Development of Artificial Intelligence(AI) Awareness programme on Science and Mathematics subjects for in-service primary teachers From Sindhudurg District

Research submitted to the

DIET SINDHUDURG

Submitted by

Smt. Snehal Vilasrao Pednekar

Lecturer, DIET, Sindhudurg

Guided by

Shri. Rajendra V. Kambale

Principal of DIET, Sindhudurg

Research Center

DIET, Sindhudurg

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DECLARATION

I hereby declare that the action research entitled "**Development of Artificial Intelligence(AI) Awareness programme on Science and Mathematics subjects for in-service primary teachers from Sindhudurg District"** has been completed and written by me and has not previously formed the basis for the award of any degree or diploma or other similar title of this or any other university or examining body.

Further, I declare that I have not violated any of the provisions under Copyright/Privacy/Cyber/IPR acts amended from time to time.

Place :- Sindhudurg

Date :-

Snehal Vilasrao Pednekar

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Shri. Rajendra V. Kmabale

Principal of DIET, Sindhudurg

CERTIFICATE

This is to certify that the dissertation entitled "**Development of Artificial Intelligence(AI) Awareness programme on Science and Mathematics subjects for in-service primary teachers from Sindhudurg District"** which is being submitted for giving academic support to the primary teachers is the result of the original work completed by **Snehal Vilasrao Pednekar** under my supervision and guidance and to the best of my knowledge and belief, the work embodied in research has not formed earlier the basis for the award of any degree or similar title of this or any other university or examining body.

Place :- Sindhudurg

Date:

Shri. Rajendra V. Kmabale

Principal of DIET, Sindhudurg

ACKNOWLEDGEMENT

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I would like to extend my thanks to all BEO from all blocks from Sindhudurg district at initial stage and getting data from blocks. I would like to express my deep gratitude towards all officers from DIET, Sindhudurg for guiding and providing me the necessary help during the study. I am also thankful to all Clusterheds from selecting clusters for helping me during the study. And also thankful to all teachers', headmasters from celected clusters of Sindhudurg district for their full cooperation with me and helped me in overall research work.

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I express my heartfelt gratitude towards my loving family for their constant inspiration and understanding during the research period. Last but not the list I am thankful to all those who have directly and indirectly helped me in the completion of my research work.

Place :- Sindhudurg

Date : **Snehal Vilasrao Pednekar**

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Qualitative education is the right of every child. So for giving qualitative education every teacher should become qualitative teacher. The world has now moved into the era of Data science, and tools that have traditionally been applied to another Domain are now being considered in education.

"Education means, **an all-round drawing out of the best in child and man –body, mind, and spirit**." - Mahatma Gandhi

According to this definition for drawing out best from every child we should provide best to that child. Every child has latent power in their body, for aware that power teacher should use various resources. One of them is E- learning. E-learning is need of 21st century. There are so many e-learning technologies.

Following are some famous e-learning technologies:

1) Blended learning: It is a modern technique of providing education to students using electronic media, e-material, and online resources for student-teacher interaction with traditional classroom methods.
2) Collaborative learning: It is an e-learning approach where students socially interact with other students and teachers.
3) MOOCS: It is a social learning platform called Massive Open Online Courses for learners to learn from the web.
4) Gamification: It is an informal e-learning technique to engage the learners. This method system can provide rewards, success badges or levels, and virtual currency to motivate learners".

According to E-Learning Industry "An Artificial Intelligence based E-Learning platform is a machine/system that possesses the ability to perform different tasks requiring human intelligence. It has the ability to offer solutions to human-related problems, like speech recognition, translations, decision making, and much more." So that for giving e-learning to our children every teacher has to knowledge of artificial intelligence. Our National Education Policy 2020 also focused use of Artificial Intelligence in education.

Historical Background of Artificial Intelligence

History of Artificial Intelligence

Artificial Intelligence is not a new word and not a new technology for researchers. This technology is much older than you would imagine. Even there are the myths of Mechanical men in Ancient Greek and Egyptian Myths. Following are some milestones in the history of Artificial Intelligence which defines the journey from the Artificial Intelligence generation to till date development.

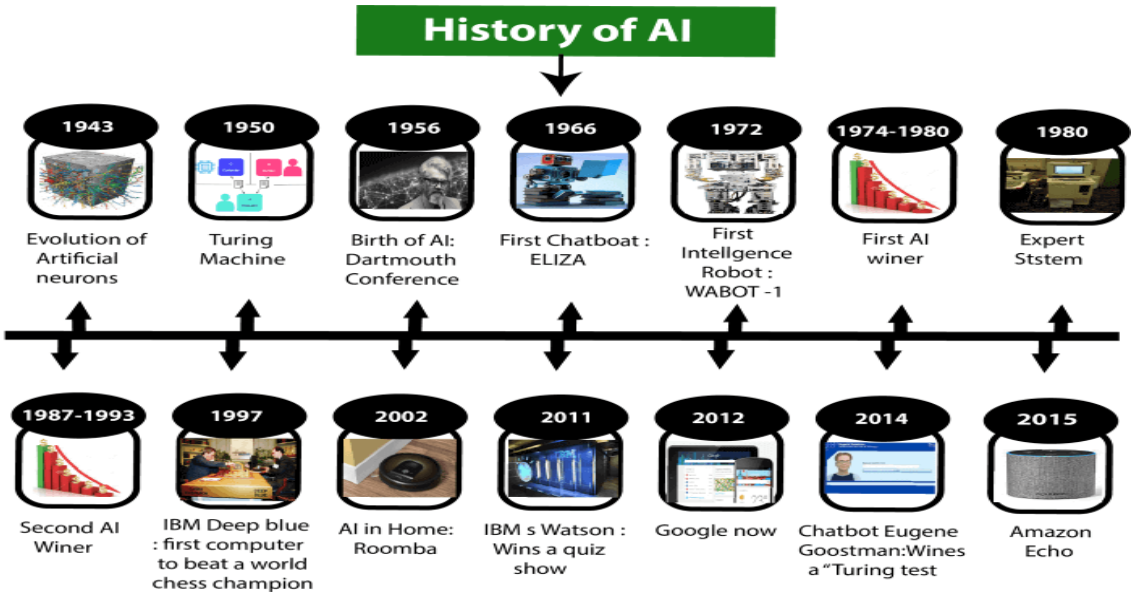


Figure of No. 1.1: History of Artificial Intelligence

Maturation of Artificial Intelligence (1943-1952)

Year 1943: The first work which is now recognized as Artificial Intelligence was done by Warren McCulloch and Walter pits in 1943. They proposed a model of **artificial neurons**.

Year 1949: Donald Hebb demonstrated an updating rule for modifying the connection strength between neurons. His rule is now called **Hebbian learning**.

Year 1950: The Alan Turing who was an English mathematician and pioneered Machine learning in 1950. Alan Turing publishes **"Computing Machinery and Intelligence"** in which he proposed a test. The test can check the machine's ability to exhibit intelligent behaviour equivalent to human intelligence, called a **Turing test**.

The birth of Artificial Intelligence (1952-1956)

Year 1955: An Allen Newell and Herbert A. Simon created the "first artificial intelligence program" Which was named as **"Logic Theorist"**. This program had proved 38 of 52 Mathematics theorems, and find new and more elegant proofs for some theorems.

Year 1956: The word "Artificial Intelligence" first adopted by American Computer scientist John McCarthy at the Dartmouth Conference. For the first time, Artificial Intelligence coined as an academic field.

At that time high-level computer languages such as FORTRAN, LISP, or COBOL were invented. And the enthusiasm for Artificial Intelligence was very high at that time.

The golden years-Early enthusiasm (1956-1974)

Year 1966: The researchers emphasized developing algorithms which can solve mathematical problems. Joseph Weizenbaum created the first chatbot in 1966, which was named as ELIZA.

Year 1972: The first intelligent humanoid robot was built in Japan which was named as WABOT-1.

The first Artificial Intelligence winter (1974-1980)

The duration between years 1974 to 1980 was the first Artificial Intelligence winter duration. Artificial Intelligence winter refers to the time period where computer scientist dealt with a severe shortage of funding from government for Artificial Intelligence researches.

During Artificial Intelligence winters, an interest of publicity on artificial intelligence was decreased.

A boom of AI (1980-1987)

Year 1980: After Artificial Intelligence winter duration, Artificial Intelligence came back with "Expert System". Expert systems were programmed that emulate the decision-making ability of a human expert.

In the Year 1980, the first national conference of the American Association of Artificial Intelligence **was held at Stanford University**.

The second Artificial Intelligence winter (1987-1993)

The duration between the years 1987 to 1993 was the second Artificial Intelligence Winter duration.

Again Investors and government stopped in funding for Artificial Intelligence research as due to high cost but not efficient result. The expert system such as XCON was very cost effective.

The emergence of intelligent agents (1993-2011)

Year 1997: In the year 1997, IBM Deep Blue beats world chess champion, Gary Kasparov, and became the first computer to beat a world chess champion.

Year 2002: for the first time, Artificial Intelligence entered the home in the form of Roomba, a vacuum cleaner.

Year 2006: Artificial Intelligence came in the Business world till the year 2006. Companies like Facebook, Twitter, and Netflix also started using Artificial Intelligence.

Deep learning, big data and artificial general intelligence (2011-present)

Year 2011: In the year 2011, IBM's Watson won jeopardy, a quiz show, where it had to solve the complex questions as well as riddles. Watson had proved that it could understand natural language and can solve tricky questions quickly.

Year 2012: Google has launched an Android app feature "Google now", which was able to provide information to the user as a prediction.

Year 2014: In the year 2014, Chatbot "Eugene Goostman" won a competition in the infamous "Turing test."

Year 2018: The "Project Debater" from IBM debated on complex topics with two master debaters and also performed extremely well.

Google has demonstrated an Artificial Intelligence program "Duplex" which was a virtual assistant and which had taken hairdresser appointment on call and lady on other side didn't notice that she was talking with the machine.

Now AI has developed to a remarkable level. The concept of Deep learning, big data, and data science are now trending like a boom. Nowadays companies like Google, Facebook, IBM, and Amazon are working with Artificial Intelligence and creating amazing devices. The future of Artificial Intelligence is inspiring and will come with high intelligence.

Meaning of Artificial Intelligence

Artificial intelligence is the science and technology which making machines those are intelligent; particularly smart computer programs as indicated by the scientist John McCarthy, Who is father of Artificial Intelligence. It is a methodology of building a machine, a modified machine controlled robot, and programming thinks keenly, in the comparative way the knowledge people being think. Man-made intelligence is structured by concentrating how the human cerebrum thinks and how people learn, choose, and working while attempting to solving other issue, and afterward utilizing the results of this examination as a premise of creating intelligent programming frameworks.

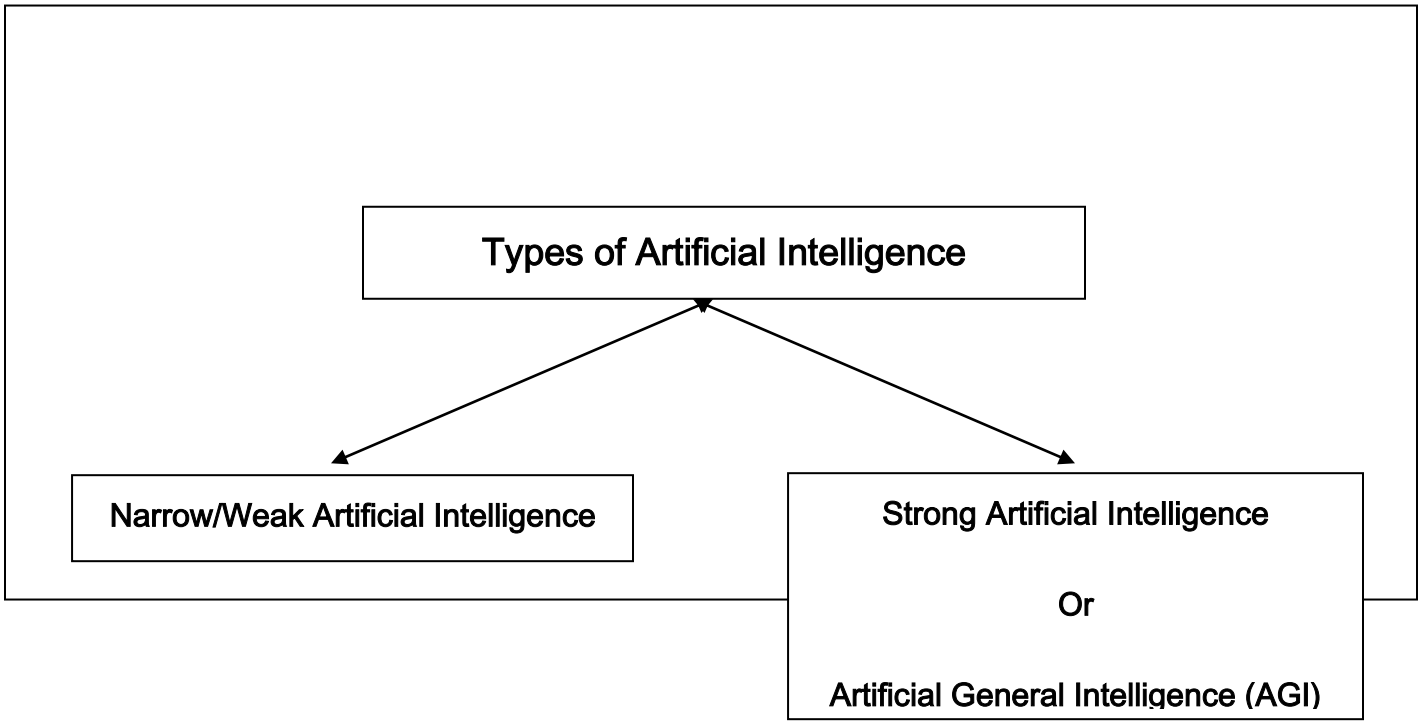


Figure No.1.2: Types of Artificial Intelligence

Narrow Artificial Intelligence or weak Artificial Intelligence is an artificial intelligence technique that operates within a limited situation and is a human intelligence simulation. Narrow Artificial Intelligence is always focused on performing a single task efficiently and effectively. These machines are intelligent systems that are operating under many constricts and restrictions even better than basic human intelligence. Strong Artificial Intelligence or Artificial General Intelligence (AGI) is the type of artificial intelligence used in robotics, movies etc. It is a machine with general intelligence that can think and work like a human being; it can apply that intelligence to solve any problem. Artificial Intelligent can be used in various fields such as Smart assistant system like Alexa, Siri, and Cortana these are intelligent voice recognition system helps to provide knowledge as well as enhance our decision making capability.

Importance of AI

AI allows organizations to make better decisions, improving core business processes by increasing both the speed and accuracy of strategic decision-making processes. Artificial

intelligence can **dramatically improve the efficiencies of our workplaces and can augment the work humans can do**. When AI takes over repetitive or dangerous tasks, it frees up the human workforce to do work they are better equipped for—tasks that involve creativity and empathy among others.

Benefits of AI for Education

- Automation.
- Smart Decision Making.
- Enhanced Customer Experience.
- Medical Advances.
- Research and Data Analysis.
- Solving Complex Problems.
- Business Continuity.
- Managing Repetitive Tasks etc.

The Advantages of Artificial Intelligence

- Increased Efficiency. One of the greatest advantages of AI systems is that they enable humans to be more efficient.
- Improved Workflows.
- Lower Human Error Rates.
- Deeper Data Analysis.
- More Informed Decision Making.
- All time Availability.

AI and Education

The introduction of AI into educational contexts may be traced to the 1970s. At that time, researchers were interested in seeing how computers might substitute for one-to-

one human tutoring, which is thought to be the most effective approach to teaching but is unavailable to most people (Bloom, 1984). Early efforts used rule-based AI techniques to automatically adapt or personalize the learning to each individual learner (Carbonell, 1970; Self, 1974). Since those beginnings, the application of AI in education has developed in multiple directions, beginning with student-facing AI (tools designed to support learning and assessment) to also include teacher-facing AI (designed to support teaching) and system-facing AI (designed to support the management of educational institutions) (Baker et al., 2019). In fact, the interaction between AI and education goes further, beyond the application of AI within classrooms (i.e. learning with AI) to teaching its techniques (i.e. learning about AI) and preparing citizens to live in the AI era (i.e. learning for human-AI collaboration). The introduction of AI into education also shines a spotlight on issues of pedagogy, organizational structures, access, ethics, equity, and sustainability – in order to automate something, you first need to thoroughly understand it.

National Education Policy (NEP) 2020 and Artificial Intelligence

NEP 2020 focused on use of ICT in education and its integration. Because India is a global leader in information and communication technology and in other cutting-edge domains, such as space. The Digital India Campaign is helping to transform the entire nation into a digitally empowered society and knowledge economy. While education will play a critical role in this transformation, technology itself will play an important role in the improvement of educational processes and outcomes; thus, the relationship between technology and education at all levels is bidirectional.

NEP 2020 regarding ARTIFICIAL INTELIGENCE and education:

1) The purpose of using ICT in education is improving teaching- learning and evaluation processes. As well as enhancing education access, support teacher preparation and professional development etc.
2) A rich variety of educational software, for all the above purposes, will be developed and made available for students and teachers at all levels.
3) Particular attention will need to be paid to emerging disruptive technologies that will necessarily transform the education system.
4) This policy has been formulated at a time when an unquestionably disruptive technology - Artificial Intelligence (AI) 3D/7D Virtual Reality - has emerged.
5) In the context of Artificial Intelligence, NRF may consider a three-pronged approach: (a) advancing core Artificial Intelligence research, (b) developing and deploying application-based research, and (c) advancing international research efforts to address global challenges in areas such as healthcare, agriculture, and climate change using Artificial Intelligence.
6) As disruptive technologies emerge, schooling and continuing education will assist in raising the general population awareness of their potential disruptive effects and will also address related issues.
7) Education will play key role in creating awareness about Artificial Intelligence based technologies.

Teacher's role in education regarding to Artificial Intelligence

Teaching- learning process is changing day by day. Mostly face to face teaching is using from ancient days. But due to Covid 19 pandemic period the trend of education is changed in all over world. Teachers are giving online guidance to their students. All are in virtual world. So all teacher should update their knowledge according to changing trend of education. Today's generation is 21st century generation, they are so fast, and

they know technology very well. So every teacher must prepare for that. Technology never replace teacher so every teacher should assimilate new technology like Artificial Intelligence in education.

Children like new things. It attracts them. So for attract student towards teaching, to sustain their attention every teacher should use new techniques in their teaching-learning process. For giving justice to our profession every teacher should update their knowledge and achieve mastery on their subject content. Especially for science and mathematics primary teacher must know the AI concept. For giving real experience through virtual reality primary teacher must know about AI and also use of AI in teaching- learning process.

1.2 Need and Importance

1) This research is important for improving primary teacher's interest in new technology.
2) This research is important for enriching primary teachers about e-learning techniques for their continues professional development.
3) This research is important for making easy and interesting the teaching- learning process.
4) Science is useful for practical knowledge and through Maths we can think critically, creatively it means through this two subject 21stcentury skill will develop so that this research is important.
5) The need of this research is to increase awareness about artificial intelligence in primary teachers.
6) The need of this research is to update primary teachers for new generation.
7) For implementing effectively NEP 2020 there is need of such kind of awareness programs.

1.3 Statement of problem

Development of Artificial Intelligence(AI) Awareness programme on Science and Mathematics subjects for in-service primary teachers from Sindhudurg District

1.4 Definition of the terms

Development

Conceptual Definition

Development is the act or process of developing unfolding, a gradual growth or advancement through progressive changes.

- New Webster Dictionary (2007)

Operational Definition

In this research development means development of programme for Primary teachers from Sindhudurg district on use of artificial intelligence in school education.

Artificial Intelligence

Conceptual Definition

It is "the science and engineering of making intelligent machines, especially intelligent computer programs". John McCarthy (Father of Artificial Intelligence)

Operational Definition

In this research artificial intelligence means all tools which are using for primary school education in teaching-learning process of science and mathematics subject.

Awareness Programme

Conceptual Definition

a course, programme, lecture, etc., introducing a new situation or environment and create awareness about it

Collins English Dictionary

Operational Definition

In this research awareness programme is for primary teachers on use of artificial intelligence in science and mathematics subjects from Sindhudurg district.

It will be in modular form. Subject of modules are as follows -

A) Historical background of Artificial Intelligence.
B) Meaning of Artificial Intelligence.
C) Various tools of Artificial Intelligence which useful in education.
D) NEP 2020 and Artificial Intelligence.
E) Use of specific tool of Artificial Intelligence in science and mathematics subjects teaching- learning process.

Primary teachers

Conceptual Definition

A person whose job is teaching, especially in a primary school

- Oxford English dictionary

Operational Definition

In this research primary teacher means teachers who are teaching to standard 1^{st} to $5^{th\ in}$ zilha parishad schools from Sindhudurg district.

Sindhudurg District

Operational Definition

Sindhudurg is one of the districts from 36 district of Maharashtra state.

1.5 Assumptions of research

1) Everyone is updating their knowledge according to changing time.
2) Teachers are technosavy.
3) National Education Policy 2020 focuses on artificial intelligence.
4) Everyone is doing continues professional development through e-learning.
5) There is unawareness about artificial intelligence in primary teachers.

1.6 Objectives of the research

1) To find out present status of primary teachers about artificial intelligence in science and mathematics subjects teaching – learning process.
2) To finalize the tools of artificial intelligence.
3) To develop awareness programme about use of artificial intelligence in science and mathematics subjects teaching – learning process.
4) To implement the awareness programme for primary teachers.
5) To find out the effectiveness of awareness programme for primary teachers.

1.7 Hypothesis of the research

Null hypothesis - Developed awareness programme will not be effective for primary teachers about use of artificial intelligence in science and mathematics subjects teaching – learning process.

1.8 Variables of the research

1) Dependant Variables: Artificial Intelligence for primary teachers.
2) Independent Variables: Researcher developed awareness programme.

1.9 The Scope of research:

1) This research will be related with in-service primary teachers from Maharashtra school.
2) The recommendation of this research will be applicable to in-service primary teachers.
3) This research is related with use of artificial intelligence in science and mathematics subjects teaching – learning process and its implementation.

1.10 Delimitations of research

1) This research will be limited with Jilha Parishad Primary teachers from Sindhudurg district.
2) This research will be limited with the concept of artificial intelligence.
3) This research will be limited with rural and urban area primary teachers from Sindhudurg district.
4) This research will be limited with the academic year 2022-23.
5) The medium of instruction is restricted to Marathi and English also.
6) Awareness Programme will be given through blended mode.
7) This research will be limited with the Science and Mathematics subject.

1.11 Chapterisation

- Chapter First :Introduction
- Chapter Second :Review of related research and literature
- Chapter Third : Research Methodology
- Chapter Forth : Data Analysis and Interpretation
- Chapter Fifth : Summary, prediction and recommendations

1.12 Clouser

In this chapter researcher writes about need of research, importance, statement of problem, definitions of terms, objectives etc.

