiveness of language games on VI standard students for improving their English vocabulary.

6. Assumptions of the Action Research

1. Language games are used in English teaching and learning process.
2. Students are familiar with various language games in English language.
3. We can motivate the English language learning through the language games.

7. Hypothesis of the Action Research

A. Research Hypothesis

Language games will be effective on improving English vocabulary of VI standard students. ($M1 - M2 \neq 0$)

Action Research Questions

1. Is there any positive effect of using Vocabulary Games on VI standard students learning English?
2. Is there any positive effect of using Computer Games on VI standard students improving English vocabulary?

B. Null Hypothesis

There will be no significant difference between mean score of Pretest (M1) and mean score of Posttest (M2) of VI standard student's performance in English vocabulary using language games. (M1- M2 = 0)

8. Scope of the Action Research

1. This study will be related to VI standard students and their teachers in Indira Gandhi High School, Peth Vadgaon, Dist. Kolhapur.
2. This study will be based on various language games used for improving English vocabulary in VI standard students.

9. Delimitations of the Action Research

1. This study will be limited to Indira Gandhi High School, Peth Vadgaon, Dist. Kolhapur.
2. This study will be limited to VI class.
3. This study will be limited to urban area only.
4. The study will be limited only for the academic year 2019-20.

10. Need of the Action Research

Now a day various teaching and learning activities and innovations came in education. Learning English through games is an effective and interesting way that can be applied in any classrooms. Games are used not only for fun merely, but more importantly for the useful practice and review of language lessons to improve learners. English vocabulary of VI standard students in of Indira Gandhi High school is very poor. All students came in poor economic background and they have no proper guidance in school as well as their home. They faced problems in learning English. So that there is an urgent need to improve their vocabulary. This specific purpose the researcher has chosen this subject.

11. Significance of the Action Research

The study is useful for understanding the new techniques/ methods of learning English through games. E.g. Vocabulary games, Computer games for language learning. It is significant for enrichment of English vocabulary in students. The results of the study should be useful for the

teachers as they also came to know the importance of language games. They can encourage students to participate in language games while conversation in English language.

12. Plan and Procedure of Action Research

A. Research Method

The present study will involve utilization of Experimental Method.

B. Research Design

In this present study following research design will be used:

O1 X O2

(Pre-Test- Post Test Single Group Design)

C. Sampling Design

Samples will be chosen by Purposive sampling in the non-probability method.

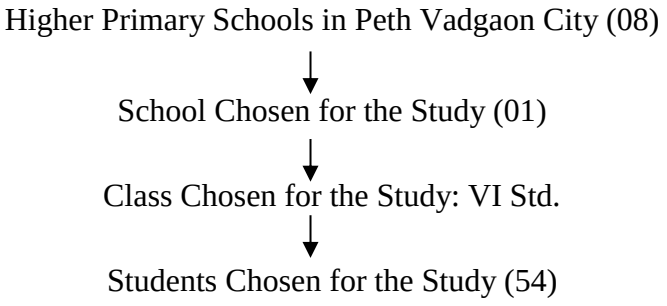

Figure No. 1: Sampling Design

D. Research Tools and Statistical Techniques

Table No. 1: Research Tools and Statistical Techniques

Sr. No.	Objectives of the Research	Research Tools	Respondent	Nature of the Tool	Statistical Techniques
1.	To find out the problems faced by VI standard students in using English vocabulary in learning English subject.	Classroom Observation	Teachers	Researcher Made	Percentage

2.	To find out various language games useful for VI standard students for improving their English vocabulary.	Check List	Experts	Researcher Made	Percentage
3.	To study the effectiveness of language games on VI standard students for improving their English vocabulary.	Achievement Test (Pre Test-Post Test)	VI Std. Students	Researcher Made	Mean, SD, Pearson 'r' ' t' test

10. अंग्रेजी माध्यम के शिक्षार्थियों की हिन्दी लेखन में होने वाली अनुशुद्धियों dk gy djukA

Mk- fl)kFk 'kDyk

leL;k dk Li"Vhdj.k

छात्रों को हिन्दी भाषा में शुद्ध लेखन संबंधित कार्य में कठिनाई होती है। वे लेखन के द्वारा अपने विचारों की अभिव्यक्ति को शुद्ध नहीं लिख पाते हैं। जिससे लेखन को पढने में कठिनाई होती है। इस कठिनाई का अध्ययन कर इसे दूर करने हेतु इस (।बजपवद त्मेमंतबी) क्रियात्मक अनुसंधान का प्रस्ताव किया गया है।

उददे्श्यः

- छात्रों में हिंदी भाषा के कौशलों का विकास करना।
- छात्रों में हिंदी भाषा के वर्णों एवं मात्राओं का ज्ञान कराना।
- छात्रों में हिंदी वर्णमाला को पहचाने की क्षमता का विकास करना।
- छात्रों को हिंदी शुद्ध लेखन लिखने में हो रही कठिनाओं को हल कराना।

Lkhekdu

भोपाल जिले में एक अंग्रेजी माध्यम का विद्यालय। कक्षा 4 के 50 छात्रों तक यह अनुसंधान सीमित है।

lHkkfor dkj.k प्रस्तुत समस्या के संभावित कारण निम्नलिखित हैंः

क्रमांक	संभावित कारण	साक्ष्य ;म्अपकमदबमेद्ध	तथ्य/अनुमान	नियंत्रण
1.	हिंदी भाषा कौशल का विकास न होना।	हिन्दी भाषा के कुछ चुने हुए शब्दों को लिखवाकर अवलोकन करना।	तथ्य	शिक्षक
2.	हिंदी के वर्णों एवं मात्राओं के ज्ञान का अभाव	सभी छात्रों को हिंदी के वर्णों एवं मात्राओं को लिखवाकर जांच करना	तथ्य	‘शिक्षक

3.	हिंदी वर्णमाला पहचाने की क्षमता का अभाव	हिन्दी वर्णों को लिखवाकर अवलोकन करना	तथ्य	शिक्षक

iem[k dkj.k% छात्रों को हिंदी भाषा के वर्णों, मात्राओं एवं वर्णमाला को पहचानने का पर्याप्त अभ्यास नहीं कराना।

ifjdYiuk% छात्रों को हिंदी भाषा के वर्णों, मात्राओं एवं वर्णमाला को शुद्ध–शुद्ध लिखने, बोलने व उचित ढंग से अभ्यास कराने से शुद्ध लेखन में सुधार किया जा सकता है।

dk;Z ;kstuk %

क्रमांक	क्रियाकलाप	उपकरण	प्रक्रिया	अवधि
1.	पूर्व परीक्षण		कक्षा 4 के हिंदी भाषा के छात्रों द्वारा लिखे गए लेखन का परीक्षण कर उनकी कमियों का पता लगाना	3 दिन
	पूर्व परीक्षण के आधार पर यह पाया गया कि बच्चों में हिंदी भाषा के मात्राओं एवं वर्णों को पहचानने की क्षमता का अभाव है।			
2.	हिंदी भाषा के वर्णों को पहचानने का अभ्यास कराना	क, ख, ग, घ, ड., च. .....आदि)	श्यामपटट् पर हिंदी भाषा के मात्राओं एवं वर्णों को लिखकर एवं उच्चारण कर लिखने व पहचानने का पर्याप्त अभ्यास कराना।	10 दिन
3.	हिंदी शब्द लिखने का अभ्यास कराना	चित्र क़मल त्रकमल, खऱगोशत्रखरगोश ग़मलात्र गमला, चऱखा त्र चरखा, मऱहल त्र महल ....इत्यादि)	हिंदी वर्णों को मिलाकर शब्द लिखने व बोलने का अभ्यास कराना	15 दिन
4.	हिंदी भाषा के शुद्ध लेखन की विधि बताना		छात्रों को हिंदी में लेखन की विधि बताकर पर्याप्त अभ्यास कराना।	5 दिन
5.	अंतिम परीक्षण		किसी कहानी/कविता/ गीत आदि के बारे में हिंदी भाषा में लेख लिखवाना एवं वाक्य बनवाकर परीक्षण करना।	1 दिन