In next chapter there is review of related literature and research.

CHAPTER II

REVIEW OF RELATED LITERATURE AND REFRENCES

2.1 Introduction

Review of literature and researches lays the role of torch light in hand to proceed in the journey of research study. It explores the variables of studies & gives clarity about the terms in research topic. So for conceptual clarity reviewing has prominent role in research. Especially to build the study on theoretical foundation review gives insight. Same is true for fencing the problem. Reviewing again gives practical touch to the process of study. Whether the ideas in mind applicable, what should be scope of studies, what the limitations are & what delimitations should be put to complete the study with available resources: such question can be answered on the basis of reviews. Hence from formulating the topic title to defining terms in it, selecting the method, choosing the sample & its size, preparing tools, collecting & analyzing the data, concluding to draw results the review is important.

2.2 Feature of related research and literature

Reviewing research involves a critical assessment of academic studies, papers, or articles. This process is fundamental to ensuring the quality, integrity, and credibility of scholarly work. Here are the key features of reviewing research:

1)Critical Analysis:

Objective Evaluation: Assess the strengths and weaknesses of the research without bias.

Depth of Analysis: Examine the methodology, data analysis, and conclusions in detail.

Relevance: Evaluate the significance of the research to the field.

2) Methodological Review:

Research Design: Assess the appropriateness and rigor of the research design.

Data Collection: Examine the methods used for data gathering to ensure they are robust and appropriate.

Data Analysis: Review the statistical or qualitative methods used to analyze the data.

3) Literature Review:

Contextualization: Ensure the research is well-situated within the existing body of knowledge.

Citation and References: Check the adequacy and relevance of the cited literature.

4) Originality and Contribution:

Innovation: Assess the novelty of the research question and findings.

Impact: Consider the potential impact of the research on the field.

5. Clarity and Structure:

Organization: Evaluate the logical flow and coherence of the paper.

Clarity of Writing: Assess the clarity, precision, and conciseness of the writing.

Presentation: Review figures, tables, and supplementary materials for clarity and accuracy.

6.Ethical Considerations:

Ethical Approval: Ensure that the research has been conducted ethically, with appropriate approvals.

Transparency: Assess the transparency in the reporting of data and methods.

7. Reviewer Feedback:

Constructive Criticism: Provide feedback that helps improve the quality of the research.

Actionable Suggestions: Offer specific recommendations for revisions or improvements.

8. Compliance with Guidelines:

Journal or Conference Standards: Ensure the research complies with the submission guidelines and standards of the intended publication or conference.

9. Reproducibility:

Data Availability: Check if the data and methods are adequately described to allow replication.

Robustness of Findings: Assess the reliability and consistency of the results.

10. Balanced Perspective:

Impartiality: Maintain objectivity throughout the review process.

Acknowledgement of Limitations: Recognize and discuss the limitations of the study.

By focusing on these features, reviewers can contribute to the advancement of knowledge in their field while maintaining high standards of academic integrity and quality.

2.3 Review of related literature

1) A. Casamayor, A. Amandi, and M. Campo, "Intelligent assistance for teachers in collaborative E-learning environments," *Computers & Education*, vol. 53, no. 4, pp. 1147–1154, 2009.View at: Publisher Site | Google Scholar

In this article researcher introduced an alert-based approach of intelligent assistance for teachers acting in collaborative work environments, with the addition of behavioral and context analysis for detecting conflictive collaboration situations. To fulfill this goal, they developed an intelligent agent integrated with a web-based distance learning platform for supporting collaborative work in distance learning education. The agent uses an extensible set of rules to detect collaboration conflicts among students and notify about them to teachers thorough onscreen alerts. Thus, the agent lightens this hard and time-consuming task that is carried out by teachers.

2) B. Boulay, "Artificial intelligence as an effective classroom assistant," *IEEE Intelligent Systems*, vol. 31, no. 6, pp. 76–81, 2016.View at: Google Scholar

The overall conclusion of these meta-reviews and analyses is that AIED systems perform better than CAI systems and also better than human teachers working in large classes. They perform slightly worse than one-to-one human tutors. Note that most of the systems were teaching mathematics or STEM subjects, as these are the kinds of subjects for which it is easier to build the domain and student models mentioned in the Introduction. It should be noted that there was a degree of overlap between these

meta-reviews and analyses in terms of the collections of individual evaluations from which they have drawn their conclusions.

3) Chetna Arora1 & Subhash Chander2 1 Assistant Professor, Department of Education, Lady Irwin College, University of Delhi

A study of School Teachers on Adaptation to Online Education during Pandemic Period ,

A qualitative study was conducted among Delhi private and government school teachers on how they have been adopting to online education during this covid-19 pandemic. Views of the teachers were captured on the impact on the quality of education, role of ICT/Technology and adaptation from all three – parents, children, and teachers in this new format of teaching. Another aspect that was explored has been a blended mode of learning. Even though the perception is positive towards online teaching, there is a fear of the quality of education and how students, teachers and parents have been coping with some of the challenges that online teaching brought about. Online teaching in all its glory cannot be removed altogether and a fine balance between offline and online (blended) learning would need to be established over a period as things return to normalcy.

https://ncert.nic.in/pdf/publication/journalsandperiodicals/indianjournalofeducationaltechnology/IJET_January2023.pdf

4) Heema Parveen Ph.D Scholar, Department of Education, University of Kashmir, Jammu & Kashmir UT, India, Understanding Student Engagement and Online Learning Post Covid-19 Using Multiple Perspectives

Corona pandemic besides claiming countless fatalities has affected the overall structure of social institutions at large. The suspension of offline learning and implementation of remote learning in the times of Covid-19 appeared to be the biggest challenge it posed to the education sector in particular and to the nation in general. Specifically talking about the state of Jammu and Kashmir, it has been witnessing the repeated and frequent closure of educational institutions for the last three years but the shift to online mode was completely a new thing as it was for other states of the country. The crisis which emerged with an abrogation of the Article 370 (special status granted to Jammu & Kashmir) in the year 2019, left educational institutions shut for six months and it was only in February 2020 the schools were reopened. Unfortunately due to the outbreak of Covid-19, they were again closed in March of the same year and

remained shut again for almost eight months. It was only in March 2021, they were reopened but, due to the surging covid-19 cases, were closed back in April of the same year. This repeated school closure and the recurring shift to online mode during the times of covid-19 disturbed the whole teaching-learning process. In such a chaotic environment of teaching and learning, we are interested to know and understand the student engagement of 1st and 2nd grade students (aged 6-8). Also to know the challenges or opportunities their parents and teachers experienced during the whole school closure period. Parent and teacher perspective was specifically used to realise these objectives. Semi-structured interviews were used to collect the data. Later, thematic analysis was used to generate the themes.

https://ncert.nic.in/pdf/publication/journalsandperiodicals/indianjournalofeducationaltechnology/IJET_January2023.pdf

5)Jennyphar Kahimise et al. (2019): In this study, we investigate how children's online habits and behaviors increase their vulnerability to cybercrime. Today's youth spend so much time online that they are at risk of online crime. This study used a systematic literature analysis to look at earlier research on children's online behavior and vulnerability to cyber bullying. The results show that young people are most likely to utilize social networking sites, and that the biggest threat they face online is sexual exploitation. However, there are other dangers that come with using the internet, including as cyber bullying and exposure to graphic content. The findings of the evaluations may have significant implications for child online protection (COP) programs that instruct children on how to use the Internet safely and responsibly.

6) Khatereh Jalaliet al. (2017) : In the modern world, e-learning and distance education have attracted a lot of interest. The assessment of pupils in online tests is the main difficulty in e-learning. This is true because it's so simple to cheat on an online exam. Consequently, online proctoring is required to stop cheating on online exams. Online proctoring is currently done manually by humans and is not automated. In this study, we provide a webcam image processing technique for automatically detecting cheating during online exams. The proposed method has been put to the test on actual students, and the evaluation's findings indicate that it can be used successfully in online tests.

07) Mohamed Zulhilmi bin Mohamed 1 , Riyan Hidayat 1 * , Nurain Nabilah binti Suhaizi 1 , Norhafiza binti Mat Sabri 1 , Muhamad Khairul Hakim bin Mahmud 1 , Siti Nurshafikah binti Baharuddin

Artificial intelligence in mathematics education: A systematic literature review

The advancement of technology like artificial intelligence (AI) provides a chance to help teachers and students solve and improve teaching and learning performances. The goal of this review is to add to the conversation by offering a complete overview of AI in mathematics teaching and learning for students at all levels of education. A systematic literature review (SLR) was conducted using established and robust guidelines. We follow the preferred reporting items for systematic reviews and meta-analyses (PRISMA). We searched Science Direct, Scopus, Springer Link, ProQuest, and EBSCO Host for 20 AI studies published between 2017 and 2021. The findings of the SLR indicate that AI approach used in mathematics education forth samples studied were through robotics, systems, tools, teachable agent, autonomous agent, and a comprehensive approach. Then, it can be shown that the majority of the collected studies were carried out in the USA and Mexico. The analysis revealed that most of the reviewed studies used quantitative research methods. The types of themes for AI in mathematics education were categorized into advantages and disadvantages, conceptual understanding, factors, role, idea suggestion, strategies and effectiveness.

2.4 Review of related researches

1) Bhaskaran Dhaniya,(2019), 'Countinuous Professional Development: A Framework for Voluntary English Language Teachers Forum'. The study is attempt to propose a complementary model of continuous professional development program for the rural primary school ESL teachers of the country. It puts forward a new model of in-service teacher education, viz., Voluntary English Language Teacher Forum (VELTF) which is a learner-centric, learner-initiated and learner-participative system of CPD. Through this research an attempt has been made to address the lacuna in the current pre-service and in-service teacher training programmers offered by the central and state government agencies such as Sarva Shikha Abhiyan (SSA), District Institute of Education and Training (DIET) and State Institute of Education Research and Training (SCERT). The cascading and lecturing model of training and mass teaching techniques used in the current teacher education programs, fail to address the individual developmental needs of the practicing teachers. Therefore, it is necessary to device a teacher empowerment model that will address the individual developmental requirements of the rural ESL teachers. It is against this background that the research has been conducted.

https://shodhganga.inflibnet.ac.in/bitstream/10603/297172/3/03_abstracts.pdf

2) C, Thaker S. (2017).'Effectiveness of Mastery Learning Programme With Reference to Science Teaching. Unpublished. Ph.D., Education. Saurashtra University, Rajkot, Gujrat.'

The major objectives were:

1) To construct a Mastery Learning Program' for the Science subject.
(2) To test the influence of Mastery Learning Program with reference to General class teaching' on students' Science Learning Interest at the level of standard VIII and standard VI.
(3) To test the influence of Mastery Learning Program with reference to General class teaching' on students' Test Anxiety at the level of standard VIII and standard VI.
(4) To test the influence of Mastery Learning Program with reference to General class teaching' on students' Retention in the science subject at the level of standard VIII and standard VI.

Two classes from one school of standard VIII and two classes of standard VI from another school were selected for the experiment. Mastery Learning Program was developed and implemented as experiment-effect. Science Learning Interest Inventory was developed and standardized by the researcher. Test-Anxiety inventory of A. C. Trivedi was used. For the study Experimental method was used as a research method and Quasi'(Pretest - Posttest) Experimental Design was implemented - ANOVA and t-test were used as statistical method.

The major findings were:

(1) Science Learning Interest was found higher among the students taught by the Mastery Learning Programme' than the students taught by the General class teaching' at the level of standard VIII and standard VI with reference to Science Teaching.

(2) Test Anxiety was found lower among the students taught by the Mastery Learning Programme' than the students taught by the General class teaching' at the level of standard VIII and standard VI with reference to Science Teaching.

(3) In Retention, no significant difference was found between the students taught by the Mastery Learning Programme' and the students taught by the General class teaching' at the level of standard VIII and standard VI with reference to Science Teaching.

3) Dr. Mohd. Mamur Ali. Did research under the title of 'professional development of teachers with ICT'. Researcher recommend following things from research -

The increasing availability of information and communication technology presents teachers with exciting opportunities to transform pedagogical practices the demand on teachers to integrate ICT into their teaching and learning programs is high and places additional pressures on teachers in an already challenging profession students entering the work force need not only to be equipped with the skills to use those new technology but also to be flexible adaptable and multi skill then need to operate in an information age that requires them to be information literate inventive thinkers and skilled communicators first and foremost a teachers have to enhance there on ICT competencies and then have to bring challenges in their classroom with utilization of ICT. The professional development of teachers can be made possible through various online ICT subject specific courses which are available on SWAYAM, ITPD and ICT curriculum portals.

4) Dr. Prakash Rao, did research under the title of 'Perception of teachers towards in-service training programmers at primary level'. From investigators research following recommendations made In the field of primary education much attention has been not paid to know the perceptions of teachers with regard to in-service training programmers and their effectiveness. Therefore, the investigator has taken up this study to know the "perceptions of teachers towards In-service training programmers at primary level". The policy makers, educational planners, and administrators may take all these factors planning aspect, administrative aspect, academic, aspect time aspect, resource management, monitoring aspect, evaluation aspect, maintenance of records, community participation, and other aspects Into consideration while taking decisions regarding Andhra University, Visakhapatnam 196 the professional development of teachers and also for the improvement of quality at the primary school level. This also interesting to note that the teachers working in rural, urban, tribal locality differed significantly towards in-service training programmers.
5) Kaur Ravinder,(2016).'Effectiveness of In-service Teacher Training Programs at Elementary Stage in Punjab: An Evaluative study'

   The study was designed to investigate the effectiveness of in-service teacher training programs at elementary stage in Punjab. The main objectives of the study were :- (1) To review the present status of in-service teacher training

programs at elementary stage conducted by DIETs, BRCs & CRCs (ii) To study the effectiveness of in-service teacher training programs at elementary stage in terms of teacher's attitude (iii) To study the effectiveness of in-service teacher training programs in terms of teacher's effectiveness (iv) To evaluate the in-service teacher training of programs organized by DIETs, BRCs & CRCs with special reference to (a) Planning & Implementation (b) Need assessment (c) content analysis (d) follow-up mechanism v) To identify the problems in organizing in-service teacher training programs at elementary stage by DIETs, BRCs & CRCs. There was a significant improvement in teacher's attitude at the end of the in-service education & training programs.
https://shodhganga.inflibnet.ac.in/handle/10603/251165

6) Mr. Dolla. Prashant Mahndrabhai, did research under the title of 'APPLICATION OF ARTIFICIAL INTELLIGENCE IN ON-LINE EVALUATION'. In his research he did statement that "Artificial Intelligence In On-Line Evaluation" is the combination of computer technology, Evaluation Concepts and Entity. The high-speed electronic computer is the most obvious illustration of an emerging technology that is, in many respects revolutionizing evaluation. The computer has made possible the recording and storage of complex data of many types in a way that, it permits nearly instantaneous retrieval and processing data. These capabilities are strengthened the interest of evaluators in large scale studies of individual and group performance, involving large number of variables and new theories, procedures and instruments are being developed.
7) Sachdeva Uravashi, did research under the title of "Development of Self Learning Material (SLM) on Web Tools for Teaching and Learning".
The researcher has prepared the Self Learning Material (SLM) on five Web Tools for Teaching and Learning. ADDIE model was used for the development purpose. The Web Tools were selected by the sample - Teacher Educators and Student Teachers of affiliated Teacher Education Institutes (TEIs) of Delhi National Capital Region (NCR). Blogs, Podcasts, Mind Maps. Digital Lesson Plans and Educational Videos were chosen by Teacher Educators and Student Teachers. The researcher used the Four QLradrant Approach (e-Content (Text), e-Tutorial (Video), Assessment and Web Resources) for the development of Digital SLM. Demonstration (e-Tutorial) of each Web Tool was done using the Online Platform selected by Educational Experts of Delhi NCR. Blogger for Blogging, Anchor by Spotify for Podcasting, Free Mind for Mind Mapping, Google Docs for Digital

Lesson Planning and MS PowerPoint were the selected Online Platforms. The effectiveness of the developed Digital SLM in enhancing the awareness and competence of using Web Tools of Teacher Educators and Student Teachers was checked with the help of a Single Group Pretest - Posttest Pre-experimental Study. The study found that the Digital SLM developed by the researcher on Blogs, Podcasts, Mind Maps, Digital Lesson Plans and Educational Videos is effective in enhancing the awareness and competence of using Web Tools of Teacher Educators and Student Teachers.

2.5 Usefulness for this research

This all reference research and literature are very useful for this research. That all references are useful for following things for researcher :-

1) From this references it shows that research are conducted on this subject.
2) There were several researches on various subjects.
3) But this research is on program development and its effectiveness.
4) Researcher selected primary ZP teachers for this research and develop program for their awareness about use of Artificial Intelligence in regular teaching learning process.
5) Such gap identify by researcher from this references that there was not any research on such area.
6) Researcher got ideas about methodology, data collection tools and analysys from these references.
7) Important thing is that this research is consistent with the National education Policy 2020 and it gives concrete shape to the expectations put in the NEP 2020.

2.6 Clouser

In this chapter researcher has presented the review of literature and researches. On the backdrop of reviewed literature and research studies researcher has proceeded to design methodology for the research.

In next chapter plan and procedure of study is described comprehensively.

CHAPTER III

PLAN AND PROCEDURE

3.1 Introduction

Methodology means the detailed design of the research undertaken by the research investigator. Methodology involves systematic procedures starting from the initial identification of the problem to its final conclusions. Its role is to carry on the research work in a scientific and valid manner. It provides the tools and techniques by which the research problem is attacked. The Methodology involves the general activities as-identifying the problem, review of related literature, formulating the hypotheses, measurement, and data collection.

3.2 What is research?

Research is a systematic and rigorous process of inquiry aimed at discovering new knowledge, validating existing knowledge, and solving specific problems. It involves the collection, analysis, and interpretation of data to answer specific questions or test hypotheses. Here are the key components and characteristics of research:

Key Components of Research

- Problem Identification
- Literature Review
- Research Design
- Methodology
- Sampling
- Data Collection
- Data Analysis
- Conclusion and Reporting

3.3 Types of Research Methodology

1. Basic Research: Also known as fundamental or pure research, it aims to expand knowledge without immediate practical applications. It seeks to understand underlying principles and theories.

2. Applied Research: This type of research is focused on solving specific, practical problems. It aims to apply findings directly to real-world situations.
3. Descriptive/ Survey Research: It describes characteristics of a population or phenomenon, often using surveys and observational methods.
4. Exploratory Research: It explores new areas where little is known, aiming to generate initial insights and hypotheses.
5. Explanatory Research: It seeks to explain relationships and causal connections between variables.
6. Evaluation Research: It assesses the effectiveness of programs, interventions, or policies, providing feedback for improvement.

Research is a cornerstone of scientific and academic progress, driving innovation, informed decision-making, and the advancement of knowledge across various fields. It requires meticulous planning, ethical consideration, and rigorous analysis to contribute valuable insights and solutions to the world's challenges.

Method used for present study

For present study researcher selected mixed method that is survey and experimental.

Plan and Procedure of the research

A. Research Method

Researcher used Survey and Experimental method of research.

Features of Survey Method

1. Structured data collection
2. Quantitative and qualitative data
3. Sampling
4. Versatility
5. Validity

Steps of Survey Method

Figure No. 3.1 Steps of Survey Method

Advantages

Relatively easy to administer

Can be developed in less time (compared to other data-collection methods)

Cost-effective, but cost depends on survey mode

Can be administered remotely via online, mobile devices, mail, email, kiosk, or telephone.

Conducted remotely can reduce or prevent geographical dependence

Capable of collecting data from a large number of respondents

Numerous questions can be asked about a subject, giving extensive flexibility in data analysis

With survey software, advanced statistical techniques can be utilized to analyze survey data to determine validity, reliability, and statistical significance, including the ability to analyze multiple variables

A broad range of data can be collected (e.g., attitudes, opinions, beliefs, values, behavior, factual).

Standardized surveys are relatively free from several types of errors

Disadvantages

The reliability of survey data may depend on the following factors:

Respondents may not feel encouraged to provide accurate, honest answers

Respondents may not feel comfortable providing answers that present themselves in a unfavorable manner.

Respondents may not be fully aware of their reasons for any given answer because of lack of memory on the subject, or even boredom.

Surveys with closed-ended questions may have a lower validity rate than other question types.

Data errors due to question non-responses may exist. The number of respondents who choose to respond to a survey question may be different from those who chose not to respond, thus creating bias.

Survey question answer options could lead to unclear data because certain answer options may be interpreted differently by respondents.

Experimental Research design

What is experimental research?

Experimental research is a form of comparative analysis in which you study two or more variables and observe a group under a certain condition or groups experiencing different conditions. By assessing the results of this type of study, you can determine correlations between the variables applied and their effects on each group. Experimental research uses the scientific method to find preferable ways of accomplishing a task for providing a service.

Eexperimental research design

There are three different types of experimental research design, divided by key elements related to how you conduct each experiment. Within these types, there are also subdivisions that the behaviors within the experiment can affect. The three main types of experimental research design are:

1. Pre-experimental research

A pre-experimental research study is an observational approach to performing an experiment. It's the most basic style of experimental research. Pre - experimental research can occur in one of these design structures:

- **One-shot case study research design:** In this form of experimental research, experimenters subject a single group to a stimulus and test them at the end of the application. This allows researchers to gather results for performance by individuals or entities subject to the stimuli being tested.
- **One-group pretest-posttest design:** In this type of research, researchers apply a test both before and after the application of the stimuli. This provides a comparison of performance with and without application for researchers to make judgments about the effects of the stimuli on the subjects.
- **Static group comparison design:** In a static group comparison, researchers assess two different groups, with only one group receiving the stimuli the researchers are assessing. Testing occurs at the end of the process, allowing the researchers to compare the results from the subjects who received the stimuli against those who didn't.

2. Quasi-experimental research

Quasi-experimental research is similar to true experimental research, and experimenters can apply it in similar ways. The primary distinction between the two is a lack of randomization when assigning participants to groups in a quasi-experimental study. This usually occurs because of rules or regulations that prevent researchers from applying random allocations in some settings, such as a research study at a university.

3. True experimental research

True experimental research is the main method of applying untested research to a subject. Under true experimental conditions, participants receive randomized assignments to different groups in the study. This removes any potential for bias in creating study groups to provide more reliable results. There are a few design structures a researcher may use when performing experimental research, which differs, based on the number and style of groups used:

Posttest-only control group design

In this design structure, a researcher divides participants into two groups at random. One group acts as a control and doesn't receive the stimuli being tested, while the second group does receive the stimuli researchers are assessing. Researchers perform tests at the end of the experiment to determine the practical results of being exposed to the stimuli.

Pretest-posttest control group design

Under this structure, researchers provide tests to the participants both before and after the non-control group receives exposure to the stimuli. Researchers test groups twice, so this structure provides multiple methods of assessing the results.Experimenters can examine changes in performance for the non-control group, and they may also determine if any changes occur due to participants undergoing the same test twice. They may do this by checking if the control group has also changed, which researchers can then use to make adjustments as needed when analyzing the data.

Solomon four-group design

This is the most comprehensive design structure for an experimental research project. Under the Solomon four-group design, participants receive an assignment to one of four randomly allocated groups. These groups provide all four possible permutations for both control and non-control groups and post-test or pre- and post-test control groups. Having a comprehensive set of data with multiple ways of differentiating between groups can enhance researchers' abilities to reach conclusions based on the resulting data.

Advantages of using experimental research

Experimental research provides you with more information when making professional decisions, which might allow you to complete better and more profitable actions. There are many advantages of using the experimental research approach, including:

Strong variable control

Broad application across fields

Specific results

B. Procedure of Research

1) Formulation of research title.
2) Setting the objectives.
3) Delimitating the scope.
4) Researcher used survey method for study present status of primary teachers about awareness about artificial intelligence in science and mathematics subjects teaching – learning process.
5) Study tools for do experiment on primary teachers.
6) Researcher used experimental method for study effectiveness of awareness programme developing for the primary teachers about use of artificial intelligence in science and mathematics subjects teaching – learning process.
7) Researcher then does analysis of collected data.
8) Development of research tools
9) Interpreting the data
10) Reporting conclusion

C. Research design

Researcher used Pre Test-Post Test single group experimental design to study effectiveness of awareness programme.

O_1 X $O_1 O_{1,} O1$ ⟶ Pre Test

O1 O_1 $O_{1,} O_1$ ⟶ Post Test

X: programme

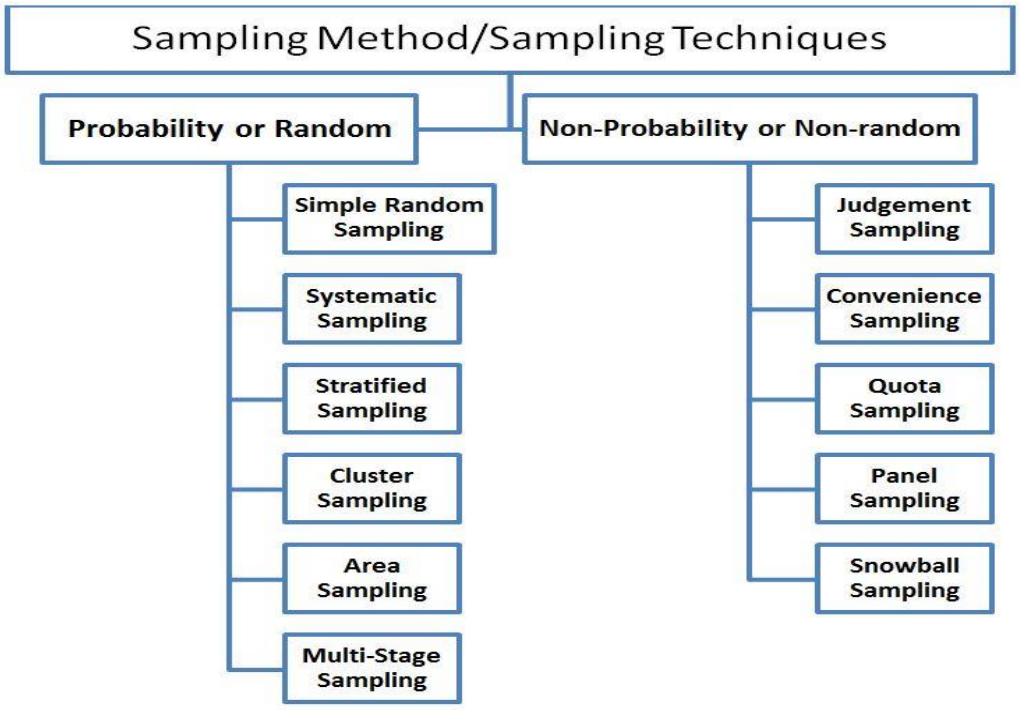
3.4 Sample selection

In this research researcher used purposeful sampling method from non-probability type of sampling for study present status of primary teachers about artificial intelligence and effectiveness of programme which will develop for primary teachers on

use of artificial intelligence in science and mathematics subjects teaching – learning process.

Methods of Sampling

Graph No. 3.1



Sampling definitions:

Population
The total number of people or things you are interested in

Sample
A smaller number within your population that will represent the whole

Sampling
The process and method of selecting your sample

Why is sampling important?

Although the idea of sampling is easiest to understand when you think about a very large population, it makes sense to use sampling methods in studies of all types and sizes. After all, if you can reduce the effort and cost of doing a study, why wouldn't you? And because sampling allows you to research larger target populations using the same resources as you would smaller ones, it dramatically opens up the possibilities for research.

Sampling is a little like having gears on a car or bicycle. Instead of always turning a set of wheels of a specific size and being constrained by their physical properties, it allows you to translate your effort to the wheels via the different gears, so you're effectively choosing bigger or smaller wheels depending on the terrain you're on and how much work you're able to do.

Sampling allows you to "gear" your research so you're less limited by the constraints of cost, time, and complexity that come with different population sizes.

It allows us to do things like carrying out exit polls during elections, map the spread and effects rates of epidemics across geographical areas, and carry out nationwide census research that provides a snapshot of society and culture.

Probability and non-probability sampling

Sampling strategies vary widely across different disciplines and research areas, and from study to study.

There are two major types of sampling – probability and non-probability sampling.

> **Probability sampling**, also known as random sampling, is a kind of sample selection where randomisation is used instead of deliberate choice.
>
> **Non-probability sampling** techniques are where the researcher deliberately picks items or individuals for the sample based on their research goals or knowledge.

Probability sampling methods

There's a wide range of probability sampling methods to explore and consider. Here are some of the best-known options.

1. Simple random sampling

With simple random sampling, every element in the population has an equal chance of being selected as part of the sample. It's something like picking a name out of a hat. Simple random sampling can be done by anonym sing the population – e.g. by assigning each item or person in the population a number and then picking numbers at random.

Simple random sampling is easy to do and cheap, and it removes all risk of bias from the sampling process. However, it also offers no control for the researcher and may lead to unrepresentative groupings being picked by chance.

2. Systematic sampling

With systematic sampling, also known as systematic clustering, the random selection only applies to the first item chosen. A rule then applies so that every nth item or person after that is picked.

Although there's randomness involved, the researcher can choose the interval at which items are picked, which allows them to make sure the selections won't be accidentally clustered together.

3. Stratified sampling

Stratified sampling involves random selection within predefined groups. It's useful when researchers know something about the target population and can decide how to subdivide it (stratify it) in a way that makes sense for the research.

For example, if you were researching travel behaviours in a group of people, it might be helpful to separate those who own or have use of a car from those who are dependent on public transport.

Stratified sampling has benefits but it also introduces the question of how to stratify a population, which adds in more risk of bias.

4. Cluster sampling

With cluster sampling, groups rather than individual units of the target population are selected at random. These might be pre-existing groups, such as people in certain zip codes or students belonging to an academic year.

Cluster sampling can be done by selecting the entire cluster, or in the case of two-stage cluster sampling, by randomly selecting the cluster itself, then selecting at random again within the cluster.

Non-probability sampling methods

Non-probability sampling methods don't offer the same bias-removal benefits as probability sampling, but there are times when these types of sampling are chosen for expediency or simplicity. Here are some forms of non-probability sampling and how they work.

1. Convenience sampling

People or elements in a sample are selected on the basis of their availability. If you are doing a research survey and you work at a university, for example, a convenience sample might consist of students or co-workers who happen to be on campus with free time who are willing to take your questionnaire.

This kind of sample can have value, especially if it's done as an early or preliminary step, but significant bias will be introduced.

2. Quota sampling

Like the probability-based stratified sampling method, this approach aims to achieve a spread across the target population by specifying who should be recruited for a survey according to certain groups or criteria. For example, your quota might include a certain

number of males and a certain number of females, or people in certain age brackets or ethnic groups.

Bias may be introduced during the selection itself – for example, volunteer bias might skew the sample towards people with free time who are interested in taking part. Or bias may be part and parcel of the way categories for the quotas are selected by researchers.

3. Purposive sampling

Participants for the sample are chosen consciously by researchers based on their knowledge and understanding of the research question at hand or their goals. Also known as judgment sampling, this technique is unlikely to result in a representative sample, but it is a quick and fairly easy way to get a range of results or responses.

4. Snowball or referral sampling

With this approach, people recruited to be part of a sample are asked to invite those they know to take part, who are then asked to invite their friends and family and so on. The participation radiates through a community of connected individuals like a snowball rolling downhill.

This method can be helpful when the researcher doesn't know very much about the target population and has no easy way to contact or access them. However it will introduce bias, for example by missing out isolated members of a community or skewing towards certain age or interest groups who recruit amongst themselves

Sample selectd for this research

Considering the limitations of time and funding sample of Sindhudurg district is selected for this study. There are 8 tahasils in Sindhudurg district. 3 tahasils are selected randomly from them are Kudal, Sawanwadi and Devgad. One cluster from each thasil selected that are Madkhol from Sawantwadi, Mangav from Kudal and Padel from Devgad. Survey and experiment done on all teachers from selected clusters.

1) **Phase No.1:** To find out present status of primary teachers about artificial intelligence.

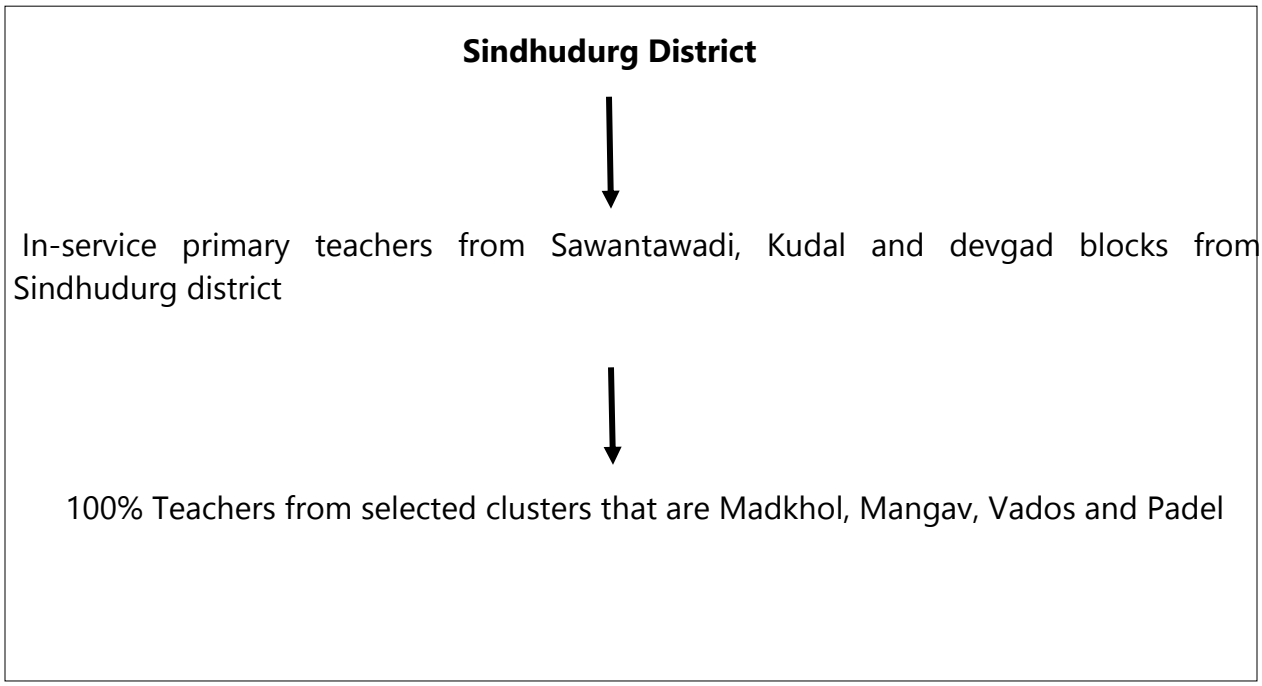


Figure No. 3.2: Sampling for Survey

Phase No.2 To study effectiveness of programme for primary teachers on use of intelligence artificial in science and mathematics subjects teaching – learning process.

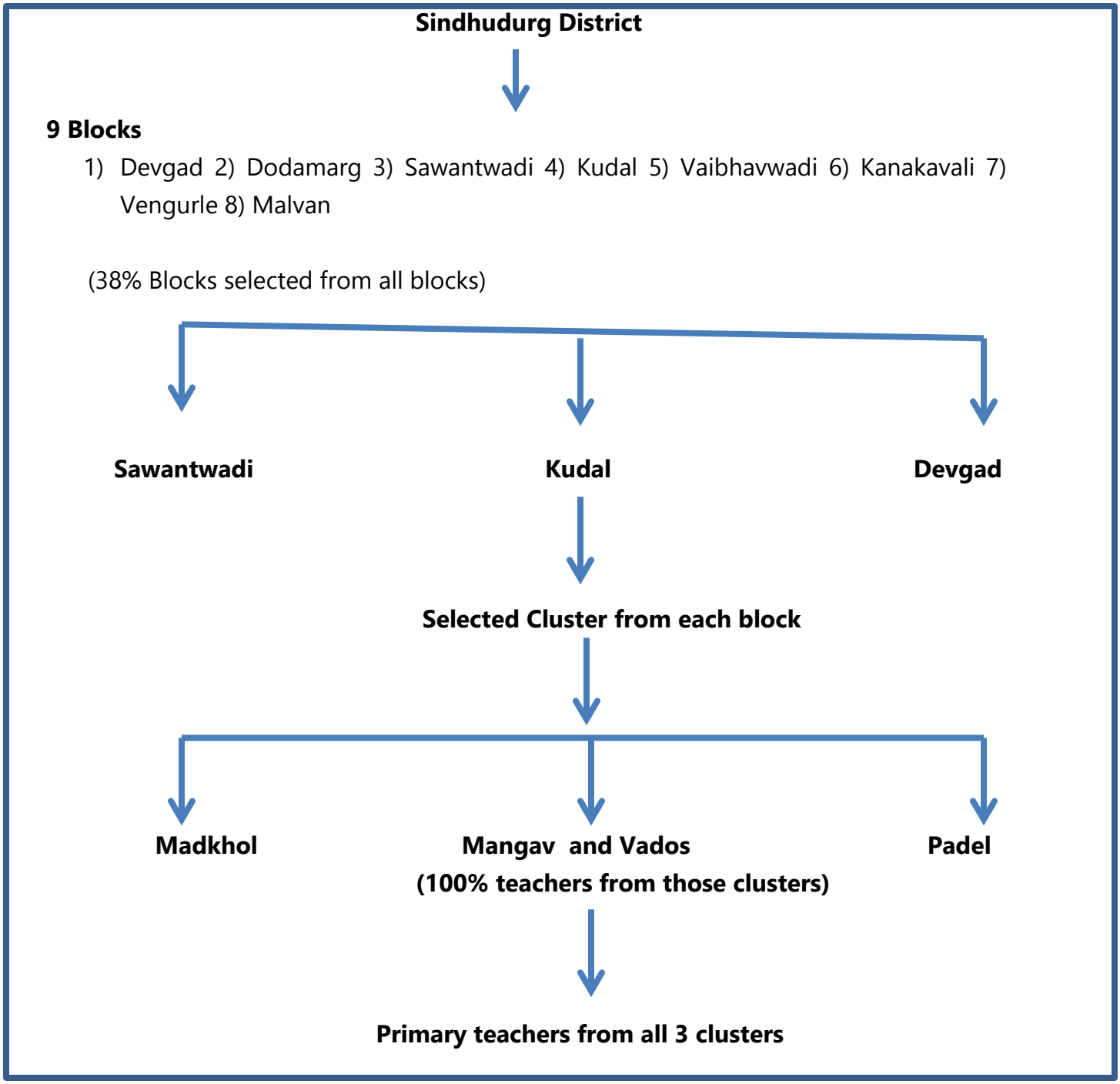
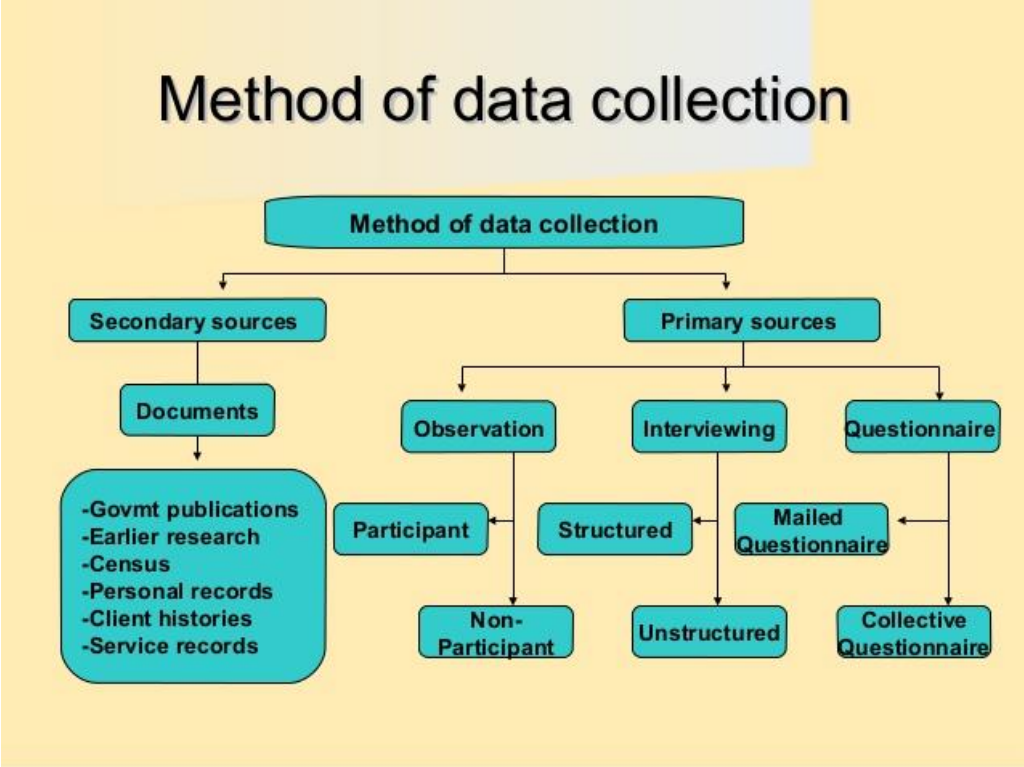


Figure No. 3.3: Sampling for Experimental method

3.5 Tools for data collection

There are so many tools and techniques of data collection e.g. Interview, case study etc.



Graph No.3.2 Methods of data collection

Researcher selected questionnaire for survey and Standardized test experiment.

Questionnaire

What Is a Questionnaire?

A questionnaire is a research tool featuring a series of questions used to collect useful information from respondents. These instruments include either written or oral questions and comprise an interview-style format. Questionnaires may be qualitative or

quantitative and can be conducted online, by phone, on paper or face-to-face, and questions don't necessarily have to be administered with a researcher present.

Questionnaires feature either open or closed questions and sometimes employ a mixture of both. Open-ended questions enable respondents to answer in their own words in as much or as little detail as they desire. Closed questions provide respondents with a series of predetermined responses they can choose from.

Advantages of Questionnaires

Some of the many benefits of using questionnaires as a research tool include:

Practicality: Questionnaires enable researchers to strategically manage their target audience, questions and format while gathering large data quantities on any subject.
Cost-efficiency: You don't need to hire surveyors to deliver your survey questions — instead, you can place them on your website or email them to respondents at little to no cost.
Speed: You can gather survey results quickly and effortlessly using mobile tools, obtaining responses and insights in 24 hours or less.
Comparability: Researchers can use the same questionnaire yearly and compare and contrast research results to gain valuable insights and minimize translation errors.
Scalability: Questionnaires are highly scalable, allowing researchers to distribute them to demographics anywhere across the globe.
Standardization: You can standardize your questionnaire with as many questions as you want about any topic.
Respondent comfort: When taking a questionnaire, respondents are completely anonymous and not subject to stressful time constraints, helping them feel relaxed and encouraging them to provide truthful responses.
Easy analysis: Questionnaires often have built-in tools that automate analyses, making it fast and easy to interpret your results.

Disadvantages of Questionnaires

Questionnaires also have their disadvantages, such as:

Answer dishonesty: Respondents may not always be completely truthful with their answers — some may have hidden agendas, while others may answer how they think society would deem most acceptable.

Question skipping: Make sure to require answers for all your survey questions. Otherwise, you may run the risk of respondents leaving questions unanswered.

Interpretation difficulties: If a question isn't straightforward enough, respondents may struggle to interpret it accurately. That's why it's important to state questions clearly and concisely, with explanations when necessary.

Survey fatigue: Respondents may experience survey fatigue if they receive too many surveys or a questionnaire is too long.

Analysis challenges: Though closed questions are easy to analyze, open questions require a human to review and interpret them. Try limiting open-ended questions in your survey to gain more quantifiable data you can evaluate and utilize more quickly.

Unconscientious responses: If respondents don't read your questions thoroughly or completely, they may offer inaccurate answers that can impact data validity. You can minimize this risk by making questions as short and simple as possible.

Types of Questionnaires in Research

There are various types of questionnaires in survey research, including:

Postal: Postal questionnaires are paper surveys that participants receive through the mail. Once respondents complete the survey, they mail them back to the organization that sent them.

In-house: In this type of questionnaire, researchers visit respondents in their homes or workplaces and administer the survey in person.

Telephone: With telephone surveys, researchers call respondents and conduct the questionnaire over the phone.

Electronic: Perhaps the most common type of questionnaire, electronic surveys are presented via email or through a different online medium

Test

A test is a systematic procedure for observing a person's behavior and describing it with the help of a numerical scale. Test is helpful in getting a quantitative data.

It is essentially an objective and standardized measure of a sample of behavior. Psychological tests which are available in research cells or departments are standardized tests. Teacher made test are non-standardized test.

Types of Tests

Tests are classified in different ways based on their function, nature and procedure of administration and are presented here under:245Tools and Techniques for data Collection.

Let us now understand the meaning of this classification and will also get information about these tests in details.

A. Classification of the Tests as per their Function

(i) Educational Tests –

(ii) Personality Tests -

(iii) Aptitude Tests -

B. Classification of the Tests as per their Nature

(i) **Speed Tests** are those tests which contain such items which are of somewhat equal difficulty value. To solve the tests the time limits are fixed. e.g. our usual school/college tests.

(ii) **Power tests** are those tests which contain items of different difficulty value arranged in increasing order of difficulty value . For such tests time limit is not fixed, it is flexible.