eY;kdu% बच्चों को हिन्दी भाषा में लेख लिखवाना, जिस पर लेखन का अभ्यास नहीं कराया गया हो। लिखे गए लेखन की भाषा, शैली और विषयवस्तु का मूल्यांकन पूर्व परीक्षण एवं अंतिम परीक्षण से तुलना करना।

fu"d"kZ% पूर्व परीक्षण एवं अंतिम परीक्षण के आधार पर निष्कर्ष निकलता है कि बच्चों को पहले मात्राओं एवं वर्णों को पहचानना, अर्थपूर्ण शब्द व वाक्य बनाना आदि की समक्ष विकसित करना। फिर बच्चों द्वारा छोटे–छोटे वाक्य स्वयं लिखने व उनको प्रोत्साहित करने से हिन्दी लेखन में होने वाली अनुशुद्धियों को दूर किया जा सकता है।

l{kko%

1. छात्रों को हिन्दी भाषा के मात्राओं एवं वर्णों को पहचानने की समझ विकसित करवाना।
2. हिन्दी भाषा के मात्राओं एवं वर्णों को मिलाकर वाक्य बनाने का पर्याप्त अभ्यास करवाना।
3. छात्रों को हिन्दी भाषा स्वयं लिखने के लिए प्रेरित करना चाहिए।
4. छात्रों की लेखन में केवल कमियाँ बताकर ही हतोत्साहित न करें, वरन उनकी लेखन की सराहना भी करें।
5. बच्चों द्वारा लेखन को अधिक अच्छा बनाने के लिए सुक्षाव देकर सुधार कराऍं।

11. jktdh; आदर्श ikFkfed fo|ky; ykgk?kkV dh d{kk 4 e: v/;;ujr Nk=&Nk=kvk e: x|.ku n{krk dk fodkl djukA

श्री दीपक सोरारी
Lecturer, DIET, Champawat

I: leL;k dh i"BHkfe@ifjp; ¼Background½&

गणित विशय का विद्यालय के साथ साथ दैनिक जीवन में महत्वपूर्ण स्थान है। जिस के कारण इस विशय मे न्यूनतम सम्प्राप्ति स्तर विद्यालय एवं समाज के घातक सिद्ध हो सकता है। गणित विशय में संक्रियाओं (जोड़, घटाना, गुणा, भाग) का वि"ोश महत्व है। जिसमें कु"ालता प्राप्त करने से छात्रों की मानसिक व तार्किक क्षमता का विकास होता है। इससे गणित विशय रूचिकर हो जाता है, और छात्र जटिल गणितीय संबोधों को तनाव रहित रहकर सरलता से समझने लगते है और अपने छोटे छोटे क्रियाकलापों में अनुप्रयोग करते हुए अपने अनुप्रयोगात्मक/कौशलात्मक विकास को मजबूत करते है।