(iii) **Verbal Tests** include question answer pattern in the form of 'words'. Such verbal tests can be either paper pencil (written) tests or oral tests.

(iv) **Non-verbal Tests** necessarily contain items in the figural or symbolic form i.e. other than 'words'. Raven's Progressive Matrices Test is a non-verbal test.

(v) **Performance Tests** require action on part of the respondent as his/her response. Bhatia's Intelligence test is a performance test.

(vi) **Standardized Tests** imply uniformity of procedure in administering and scoring the tests. Another important aspect of standardized tests is the establishment of norms, reliability and the validity of the tests.

(vii) **Criterion Referenced Tests** have been contrasted with the usual norm-referenced tests in which an individual's score is interpreted by comparing it with the scores obtained by others in the group on the same test. Unlike

in a norm-referenced test, in a criterion referenced test an individual's score is interpreted by comparing it with an external criterion.

3.6 Statistical tool

Researcher selected percentile statistical tool for present study.

Percentage

Percentage is a statistical tool used to express relative amounts of increase or decrease in a standardized ratio comparison. It is commonly used in various fields such as education, scientific research, and measurement instruments. In education, the understanding of percentage is often challenging for students, but it can be supported through the use of bar models and contextual problems. In scientific research, percentages are frequently used to present findings and compare results, but authors should ensure the clinical validity and mathematical accuracy of the percentages they report. In the study of rates, the relationship between percent of increase and percent of decrease is explored, revealing connections to other topics such as work problems and the harmonic mean. In the field of distributed computing systems, percentiles are calculated and managed to analyze performance data. Additionally, in the field of measurement instruments, a percentage table is used for accurate length measurement.

3.7 Procedure of data analysis

1. First of all researcher collect data by selected tools
2. Researcher analyzed this data by the use of percentage.

3.8 Clousre

In third chapter researcher gave details about research methodology, sampling, tools of data collection, statistical tools and the procedure of researcher.

In next 4^{th} chapter include the analysis and interpretation of data.

CHAPTER IV

ANALYSIS AND INTERPRITATION OF DATA

4.1 Introduction

In third chapter researcher gave information about research methodology. In this chapter researcher gives details about analysis and interpretation of data.

The method of this research is survey method and experimental method so selected purposive sampling method. Researcher collects data to study Development of Artificial Intelligence(AI) Awareness programme on Science and Mathematics subjects for in-service primary teachers From Sindhudurg District's collected data doesn't having any meaning. So giving meaning to it analysis and interpretation is very important.

4.2 Analysis and Interpretation of Data

Researcher using percentage for analyze and interpret collected data.

Objective wise analysis of data and conclusion

Objective No.1 - To find out present status of primary teachers about artificial intelligence in science and mathematics subjects teaching – learning process.

First researcher do survey of in-service primary teachers for getting present status of in-service primary teachers about awareness of use of AI in teaching learning process.

Analysis of survey

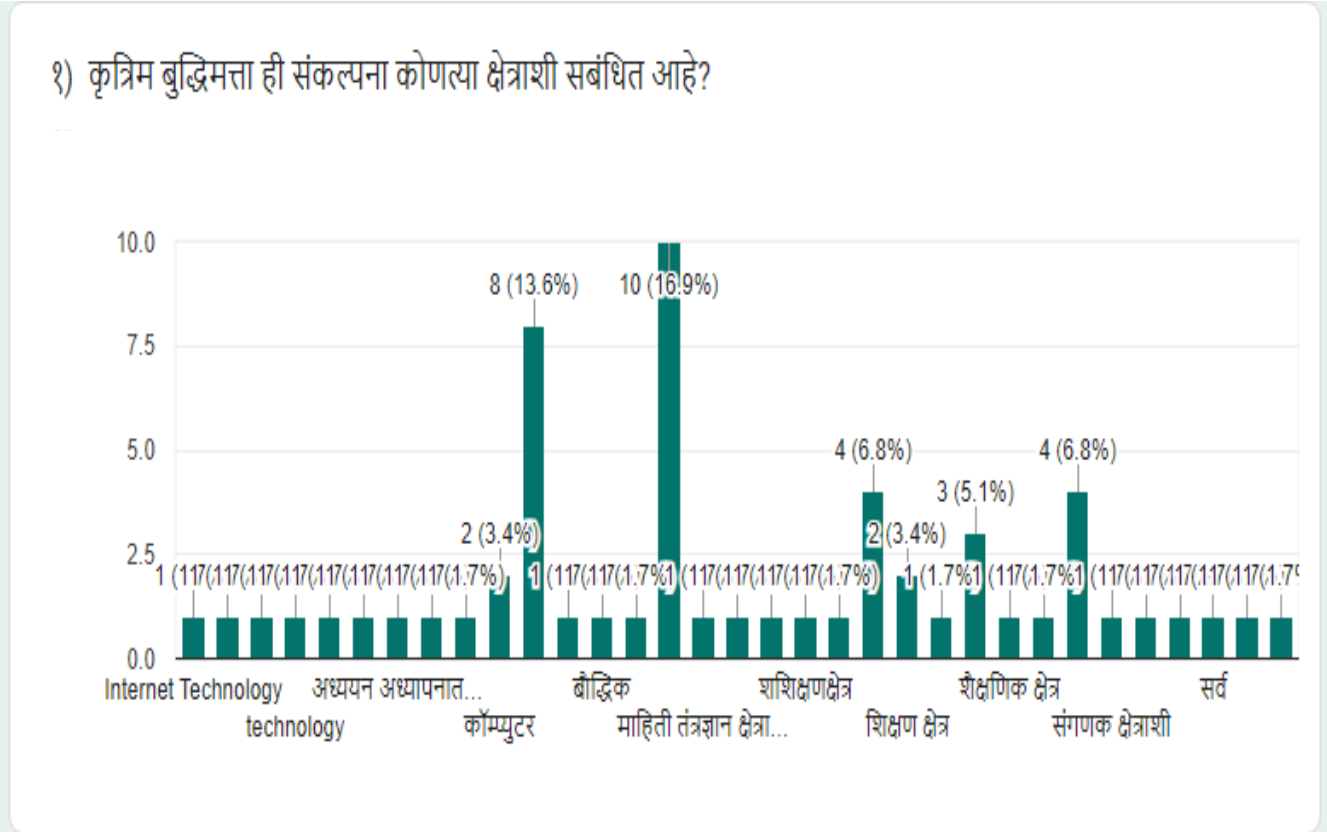
Table No. 4.1

Analysis of Questionnaire about present status of in-service primary teachers

Sr. No.	Questions	Yes %	No %	Remark
1	कृत्रिम बुद्धिमत्ता ही संकल्पना कोणत्या क्षेत्राशी सबंधित आहे?			16.9% said that its related to ICT
2	कृत्रिम बुद्धीमत्ता या संकल्पनेच्या शिक्षणातील वापराविषयी माहिती आहे का?	81.4	18.6	
3	खालीलपैकी कोणत्या कृत्रिम बुद्धीमत्तेच्या साधनाचा आपण अध्ययन अध्यापनामध्ये वापर केला आहे-?			57.6% are using Mobile 18.6% are using you tube 13.6% Google search
4	वरील साधनांव्यातिरिक्त इतर साधनाचा वापर केला असेल तर येथे त्याचे नाव नोंदवावे.			35.6% not used anything instead from given list
5	अध्यापनामध्ये कृत्रिम बुद्धिमत्तेचा वापर करता -अध्ययन" या विधानाशी "येतोतुम्ही सहमत आहात का?	96.6		
6	प्राथमिक शिक्षण घेत असताना विद्यार्थ्यांना स्वयं अध्ययनासाठी कृत्रिम बुद्धिमत्ता उपयुक्त आहे असे आपणास वाटते का?	93.2	6.8	
7	विद्यार्थांचा अध्ययन क्षय भरून काढण्यासाठी कृत्रिम बुद्धिमत्ता उपयुक्त आहे असे आपणास वाटते का?	84.7	15.3	
8	होय असेल तर कसे उपयुक्त आहे ते स्पष्ट करा.			60.5% said that its useful for self-learning
9	अध्ययन अध्यापनामध्ये - कृत्रिम बुद्धिमत्तेचा वापर करताना काय फायदे होतात ?			
10	अध्यन अध्यपनामध्ये - कृत्रिम बुद्धिमत्तेचा वापर करताना कोणत्या आव्हानांना सामोरे जावे लागते?			Mostly teachers said that mentaly, technical and many more issues
11	राष्ट्रीय शैक्षणिक धोरण २०२० आणि कृत्रिम बुद्धिमत्ता याचा काही सहसबंध आहे का?	93.2	6.8	
12	अटल टिंकरिंग लॅब, रोबोटिक्स लॅब विषयी माहिती आहे का?	67.8	32.2	
13	रोबोटिक्स लॅब कोणत्या शाळेला शासनाकडून देण्यात आलेल्या आहेत?			10% teachers don't know about it
14	AI म्हणजे काय?			71.2% teachers gave right answer
15	कृत्रिम बुद्धिमत्ता या तंत्रज्ञानाविषयी आपणास प्रशिक्षण आवश्यक आहे का?	100		

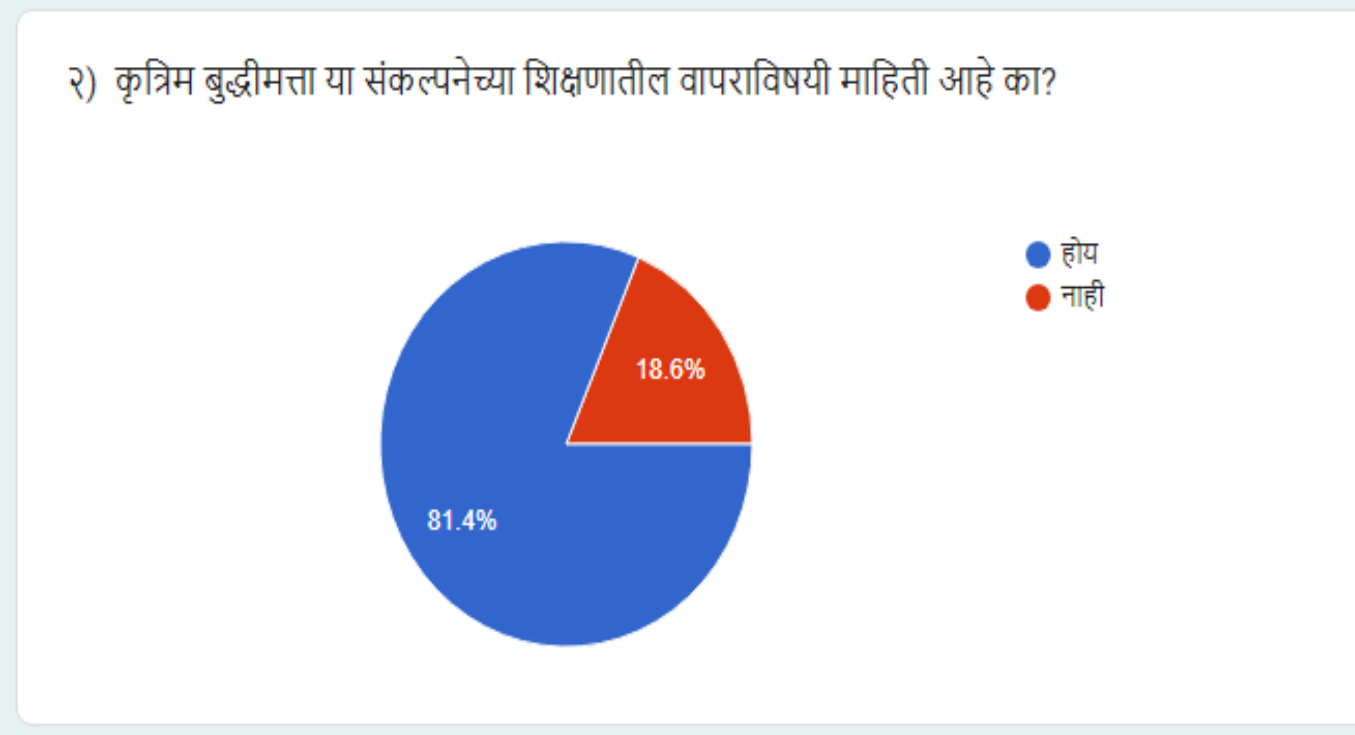
Graph wise explanation of questionnaire which shows the present status of in-service primary teachers about Artificial Intelligence

Graph No.4.1



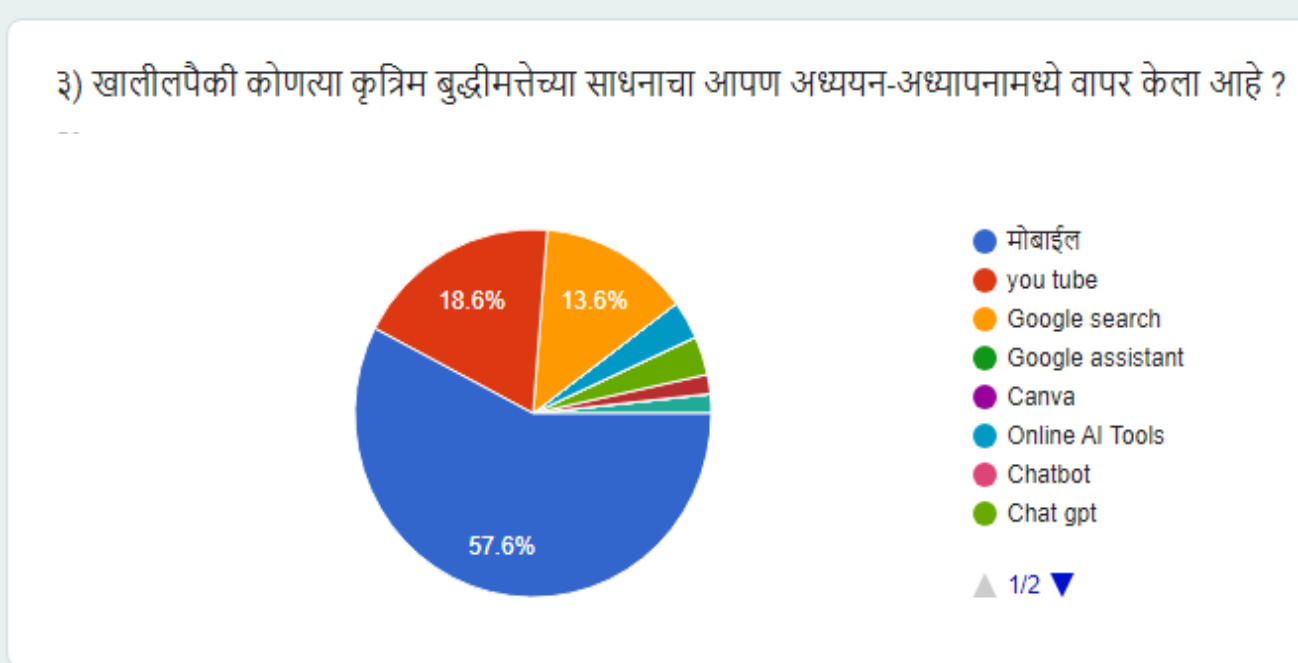
From this graph 16.9 % teachers are said that artificial intelligence is related with information technology field and 13.6% said that it's related with computer field. It means they need more information about artificial intelligence. There is so poor situation about awareness of artificial intelligence.

Graph No.4.2



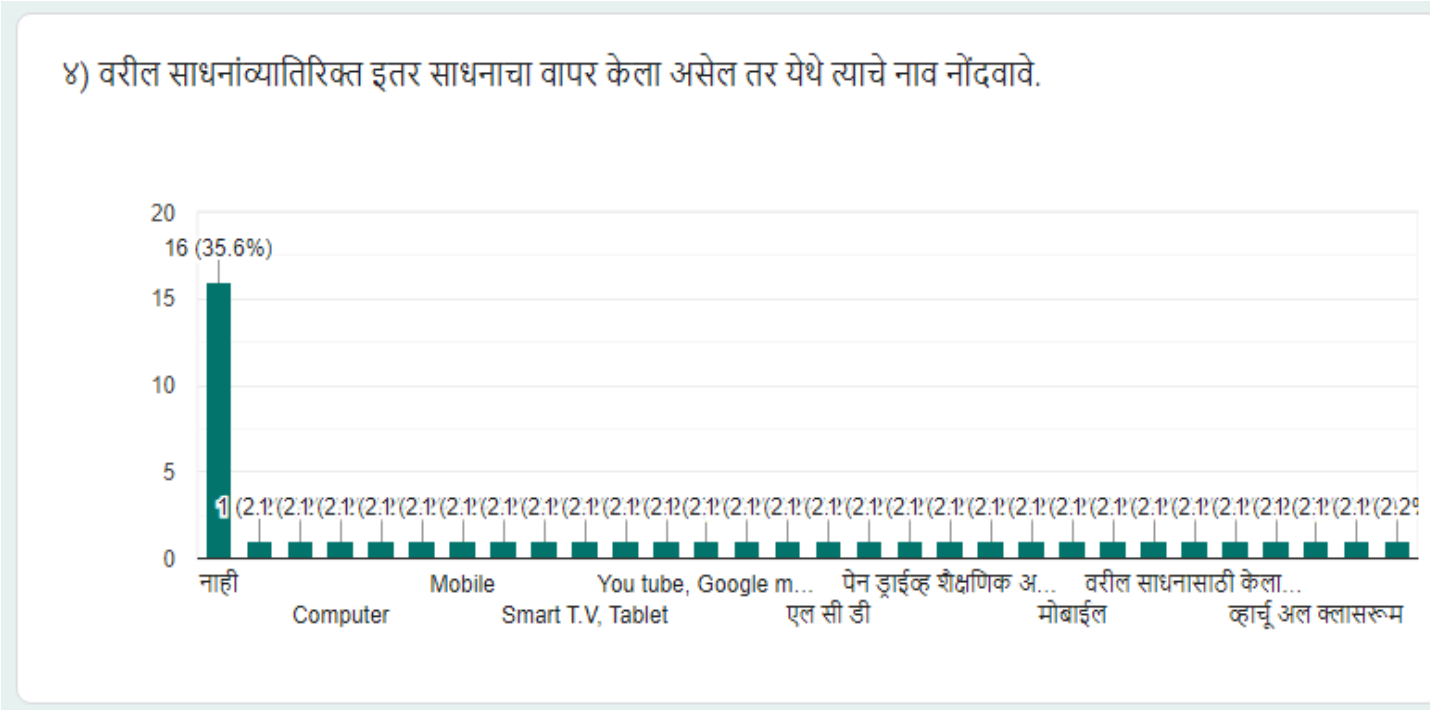
This graph shows that 81.4% teachers said that they know about use of AI in education but 18.6% teachers don't know about it so they need more information about it.

Graph No.4.3



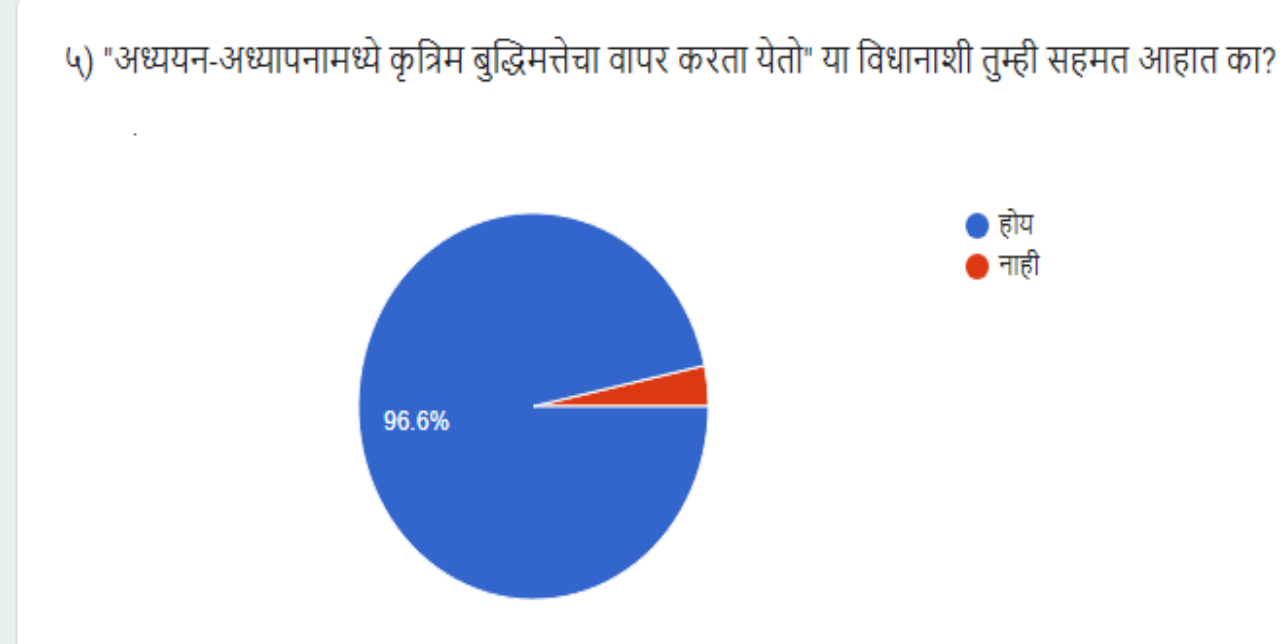
This graph shows that 57.6% teachers are using Mobil as tool of AI in education and 18.6% you tube as well as 13.6% Google search but very few are using online AI tools, it means teachers need awareness about the tool of AI and their use in regular teaching-learning process.

Graph No. 4.4



This graph shows that 35.6% teachers are not using other tool of AI which researcher not given in list of previous question. But very few are using other tool like tablet, pen drive, smart TV etc. This also shows that teachers need more information about tools of AI.

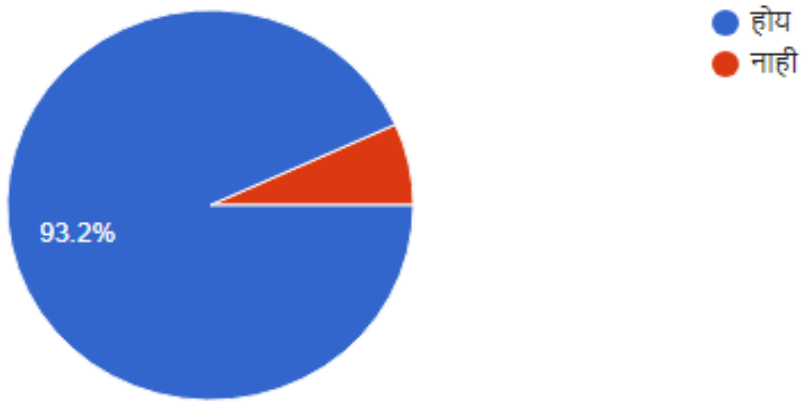
Graph No.4.5



This graph shows that 96.6% teachers are agree with researcher maid statement that AI can use in teaching-learning. But 3.4% are not agreeing so they need more information about AI.

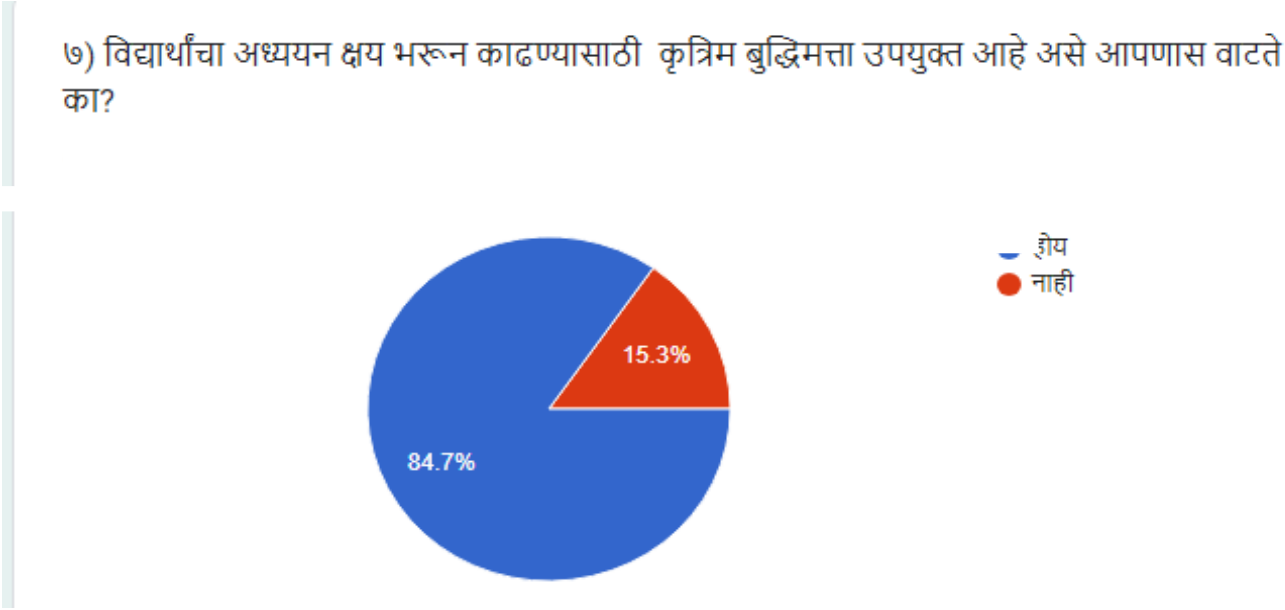
Graph No.4.6

६) प्राथमिक शिक्षण घेत असताना विद्यार्थ्यांना स्वयं अध्ययनासाठी कृत्रिम बुद्धिमत्ता उपयुक्त आहे असे आपणास वाटते का?



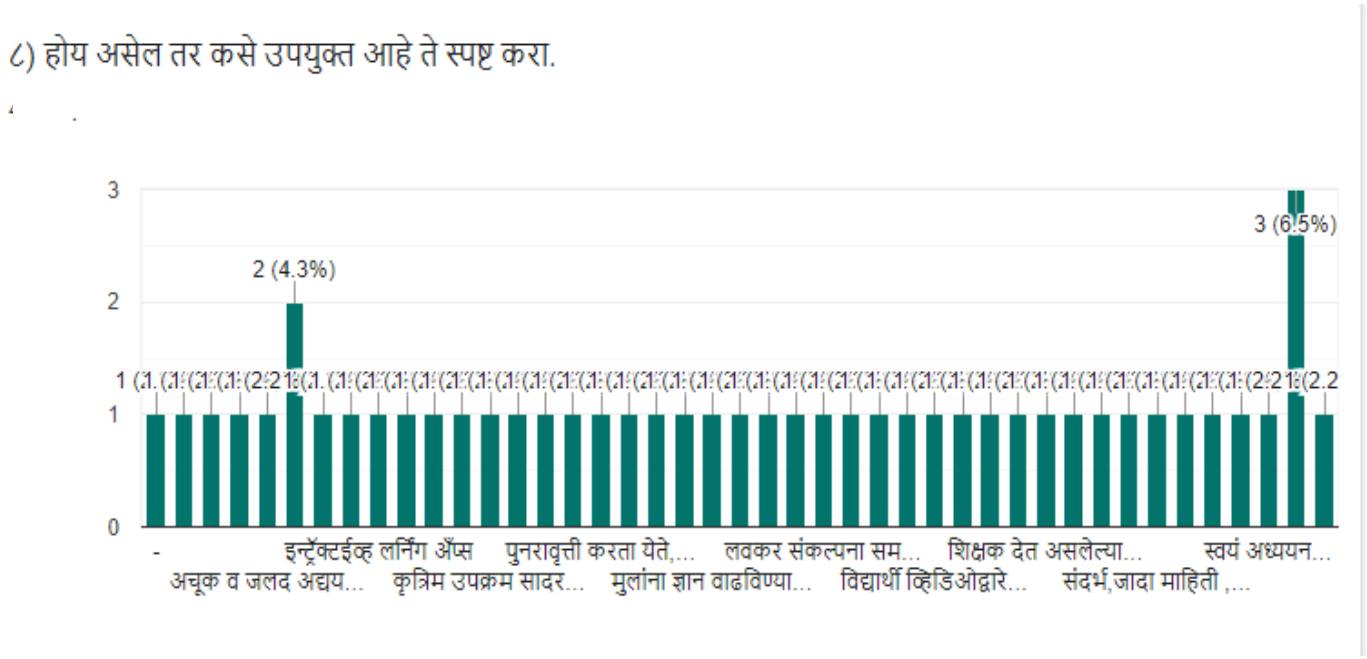
This graph shows that 93.2% teachers said that AI is useful to student for self-learning in primary education but remaining are not agreeing so they need more information about AI.

Graph No.4.7



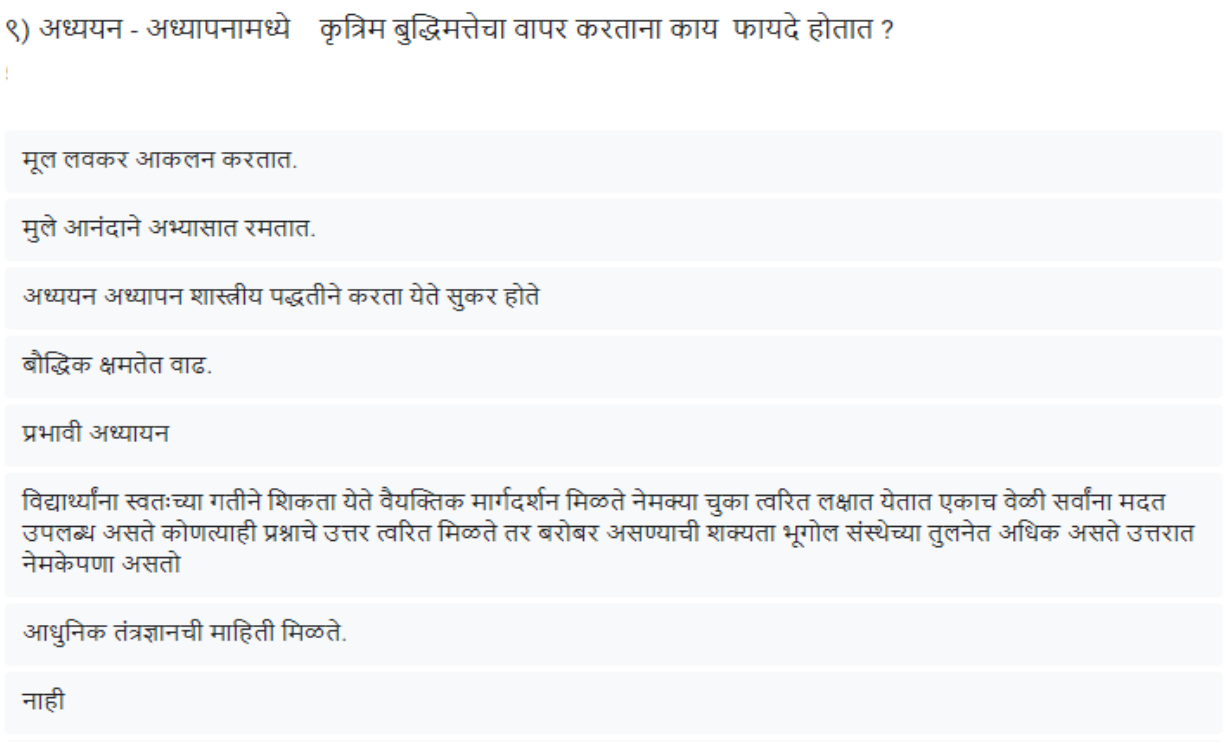
This chart shows that 84.7% teachers agee with researcher maid statement that AI is useful to reduce learnig gap of students but 15.3% teachers are not agree.

Graph No. 4.8



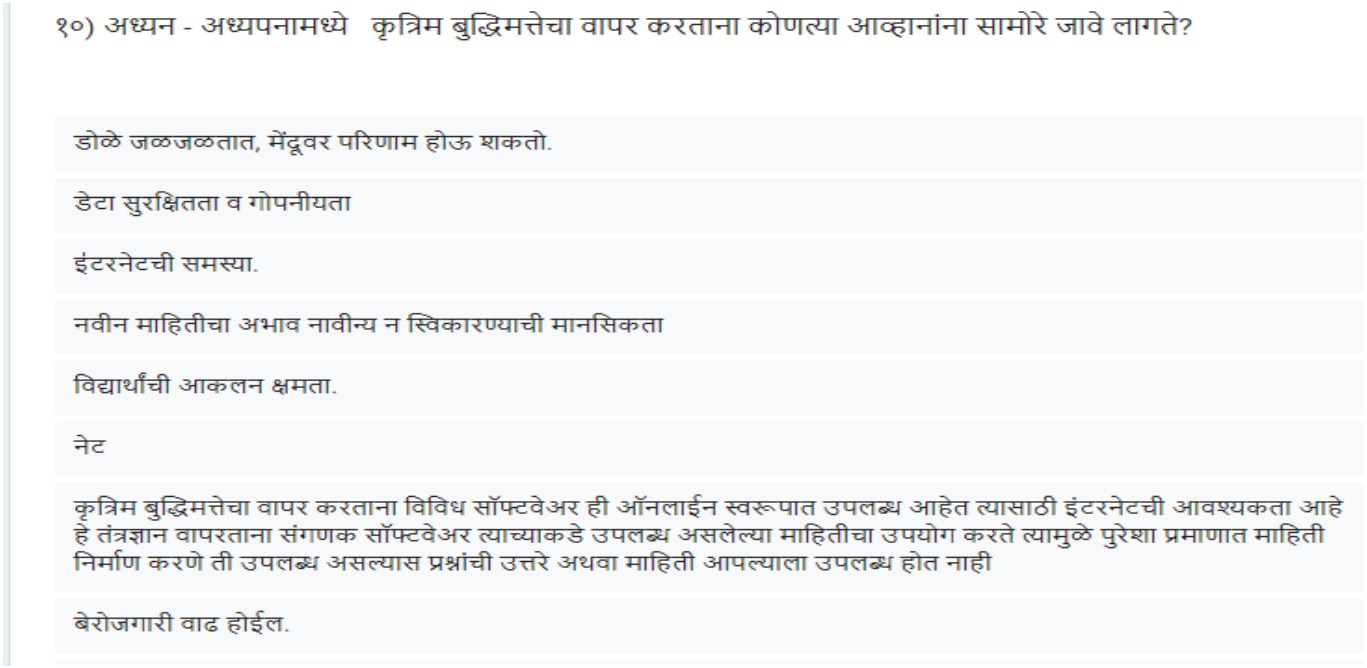
This graph shows that 6.5% teachers siad that AI is useful in self learning.

Graph No. 4.9



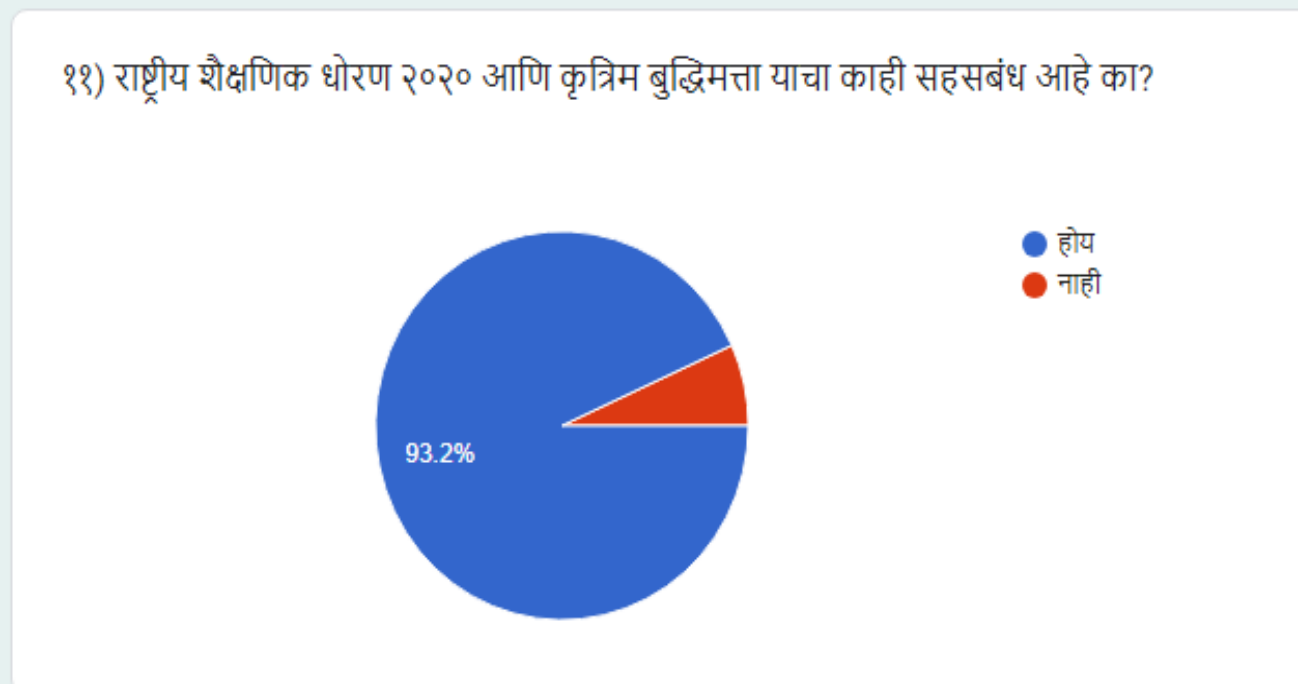
This chart shows that mostly tachers said that AI is useful in teacheing- learning for self learnig for students.

Graph No. 4.10



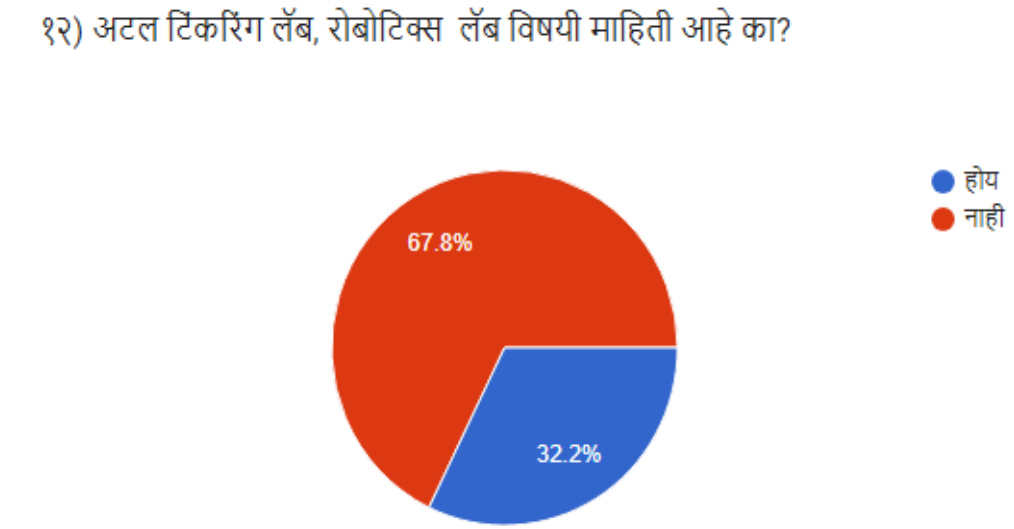
This graph shows that the challenges facing in use of AI in teaching learning process that are physical problems, techniquel isssues etc.

Graph No. 4.11



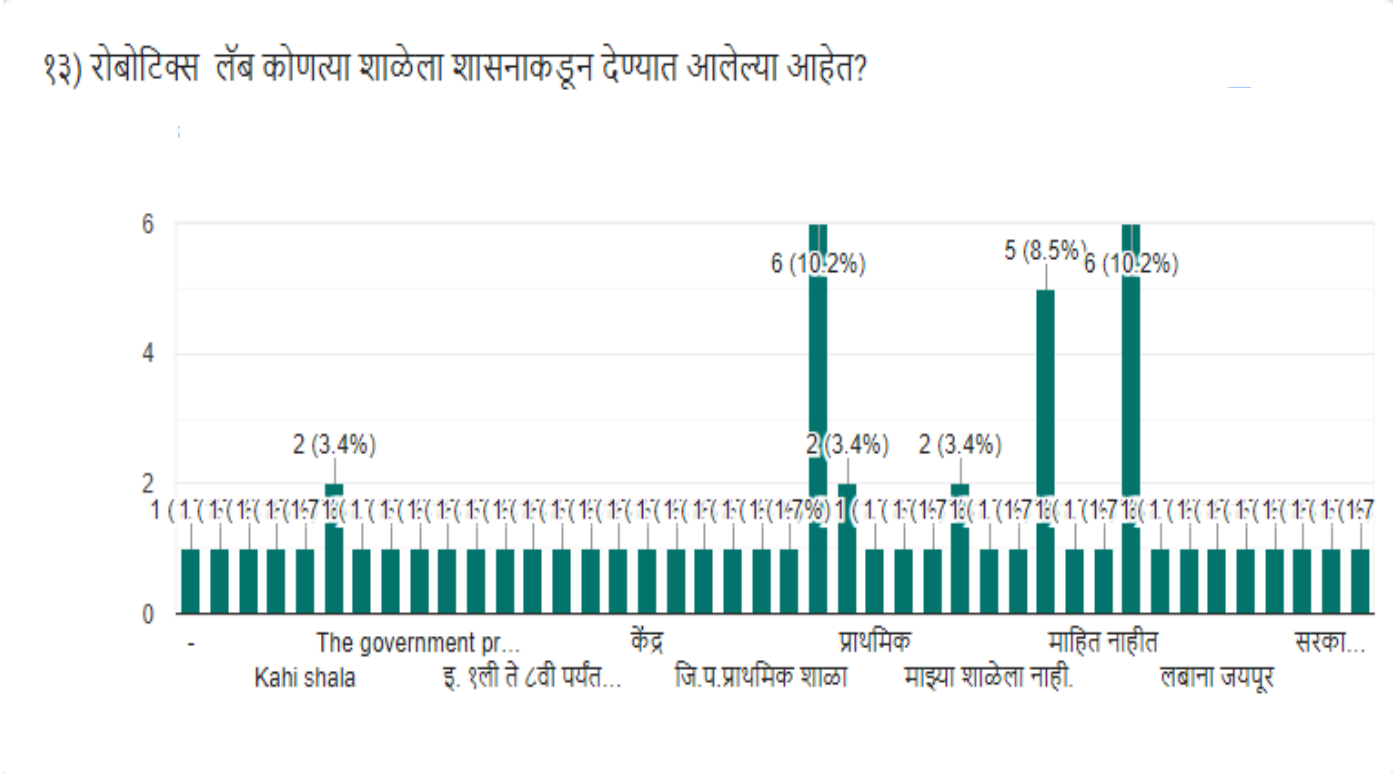
This graph shows that 93.2 % teachers are agree with the researcher made statement that there is relation between NEP2020 and AI but remaining are not agree.

Graph No. 4.12



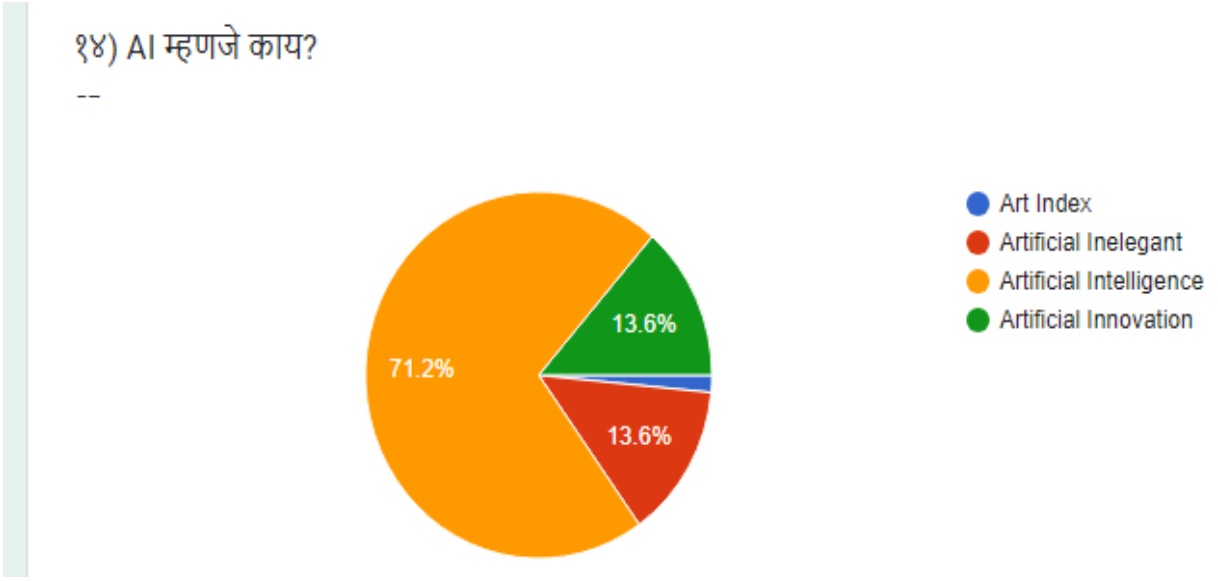
This graph shows that 32.2 % teachers are not aware about ATAL Tinkaring LAB and rototics lab which are for zp school.

Graph No.4.13



This graph show that 10.2 % teachers knows that robotics lab are for zp school and other don't know about it. It means they need more information about it.

Graph No. 4.14



This graph shows that 71.2% teachers are giving right answer that AI means artificial intelligence but reaming doesn't know about it. So they need more information about it.