राजकीय आद"ार्ा प्राथमिक विद्यालय लोहाघाट उत्तराखंड राज्य के जनपद चम्पावत के नगर लोहाघाट के मध्य में स्थित है। जिसमें छात्र संख्या 104 (बालक 51 तथा बालिका 53) है। मासिक परीक्षा, NAS/SLAS के परिणामो के अवलोकन मे यह पाया गया कि कक्षा 4 (बालक 08, बालिका 09 कुल 17) के छात्रों का गणित विशय में सम्प्राप्ति स्तर न्यून है। उक्त स्थिति के विश्लेषण यथा अभ्यास पुस्तिका एवं गृहकार्य का अवलोकन करने में यह पाया गया कि छात्रों में गुणन कौ"ालों के विकास हेतु प्रभावी प्रयासों की नितांत आवश्यकता है। विद्यालय में पढ़ने वाले छात्र/छात्राएं नगर से लगे ग्रामीण परिवे"ा से संबंधित है। घर में शैक्षिक वातावरण एवं अभिभावकों से उचित मार्गद"ार्न प्राप्त ना हो पाने के कारण वे न तो गणित में रूचि लेते है न ही दिये गये अभ्यास कार्य को यथासमय पूरा कर पाते है। अतः कक्षा 4 के कुछ छात्र/छात्राओं में गुणन कौ"ाल का पर्याप्त विकास ना

होने से वे गणित विशय में गुणा पर आधारित प्र"ानों से संबंधित इबारती प्र"ानों को हल करने में कठिनाई महसूस कर रहे है।

अध्ययन की आवश्यकता (Purpose/Need of study½–

छात्रों द्वारा गणित विशय में एक अंकीय गुणा के प्र"ानों को तो सही से हल किया जा रहा है, परन्तु दो या दो से अधिक अंको की गुणा करने वे गलतियां जैसे हासिल को जोड़ना सही क्रम में लिखना आदि में

गलतियां कर रहे है। कक्षा स्तर में वृद्धि होने से छात्रों कों बड़े इबारती प्र''नों कों हल करना पड़ता हैं जिसमें 2 या 2 से अधिक अंकीय संख्या के गुणा भाामिल होते है।

अतः बच्चों में इस दक्षता का विकास होना अत्यंत आव''यक है। गुणन कौशलो के ज्ञान से छात्र बड़ी कक्षाओं के गणितीय संबोधों को आसानी से हल कर सकेंगें। छात्रों में गुणन कौ''ाल का समुचित विकास होने से वे गुणन पर आधारित प्र''नों को आसानी से हल कर पायेंगें तथा इससें उनका उपलब्धि स्तर भी बढ़ेगा। इसके अतिरिक्त इससे निम्न लाभ होंगे–

- ❖ छात्र–छात्राओं का एवं विद्यालय के भौक्षिक उपलब्धि स्तर में वृद्धि होगी।
- ❖ क्रियात्मक भाोध अध्यापक की क्षमता संवर्धन में सहायक होगा।
- ❖ छात्रों एवं अध्यापकों का गणितीयकरण अर्थात उनकी तर्क एवं चिंतन शक्ति का विकास होगा।

lcf/kr 'kks/k ,oa lkfgR; dk v/;;u&

- ❖ एन0सी0ई0आर0टी की कक्षा 4 की गणित विषय की पुस्तकें
- ❖ एन0सी0एफ0 2005 का गणित आधार पत्रक
- ❖ एकलव्य, दिगंतर प्रकाशन की गणित गतिविधि आधारित पुस्तकें
- ❖ ई–पाठशाला
- ❖ सम्पर्क फाउन्डेशन की किट एवं मैन्यूअल

अध्ययन के उद्देश्य–

1. छात्र दो तथा तीन अंक के हासिल वाली गुणन प्रक्रिया को समझकर गुणा के सामान्य प्र''न हल कर सकेंगे।
2. छात्र दो तथा तीन अंक के हासिल वाली गुणन प्रक्रिया को समझकर उससे संबंधित इबारती/व्यवहारिक प्र''नो को हल कर सकेंगे।
3. इस योजना से विद्यालय के गणित विशय में संप्राप्ति स्तर में वृद्वि हो सकेगी।

v/;;u dh fy, ifjdYiuk,a&

परिकल्पना के निर्माण हेतु समस्या के कारणों का विश्लेशण किया जाना आवश्यक होगा। परिकल्पना निर्माण हेतु संभावित कारणों का विवरण निम्नवत है–