Graph No.4.15

This graph shows that 100% teacher needs training about AI.

Through this questionnaire it clears that in- service primary teachers from Sindhudurg district didn't have much awareness about artificial intelligence and use of it in teaching learning process.

Objective No. 2 To finalize the tools of artificial intelligence.

Table No.4.2 Researcher Made Checklist

Researcher made check list of tools of artificial intelligence and checked by expert. Following tools are accepted by 6 experts.

No.	Tools of AI	Remark
1	Google Search	Accepted by experts
2	Google Assistant	Accepted by experts
3	Google map	Accepted by experts
4	Google Photos	Accepted by experts
5	You Tube	Accepted by experts
6	Facebook	Accepted by experts
7	Smart Watch	Accepted by experts
8	Chat bot	Accepted by experts
9	Chat gpt	Accepted by experts
10	Virtual classes	Accepted by experts
11	Online meet on Zoom, Google meet, Webex, Microsoft Teams	Accepted by experts
12	Drone Camera	Accepted by experts
13	Face Recognition	Accepted by experts
14	AI Online PPT maker	Accepted by experts
15	AI online Video Maker	Accepted by experts
16	Interactive Panel	Accepted by experts
17	Online Payment e.g. Gpay,phonpay etc.	Accepted by experts
18	Smart TV	Accepted by experts
19	Robots	Accepted by experts
20	Online Courses e.g. MOOC , DIKSHA , SWAYAM etc.	Accepted by experts

Objective No.3 To develop awareness programme about use of artificial intelligence in science and mathematics subjects teaching – learning process.

Researcher developed Artificial Intelligence awareness program on Science and Mathematics subjects for in- service primary teachers. This programme was checked by experts. 95% experts remarked that this programme will be effective to create awareness among in-service primary teachers about use of artificial intelligence in science and maths subjects teaching – learning process.

Objective No.4 To implement the awareness programme for primary teachers.

Researcher conducted training for create awareness about use of AI in science and maths subjects teaching – learning process among in-service primary teachers from Sindhudurg districts.

Objective No. 5 To find out the effectiveness of awareness programme for primary teachers.

For this objective researcher took pre-test and post-test and from that result it proves that this awareness program strongly effective to create awareness among in-service primary teachers about Artificial Intelligence and use of its tools in Mathematics and Science teaching and learning process.

Following are tables which shows response of in-service teachers in pre-test and post-test.

Table No. 4.3

Analysis of Pre-test of In-service primary teachers from Sindhudurg district about Artificial Intelligence

Sr. No.	Questions	Yes %	No%	Remark
1	खालीलपैकी कृत्रिम बुद्धिमत्तचे जनक कोणाला म्हंटले जाते?			78.3 gave right answer
2	Artificial intelligence is the ---------- and technology which making machines those are intelligent			79.5% gave right answer
3	खालीलपैकी कृत्रिम बुद्धीमत्तेचे प्रकार कोणते?			89.2% gave right answer
4	"Chatbot हे एक Narrow AI चे वैशिष्ट्य आहे?" सत्य की असत्य	89.2	10.8	
5	खालीलपैकी कृत्रिम बुद्धीमत्ता अंतर्गत आपण कोणते साधन वापरू शकतो?			79.5% said that google search 50% said that Google Assistant
6	राष्ट्रीय शैक्षणिक धोरण २०२० मधील कोणत्या क्रमांकाच्या मुद्द्यामध्ये तंत्रज्ञान व एकात्मीकरण यावर विवेचन केलेले आहे?			42.8% gave right answer
7	जिल्हा परिषद शाळांमध्ये कृत्रिम बुद्धिमत्तेचा वापर अध्ययन अध्यापनामध्ये केला जात आहे का?	86.7	13.3	
8	होय असेल तर कोणत्या प्रकारे ते स्पष्ट करा.			
9	अध्ययन - अध्यापनामध्ये कृत्रिम बुद्धिमत्तेचा वापर करून आपण आंतरारष्ट्रीय शिक्षण देवू शकू असे वाटते का ?	96.4		
10	अध्यन - अध्यपनामध्ये कृत्रिम बुद्धिमत्तेचा वापर करून विद्यार्थ्यामधील कोणत्या क्षमता/कौशल्य विकसित करता येतील ?			81.9% said that self-learning
11	राष्ट्रीय शैक्षणिक धोरण २०२० नुसार कृत्रिम बुद्धिमत्ता अंमलबजावणी यशस्वी करण्यासाठी मी स्वतः अद्ययावत कशाप्रकारे राहू शकतो?			Mostly said that by training
12	कृत्रिम बुद्धिमत्तेचा वापर करून आपण कोणते प्रशिक्षण घेतले आहे का?	68.7	31.4	
13	Can technology replace teacher?	67.5	32.5	
14	AI म्हणजे काय?			86.7% gave right answer

15	कृत्रिम बुद्धिमत्ता या तंत्रज्ञानामधील विविध साधनांच्या शिक्षण क्षेत्रातील वापराविषयी आपणास प्रशिक्षण आवश्यक आहे का?	97.6		

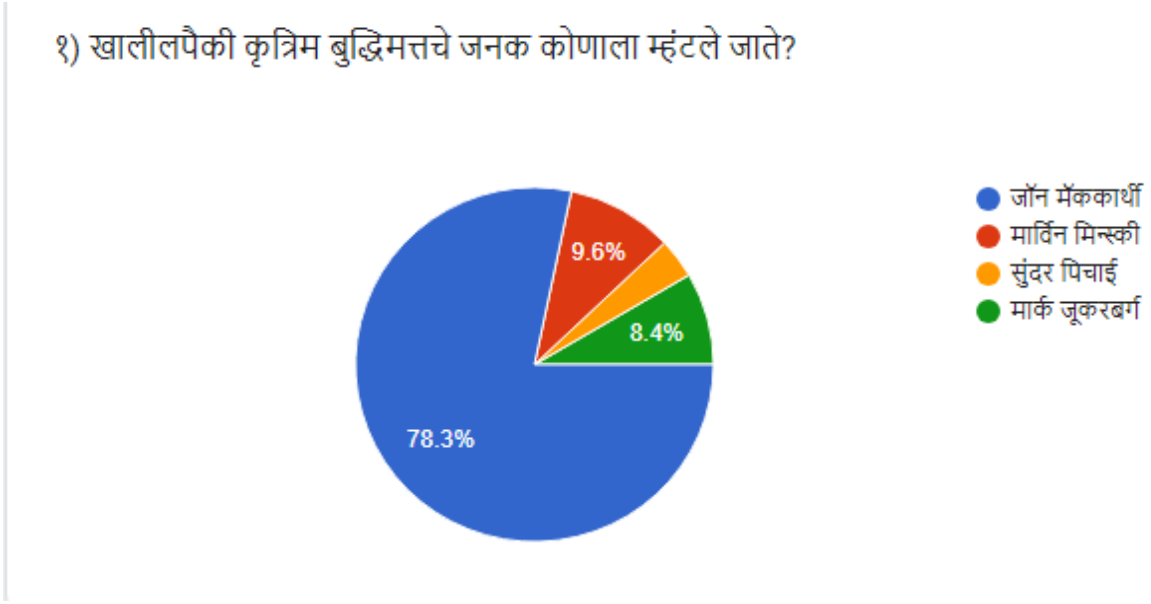
Table No. 4.4

Analysis of Post- test of in – service primary teachers about awareness of AI on Science and Maths subjects teaching- learning process.

Sr. No.	Questions	Yes%	No%	Remark
1	खालीलपैकी कृत्रिम बुद्धिमत्तचे जनक कोणाला म्हंटले जाते?			85.7% right answered
2	Artificial intelligence is the ---------- and technology which making machines those are intelligent			77.1% right answered
3	खालीलपैकी कृत्रिम बुद्धीमत्तेचे प्रकार कोणते?			80% right answered
4	"Chatbot हे एक Narrow AI चे वैशिष्ट्य आहे?" सत्य की असत्य	100		
5	खालीलपैकी कृत्रिम बुद्धीमत्ता अंतर्गत आपण कोणते साधन वापरू शकतो?			80% said that google search
6	राष्ट्रीय शैक्षणिक धोरण २०२० मधील कोणत्या क्रमांकाच्या मुद्द्यामध्ये तंत्रज्ञान व एकात्मीकरण यावर विवेचन केलेले आहे?			28.6% right answered
7	जिल्हा परिषद शाळांमध्ये कृत्रिम बुद्धिमत्तेचा वापर अध्ययन अध्यापनामध्ये केला जात आहे का?	97.1		
8	होय असेल तर कोणत्या प्रकारे ते स्पष्ट करा.			
9	अध्ययन - अध्यापनामध्ये कृत्रिम बुद्धिमत्तेचा वापर करून आपण आंतरारष्ट्रीय शिक्षण देवू शकू असे वाटते का ?	97.1		
10	अध्यन - अध्यपनामध्ये कृत्रिम बुद्धिमत्तेचा वापर करून विद्यार्थ्यामधील कोणत्या क्षमता/कौशल्य विकसित करता येतील ?			94.3% said that self – learning
11	राष्ट्रीय शैक्षणिक धोरण २०२० नुसार कृत्रिम बुद्धिमत्ता अंमलबजावणी यशस्वी करण्यासाठी मी स्वतः अद्ययावत कशाप्रकारे राहू शकतो?			By training
12	कृत्रिम बुद्धिमत्तेचा वापर करून आपण कोणते प्रशिक्षण घेतले आहे का?	45.7	54.3	
13	Can technology replace teacher?	34.3	65.7	
14	AI म्हणजे काय?			91.4% gave right answer
15	कृत्रिम बुद्धिमत्ता या तंत्रज्ञानामधील विविध साधनांच्या शिक्षण क्षेत्रातील वापराविषयी आपणास प्रशिक्षण आवश्यक आहे का?	94.3		

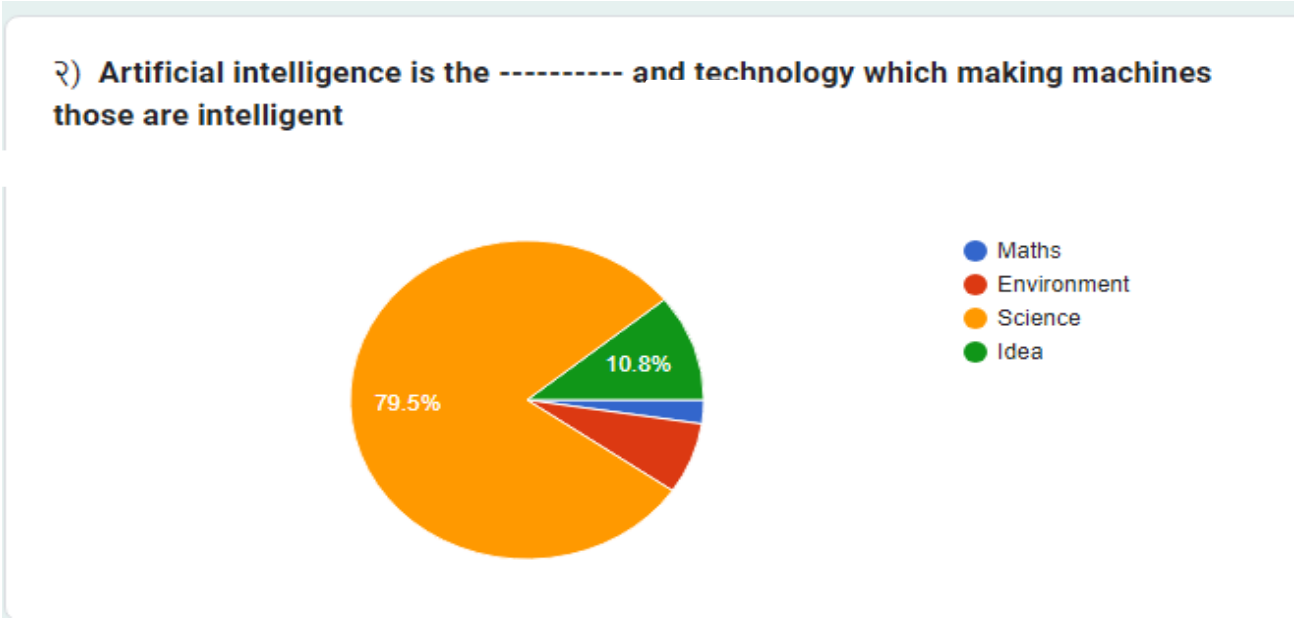
Pre Test Responses Graph wise -

Graph No. 4.16



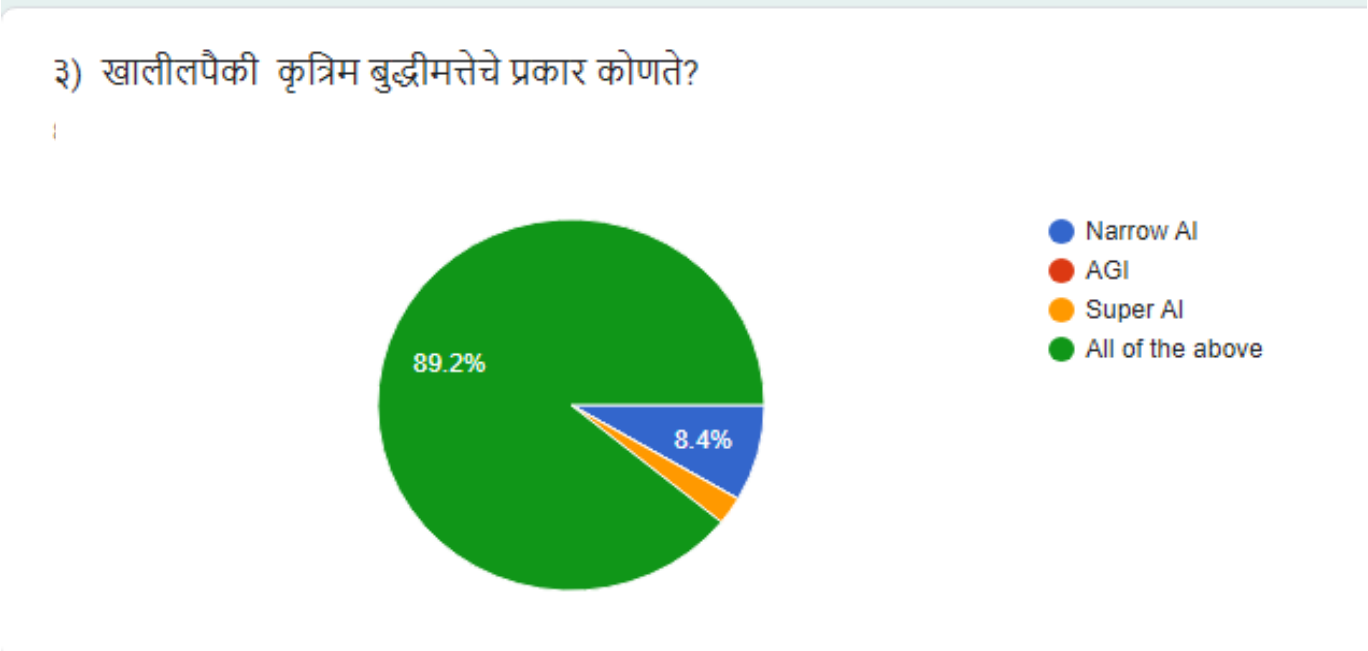
From this graph it shows that 78.3% teachers know about the father of AI but remaining are wrong.

Graph No. 4.17



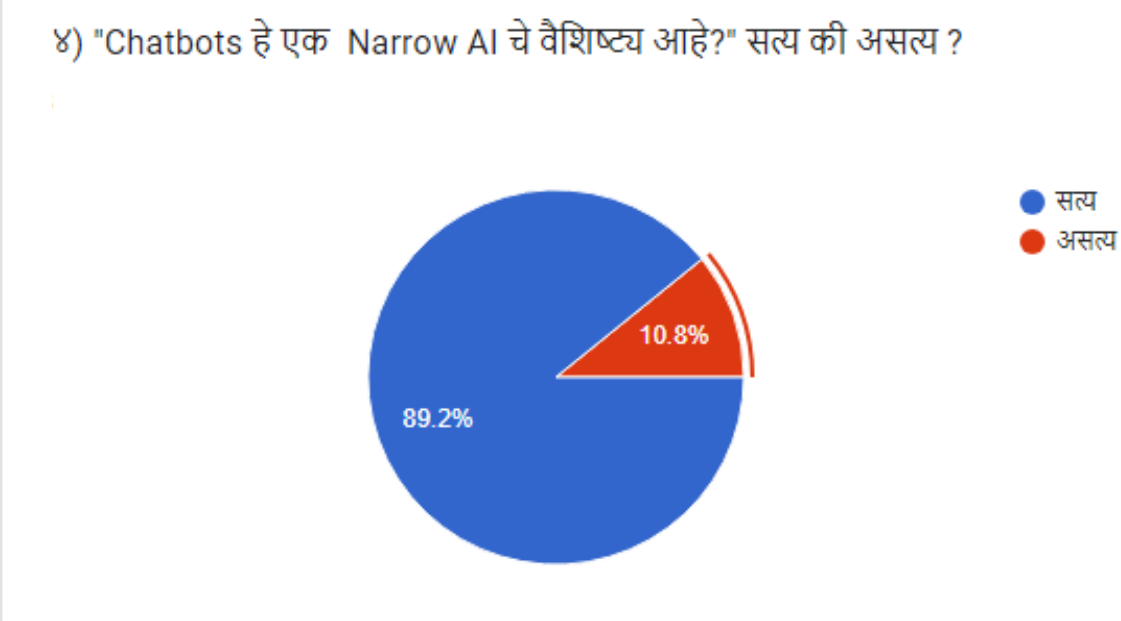
This graph shows that 79.5% teachers giving right answer of this stamen but reaming are wrong.

Graph No. 4.18



This graph shows that 89.2% teachers knows about the type of AI remaining are doesn't know about it.

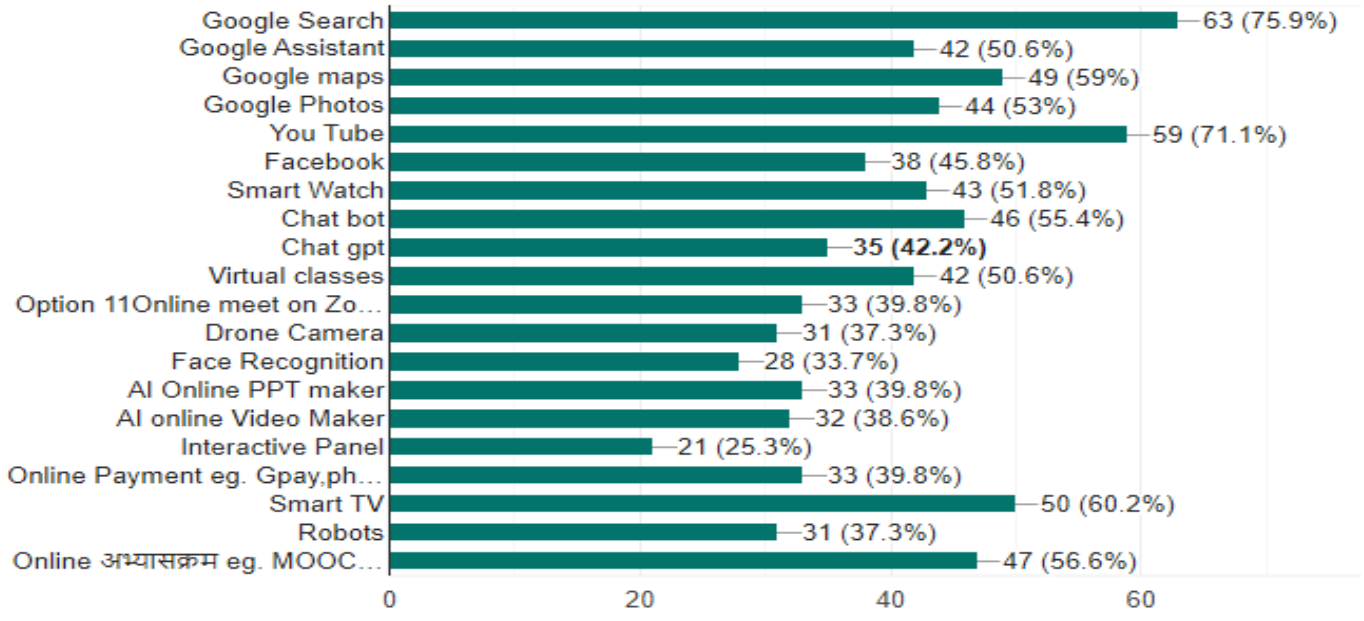
Graph No. 4.19



This chart shows that 89.2% teachers are agree with researcher made statement but remaining are not agree.

Graph No. 4.20

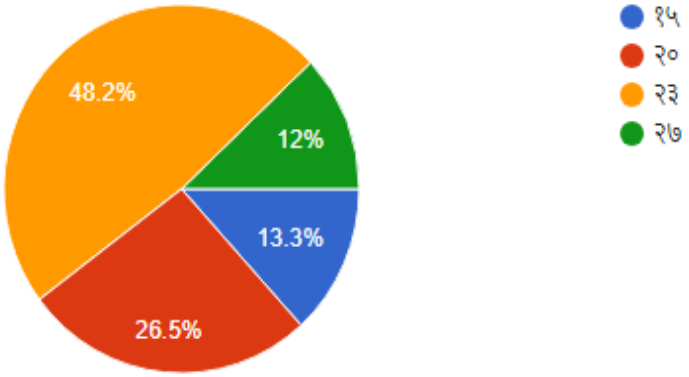
५) खालीलपैकी कृत्रिम बुद्धीमत्ता अंतर्गत आपण कोणते साधन वापरू शकतो?



This graph shows that 75.9% teachers used Google search under AI and other used other tools in teaching learning process.

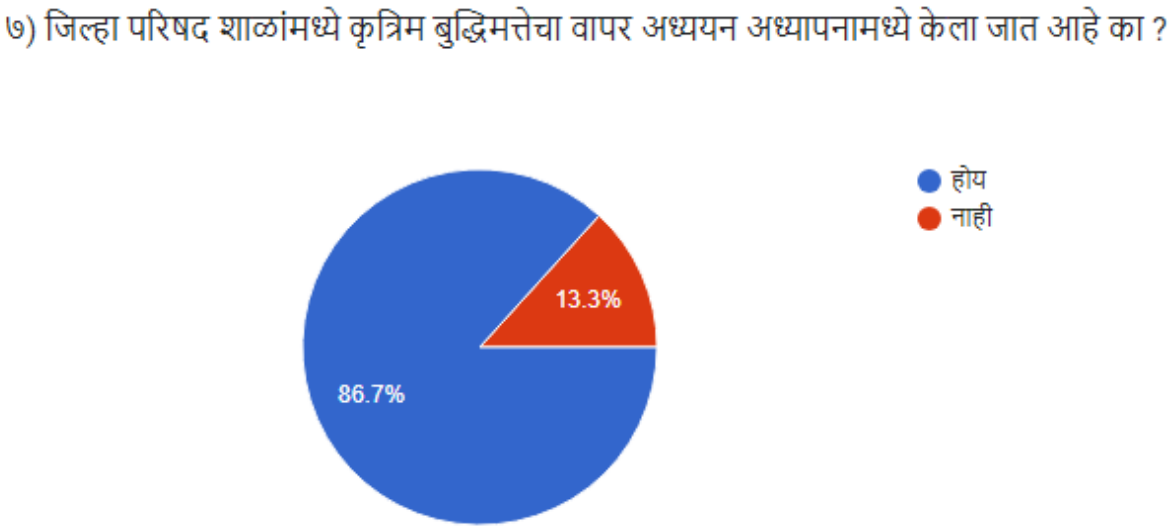
Graph No. 4.21

६) राष्ट्रीय शैक्षणिक धोरण २०२० मधील कोणत्या क्रमांकाच्या मुद्द्यामध्ये तंत्रज्ञान व एकात्मीकरण यावर विवेचन केलेले आहे?



This graph shows that 48.2% teachers are aware about the point which said about technology and inclusion reference in NEP 2020. But other is not aware about it.

Graph No. 4.22



This graph shows that 86.7% teachers are said agree with research her maid statement that there is use of AI in teaching learning process in Zilha Parishad School. But other teachers are not agree.

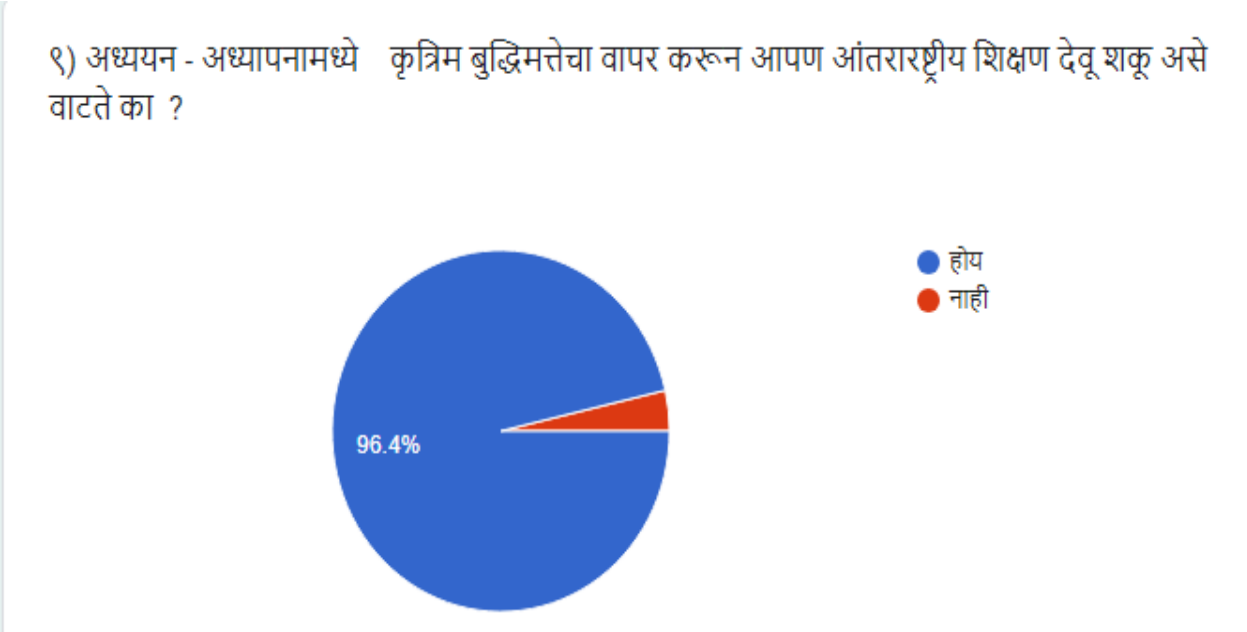
Graph No. 4.23

८) होय असेल तर कोणत्या प्रकारे ते स्पष्ट करा.

Computer
मोबाईल,यू ट्यूब
दिक्षा अॅपचा वापर
English word
स्मार्ट टीव्ही वापर . दिक्षा ॲप
Smart TV, यु ट्यूब,
युट्यूब ,गुगल सर्च
यु ट्युब
दैनंदिन अध्ययन अध्यापन पद्धती

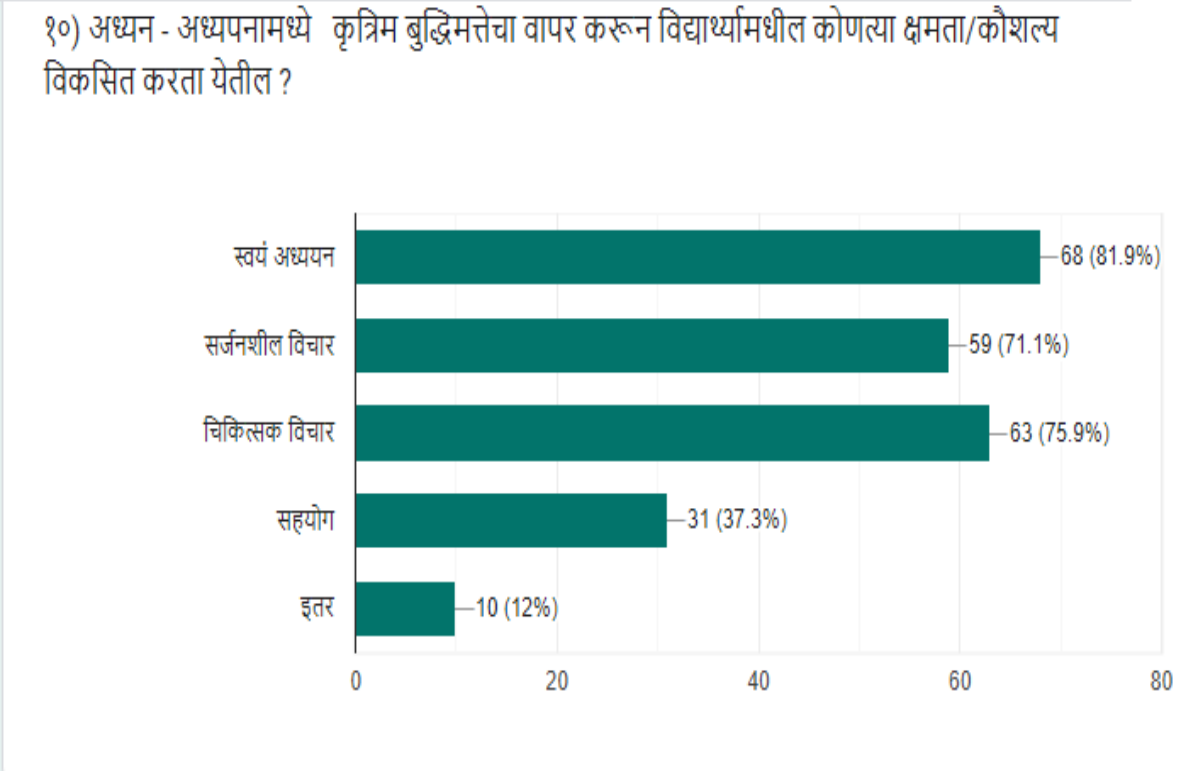
This graph shows the tools of AI used in Zilha Parishad school.

Graph No. 4.24



This graph shows that 96.4% teachers are agree with the researcher made statement that we can give international education through use of AI in teaching- learning process.

Graph No. 4.25



This graph shows that 81.9% teachers said that student can improve their self-learning by use of AI in education.

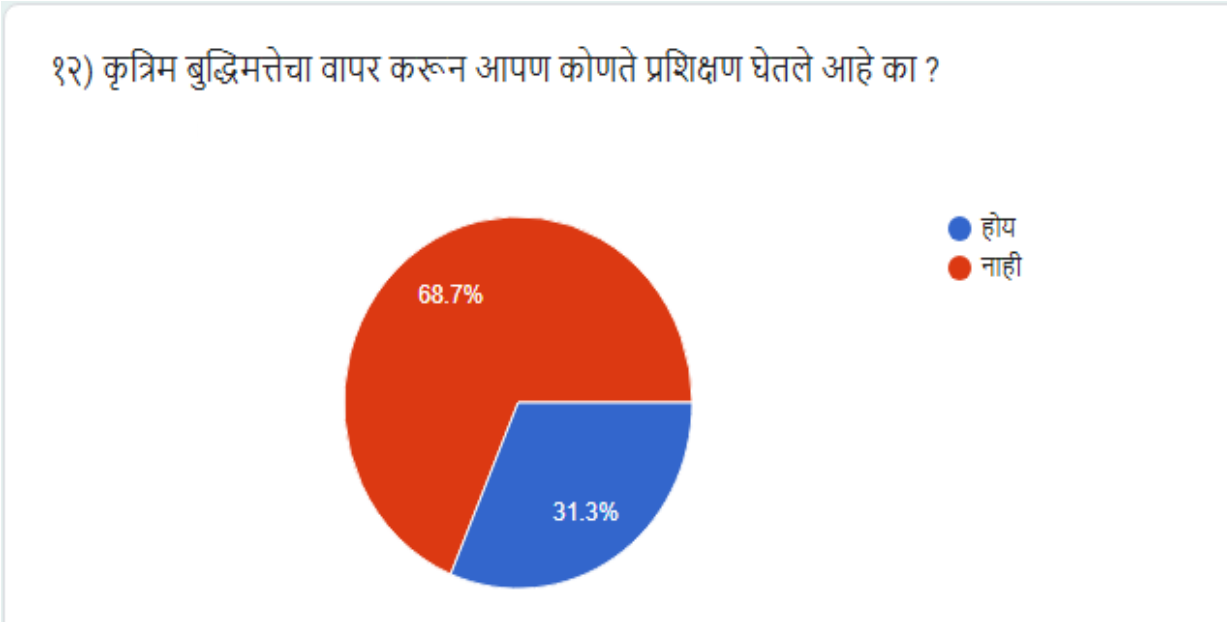
Graph No. 4.26

११) राष्ट्रीय शैक्षणिक धोरण २०२० नुसार कृत्रिम बुद्धिमत्ता अंमलबजावणी यशस्वी करण्यासाठी मी स्वतः अद्ययावत कशाप्रकारे राहू शकतो ?

प्रशिक्षण
-
तंत्रस्नेही प्रशिक्षण घेणे
अपडेट राहून, प्रक्षिक्षण घेवून
तंत्र उपयोग
वेगवेगळी प्रशिक्षणे
स्वतः चे ज्ञान अद्ययावत करुन
विविध तांत्रिक साधने वापरायला शिकेन

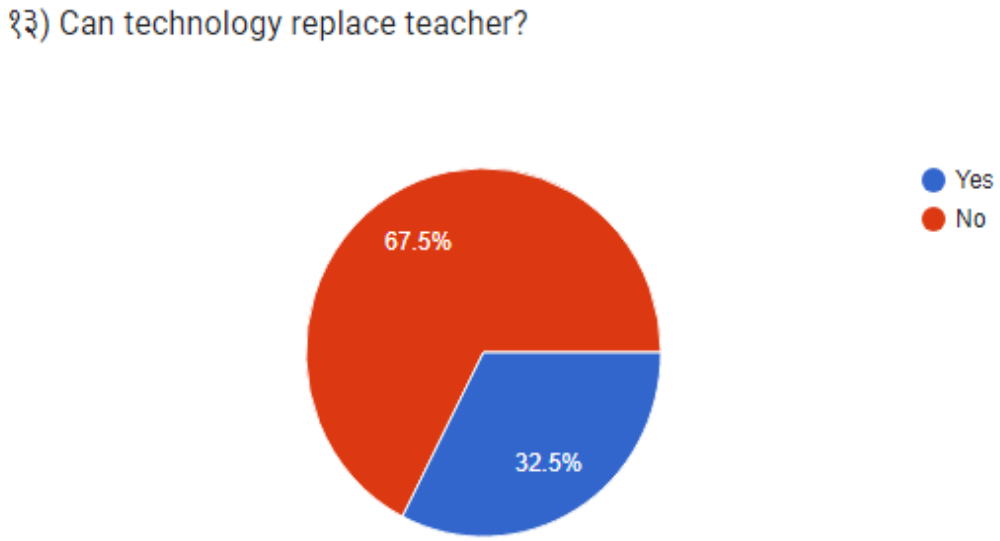
This graph shows that mostly teacher need training about AI for successful implementation of NEP2020.

Graph No. 4.27



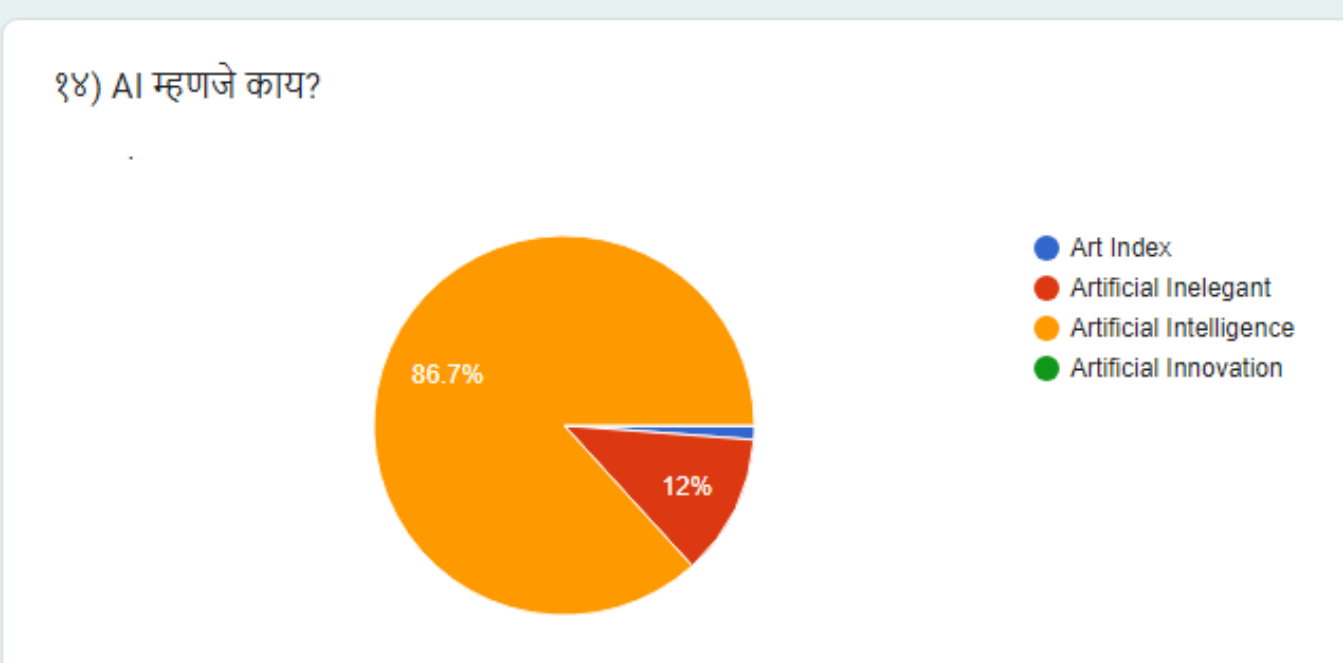
This graph shows that 68.7% teachers had taken training of AI.

Graph No. 4.28



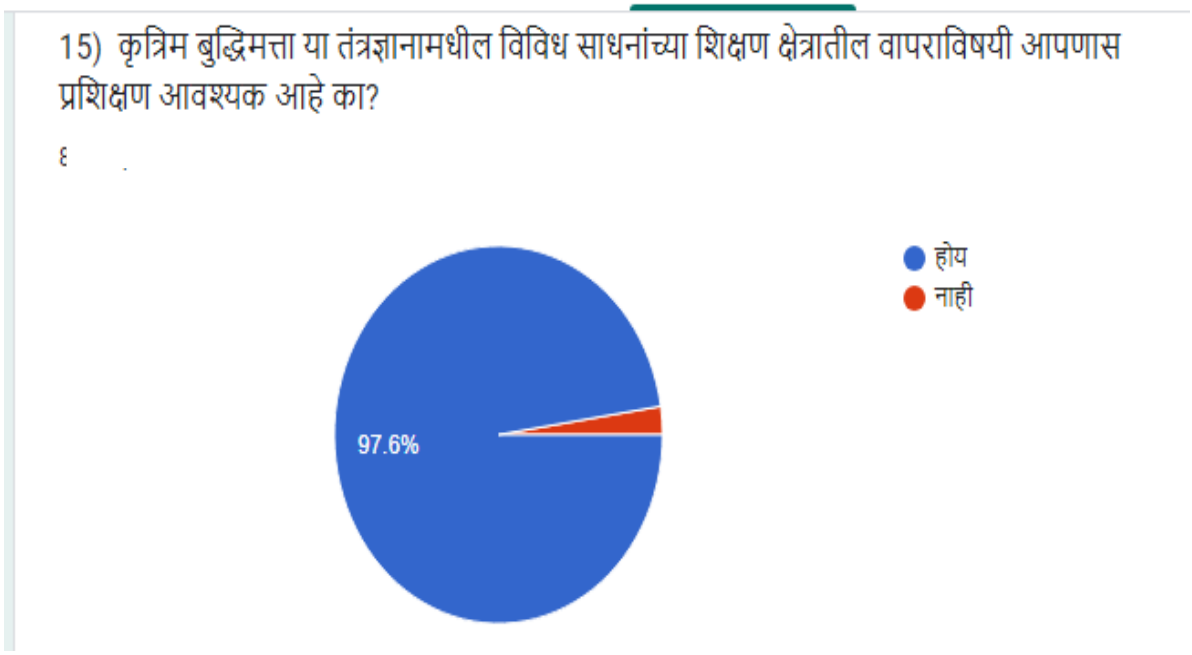
This graph shows that 67.5% teachers are agree with researcher made statement that technology can replace teacher but it's wrong it means they need more information about it.

Graph No. 4.29



This graph shows that 86.7% teachers told right answer but remaining need training.

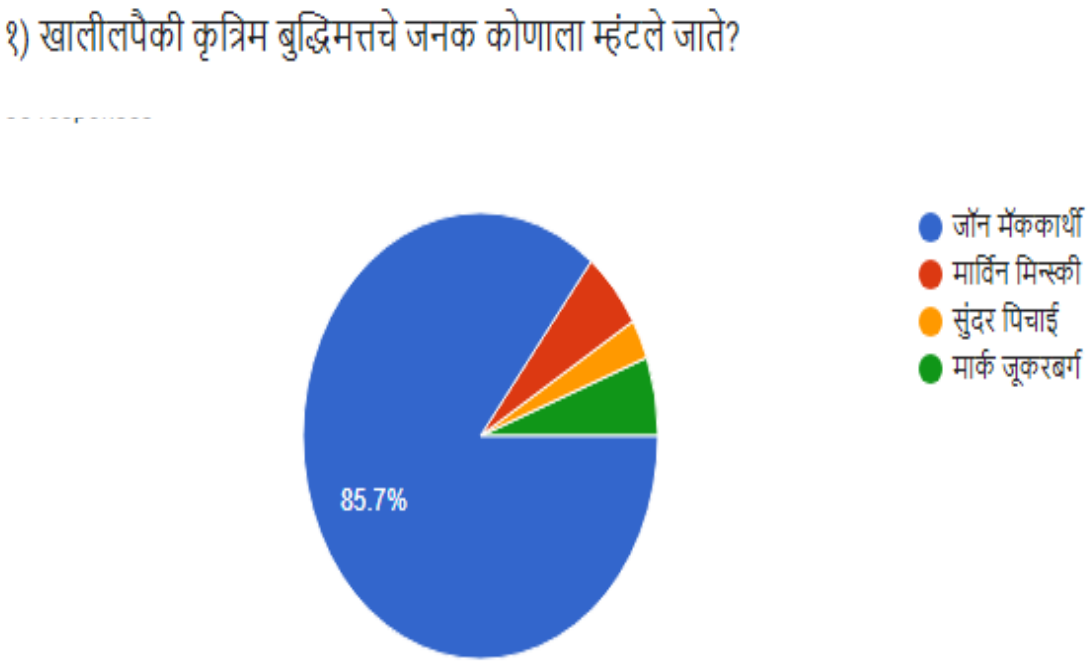
Graph No. 4.30



This graph shows that 97.6% teachers need training of use of AI in education.

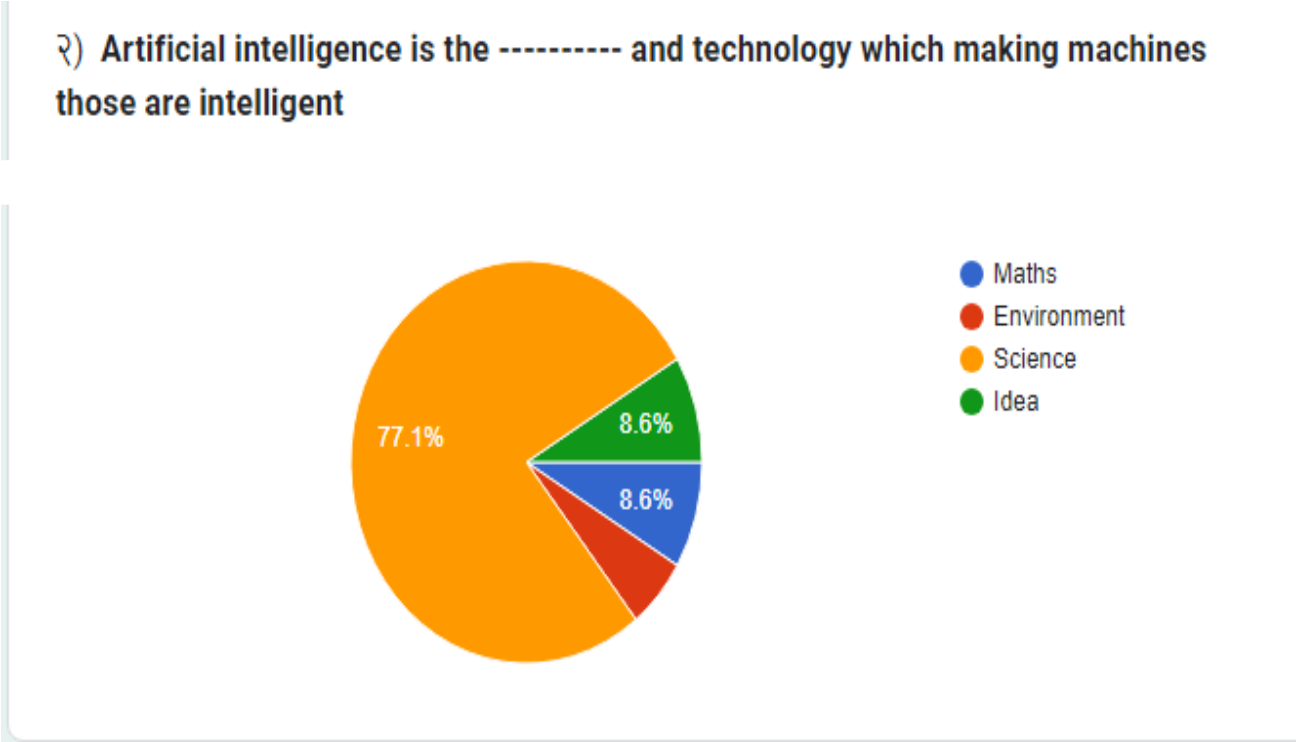
Post Test Responses Graph wise -

Graph No. 4.31



This graph shows that 85.7% teachers gave right answer of question which is more than pre-test response that is 78.3% after awareness program.