leL;k ds lEHkkfor dkj.k&

- ❖ पहाड़े याद न होना,

- ❖ गुणन की प्रक्रिया का ज्ञान न होना,
- ❖ गुणा करते समय हासिल का ध्यान न रखना,
- ❖ हासिल लेते समय ईकाई के अंक को हासिल के रूप में लिखना,
- ❖ निरंतर अभ्यास की कमी

fØ;kRed ifjdYiuk l0 & 01

उपरोक्त कारणों के विश्लेषण के प''चात विद्यालय में पहाड़ा बनाना सिखाना, पहाड़ा प्रतियोगिता जैसे सामूहिक कार्य, बिना हासिल वाले गुणन से संबंधित प्र''नों के निरंतर अभ्यास कार्य द्वारा तथा छात्रों को उचित प्रकार से अभिप्रेरित कर उक्त समस्या का समाधान हो सकता है।

क्रियात्मक परिकल्पना 01 के क्रियान्वयन के प''चात छात्र बिना हासिल वाले गुणा के प्र''नो को हल कर रहे होंगें। परन्तु हासिल वाले गुणा के प्र''नों को हल करने में छात्रों को समस्या आ रही होगी जिसके लिए परिकल्पना 2 का क्रियान्वयन किया जा सकता है।

fØ;kRed ifjdYiuk l0 & 02

विभिन्न गतिविधियों के माध्यम से हासिल की अवधारणा को स्पष्ट किया जायेगा, हासिल वाले गुणा के प्रश्नों के अभ्यास द्वारा तथा छात्रों को उचित प्रकार से अभिप्रेरित कर उक्त समस्या का समाधान हो सकता है।

ekU;rk,a ¼**Assumptions**½&

छात्रों के गणित विषय की सम्प्राप्ति स्तर में कमी के संबंध में कुछ मान्यताएं निम्नवत हो सकती है–

- ❖ छात्रों की अनियमित उपस्थिति
- ❖ f''k{kकों की कमी
- ❖ अभिभावकों के कम पढे लिखे होने से बच्चों को घर में अकादमिक सहयोग ना मिल पाना

जबकि जिस समस्या का चयन किया गया है उसके संभावित मान्यताएं/कारण–

- ❖ पहाड़े याद न होना,

- ❖ गुणन की प्रक्रिया का ज्ञान न होना,
- ❖ गुणा करते समय हासिल का ध्यान न रखना,
- ❖ हासिल लेते समय ईकाई के अंक को हासिल के रूप में लिखना,
- ❖ निरंतर अभ्यास की कमी

II: 'kks/k fMt kbu½Research Design½

भोध कार्य में समस्या निर्धारण, आकड़ों के वि"लेशण एवं परिकल्पना निर्माण के प"चात सबसे महत्वपूर्ण स्थान का है। जिसके अंर्तगत भोध विधि, प्रतिद"र्ा का चयन, आकड़े एकत्र करने के साधन एवं आकड़ों के वि"लेशण हेतु उपयुक्त सांख्यिकी विधि का चयन करना भाामिल है। यह भोध को उचित दि"ाा देने एवं यथा–समय पूर्ण कराने में महत्वपूर्ण भूमिका निभाता है।

'kks/k fof/k&

प्रस्तुत भोध में छात्रों की भोध क्रियान्वयन के पूर्व एवं प"चात स्थिति का तुलनात्मक विश्लेशण किया जाना है। अतः इसके लिए वि"लेशात्मक विधि का प्रयोग किया जायेगा। साथ ही प्रत्येक छात्र की भोध पूर्व एवं प"चात के मूल्यांकन स्थिति की व्याख्या के आधार पर निश्कर्श निकाला जायेगा। अतः इस भोध में वि"लेशणात्मक एवं व्याख्यात्मक विधि का प्रयोग किया जायेगा।

ifrn'k&

राजकीय आद"र्ा प्राथमिक विद्यालय लोहाघाट की कक्षा 4 के समस्त छात्र–छात्राएं।

vkdM+k ,d= dju dk lk/ku&

इस भोध मे न्यायद"र्ा बहुत छोटा है एवं छोटी कक्षा में छात्रों की आयु एवं मानसिक स्तर प्रारंभिक स्तर पर होता है। अतः टेस्ट पेपर , अवलोकन, प्र"नावली, अभ्यास पुस्तिकाएं, गृहकार्य पुस्तिकाएं आदि साधनों के द्वारा समस्या के कारणों की पहचान करने में एवं समस्या समाधान में सहायता मिलेगी।

आकड़ों के विश्लेषण की सांख्यिकी तकनीकें–

आकड़ों के वि"लेषण के लिए माध्य, परसेंटाइल, आकड़ों का ग्राफीय निरूपण, आदि सांख्यिकी तकनीकों का प्रयोग किया जायेगा। विस्तृत रूप में यदि हम इस समस्या के द्वारा हम छात्रों में उनके ग्रामीण एवं भाहरी परिवेश के प्रभाव का अध्ययन या छात्र एवं छात्राओं के प्रदर्शन का अध्ययन करना चाहे तो सार्थकता की जांच के लिए टी–टेस्ट भी लगाया जा सकता है।

ifØ;kRed pj.k&

- ❖ समस्या का चयन
- ❖ समस्या के संभावित कारणों की पहचान एवं विश्लेशण
- ❖ संभावित समाधान अर्थात परिकल्पना का निर्माण
- ❖ परिकल्पना की सार्थकता हेतु कार्ययोजना (शोध डिजाइन)
- ❖ प्रथम परिकल्पना का क्रियान्वयन
- ❖ प्रथम परिकल्पना की सार्थकता की जांच
- ❖ पुनः द्वितीय परिकल्पना का क्रियान्वयन (यदि पूर्व में ली गयी परिकल्पना से समस्या पूर्ण रूप से हल ना हो) fØ;kRed 'kks/k pØ leL;k lek/kku gkus rd pyrk jgxk
- ❖ द्वितीय परिकल्पना की सार्थकता की जांच
- ❖ आकड़ों का विश्लेषण एवं मूल्यांकन
- ❖ निष्कर्ष
- ❖ भोाध से संबंधित सुझाव/व्यक्तिगत विचार

III: lUnHkZ xzUFk lwph ¼Bibliography½&

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ANNEXURE B

Instructors'/Mentors' Information

Instructor	Office Location	Contact No./ Mobile/ Fax	Virtual Meeting Hours	E-mail
Dr. Amarendra Behera	Professor, C I ET, N C E RT Sri Aurobindo Marg, New Delhi 110016, India	Contact No 09873457143 Fax 011 - 2686 4141	Saturday, Sunday 7:00-8:00 a.m. / p.m.	amar_b2000@yahoo.com
Dr. Rajendra Pal	Professor and Course Coordinator, MPD,CIET, N C E RT Sri Aurobindo Marg, New Delhi 110016, India	Contact No 011 - 26565678 Mobile 9868221861 Fax 011 - 2686 4141	Saturday, Sunday 7:00-8:00 a.m. / p.m.	rajendrapal2009@gmail.com
Dr Pratima Pallai	Assistant Professor Department of Education, Tezpur Central University, Tezpur, Assam, India	8751920779	Saturday, Sunday 7:00-8:00 a.m. / p.m.	pratima_palai1@rediffmail.com
Dr. Sangeeta Dey	Project Staff, MPD, CIET, N C E RT Sri Aurobindo Marg, New Delhi 110016, India	Contact No 011 - 26565678	Saturday, Sunday 7:00-8:00 a.m. / p.m.	onlineactionresearchncert@gmail.com
Mrs. Vandana Tripathi	Project staff DER	9599253485	Saturday, Sunday 7:00-8:00 a.m. / p.m.	onlineactionresearchncert@gmail.com

Annexure C: Participants' Information

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