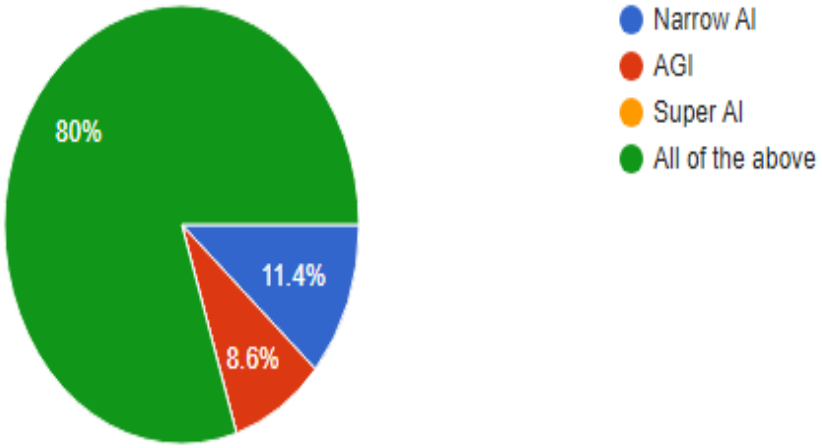
Graph No. 4.32



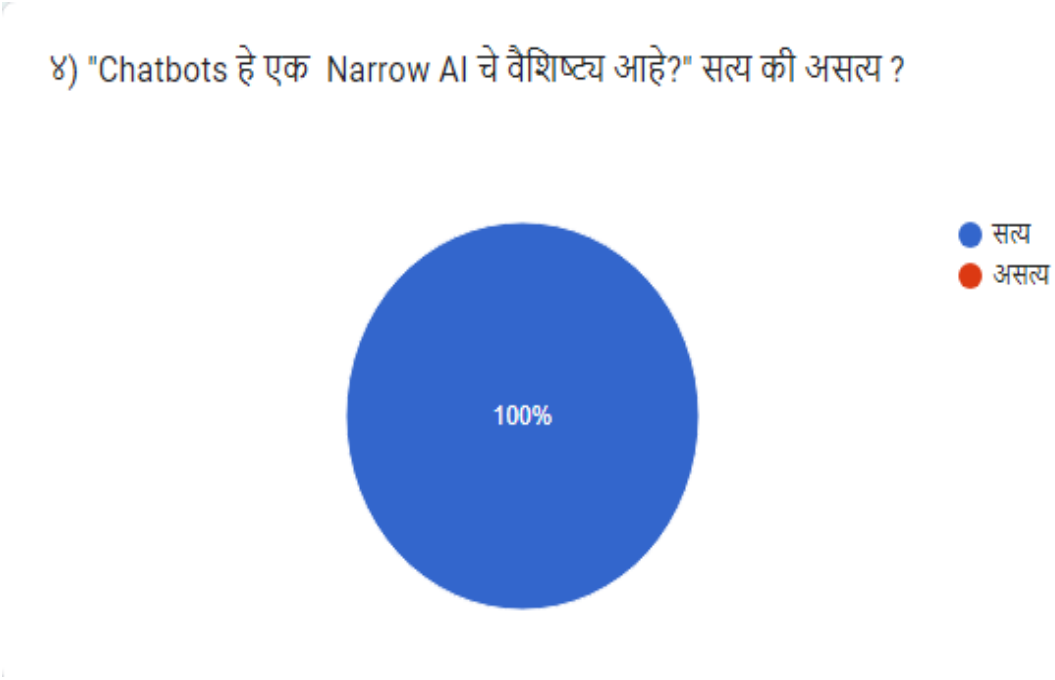
This graph shows that 77.1% teachers gave right answer of statement of researcher made statement.

Graph No. 4.33

३) खालीलपैकी कृत्रिम बुद्धीमत्तेचे प्रकार कोणते?

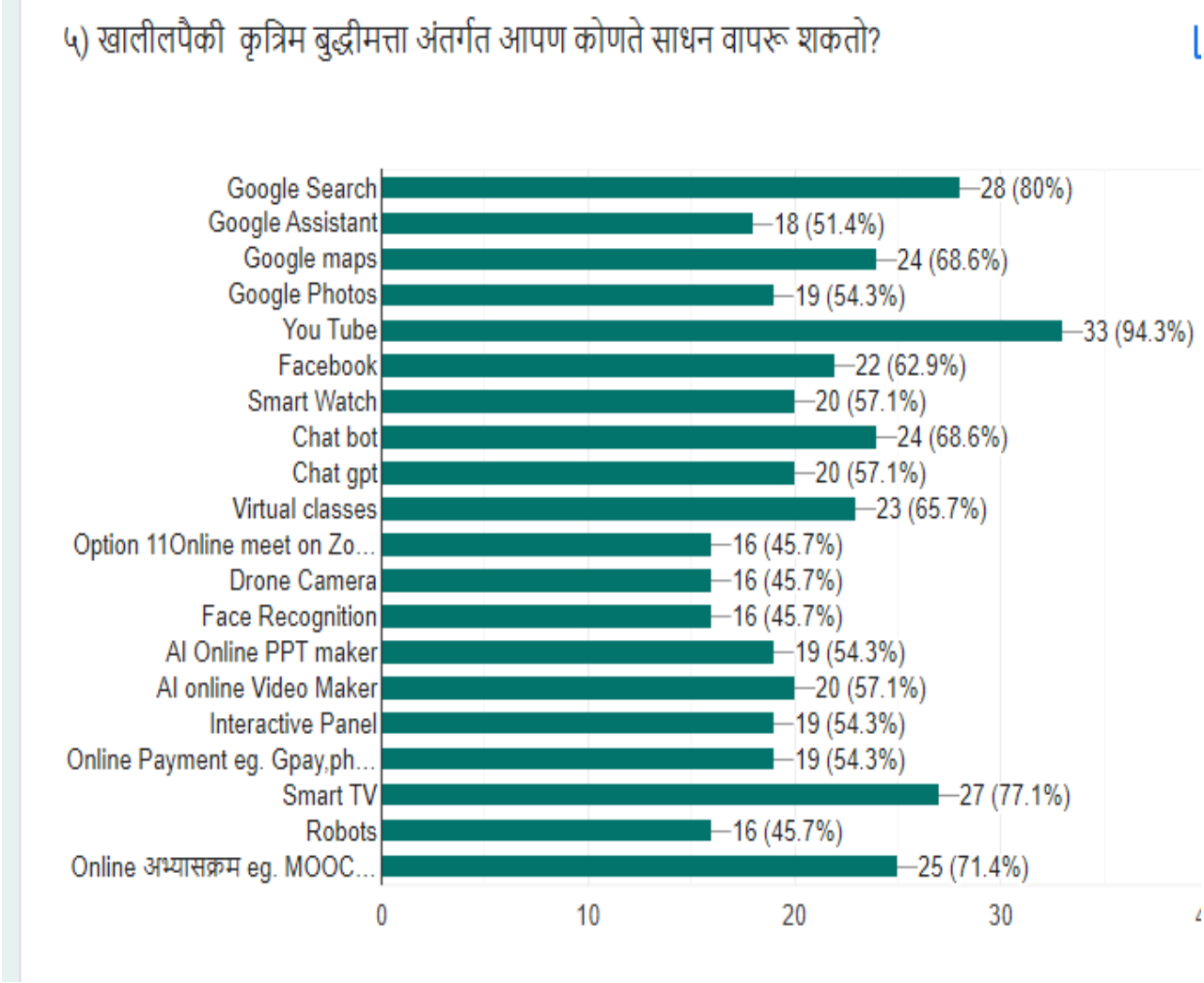


Graph No. 4.34



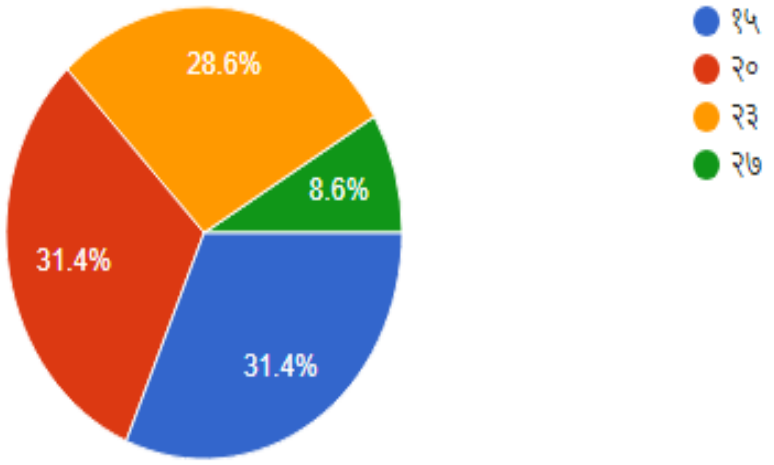
This graph shows that 100% teachers gave right response which is more than pre-test that is 89.2%.

Graph No. 4.35


५) खालीलपैकी कृत्रिम बुद्धीमत्ता अंतर्गत आपण कोणते साधन वापरू शकतो?
Google Search
28 (80%)
Google Assistant
18 (51.4%)
Google maps
24 (68.6%)
Google Photos
19 (54.3%)
You Tube
33 (94.3%)
Facebook
22 (62.9%)
Smart Watch
20 (57.1%)
Chat bot
24 (68.6%)
Chat gpt
20 (57.1%)
Virtual classes
23 (65.7%)
Option 11Online meet on Zo...
16 (45.7%)
Drone Camera
16 (45.7%)
Face Recognition
16 (45.7%)
AI Online PPT maker
19 (54.3%)
AI online Video Maker
20 (57.1%)
Interactive Panel
19 (54.3%)
Online Payment eg. Gpay,ph...
19 (54.3%)
Smart TV
27 (77.1%)
Robots
16 (45.7%)
Online अभ्यासक्रम eg. MOOC...
25 (71.4%)
0
10
20
30

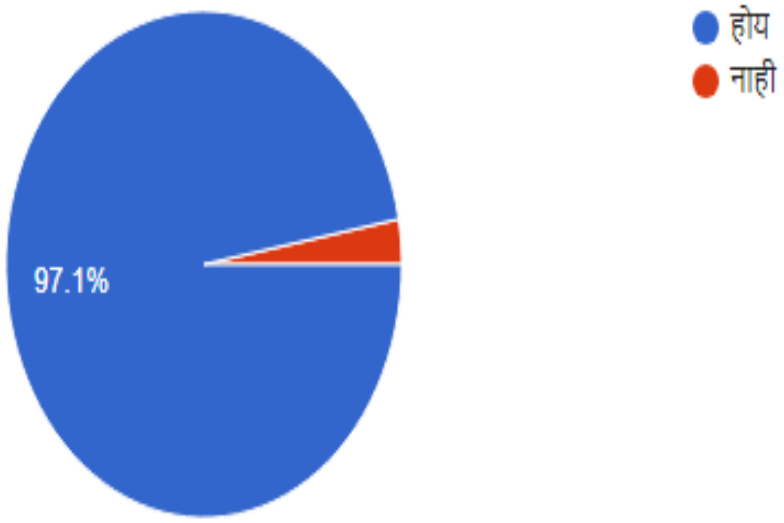
Graph No. 4.36

६) राष्ट्रीय शैक्षणिक धोरण २०२० मधील कोणत्या क्रमांकाच्या मुद्द्यामध्ये तंत्रज्ञान व एकात्मीकरण यावर विवेचन केलेले आहे?



Graph No. 4.37

७) जिल्हा परिषद शाळांमध्ये कृत्रिम बुद्धिमत्तेचा वापर अध्ययन अध्यापनामध्ये केला जात आहे का ?



This graph shows that 97.1% teachers are aware about use of AI in zilha parishad school while teaching-learning. This response is more than pre-test which is 86.7%. It means teacher got clearance about use of AI in teaching- learning after awareness program.

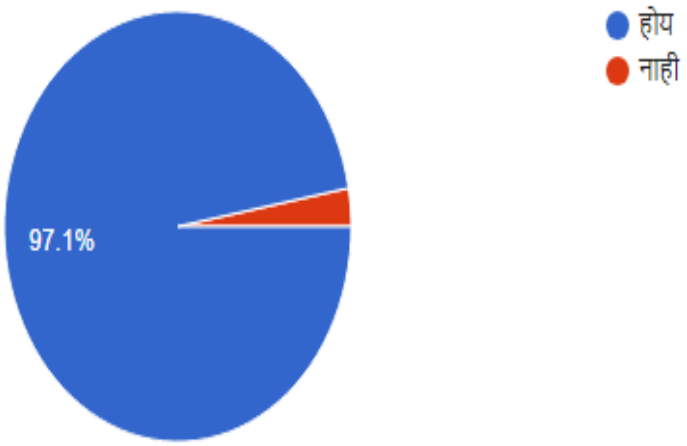
Graph No. 4.38

८) होय असेल तर कोणत्या प्रकारे ते स्पष्ट करा.

- यु ट्युब, दिक्षा अँप, क्यु आर कोड स्कॅन
- Diksha App
- Computer mobile
- स्मार्ट टी. व्ही, युट्युब
- Smart TV
- You tube
- यु ट्यूबवर शैक्षणिक व्हिडीओ दाखवून, गुगल मॅप चा वापर करून
- Youtube, Chat Bot, etc
- माहिती तंत्रज्ञान वापरून, मोबाईल मधील ॲप मुलांना स्वयं अध्ययन करण्यासाठी वापर करण्याची सवय लावणे.

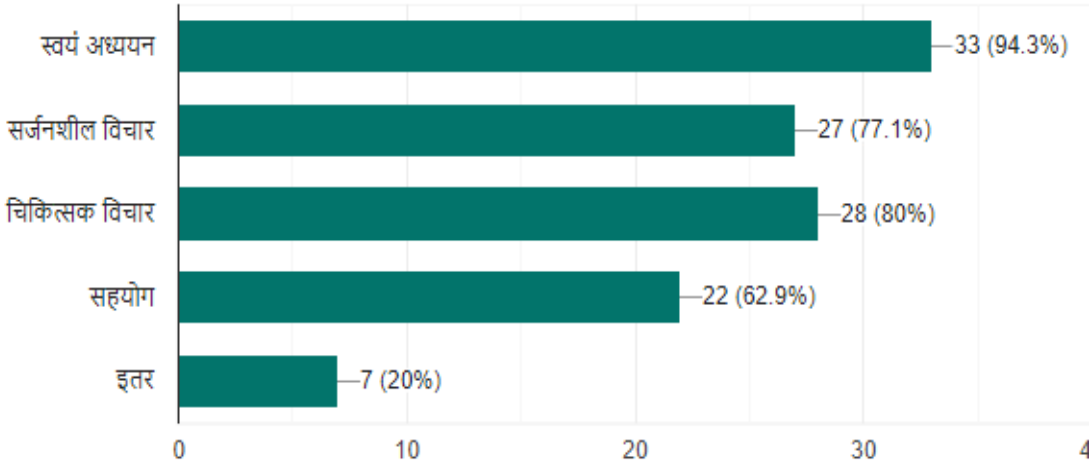
Graph No. 4.39

९) अध्ययन - अध्यापनामध्ये कृत्रिम बुद्धिमत्तेचा वापर करून आपण आंतरारष्ट्रीय शिक्षण देवू शकू असे वाटते का ?



Graph No. 4.40

१०) अध्यन - अध्यपनामध्ये कृत्रिम बुद्धिमत्तेचा वापर करून विद्यार्थ्यामधील कोणत्या क्षमता/कौशल्य विकसित करता येतील ?



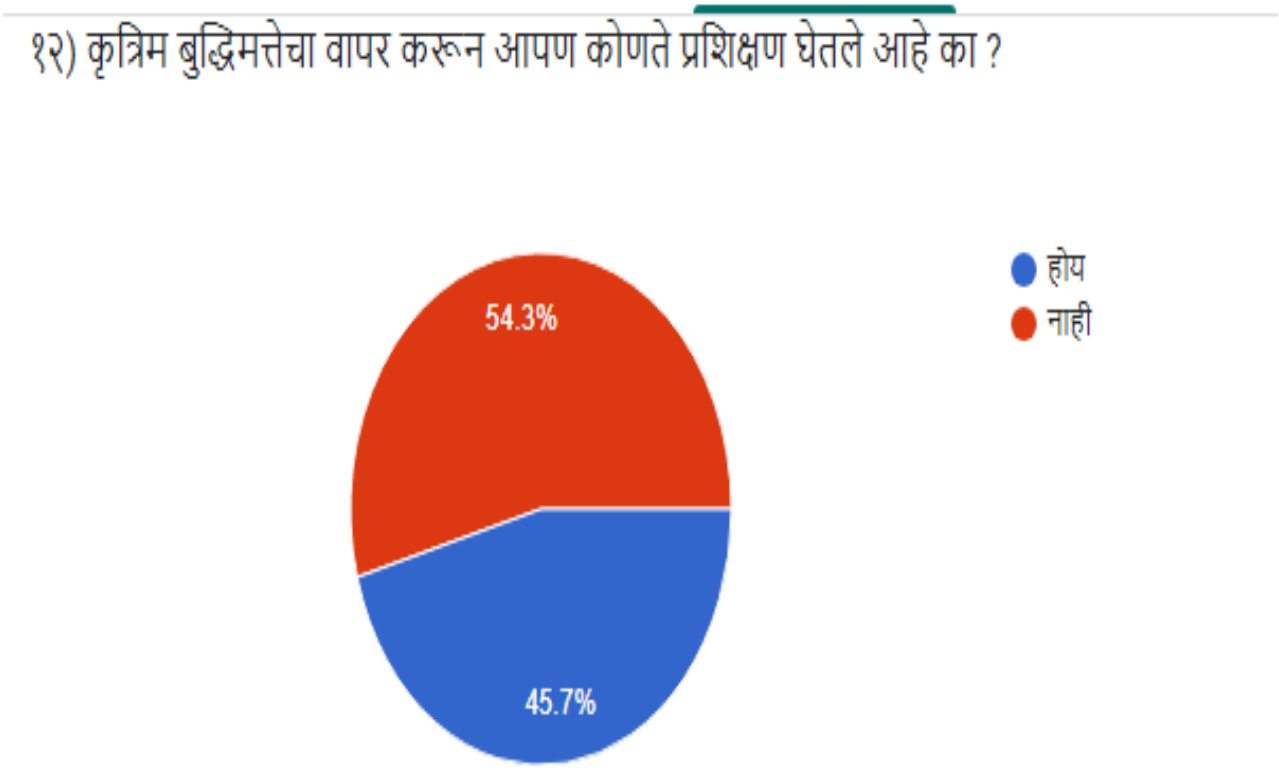
Graph No. 4.41

११) राष्ट्रीय शैक्षणिक धोरण २०२० नुसार कृत्रिम बुद्धिमत्ता अंमलबजावणी यशस्वी करण्यासाठी मी स्वतः अद्ययावत करण्याकडे ग्रह शकतो ?

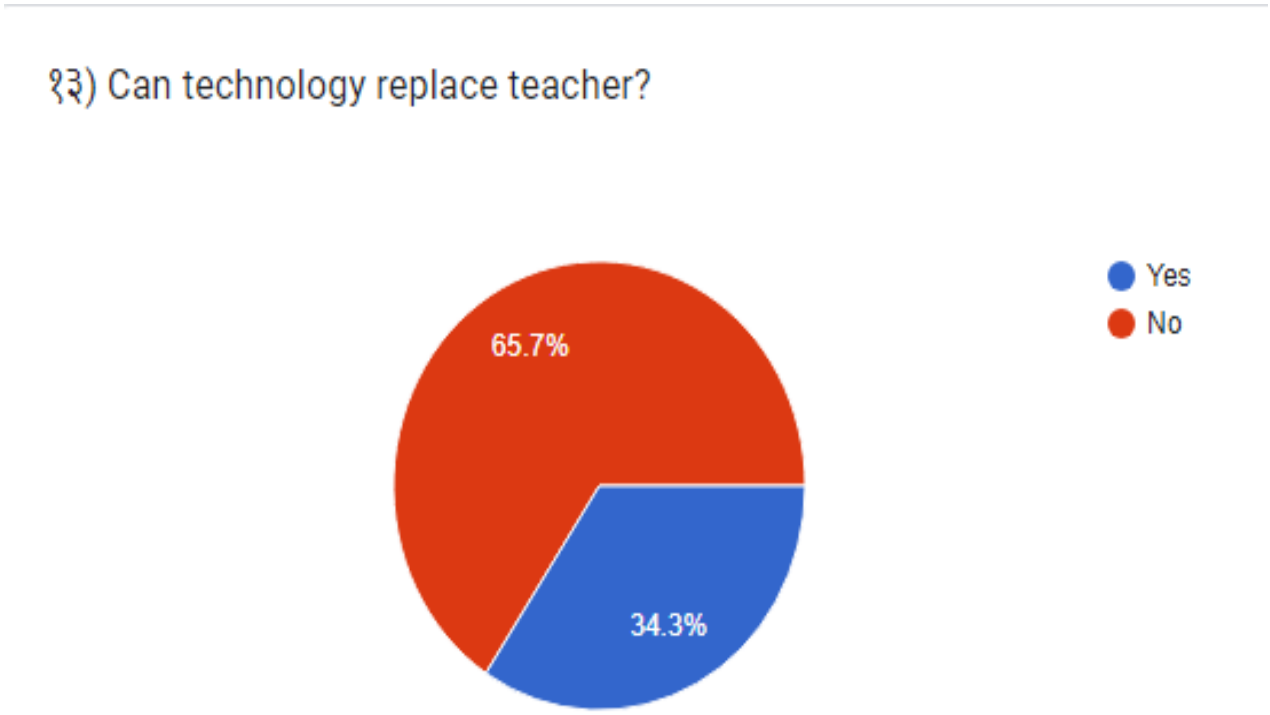
35 responses

- कृत्रिम बुद्धिमत्तेचे विविध प्रकार वापरून
- Technical Guides Important
- नवनवीन गोष्टी शिकून
- कृत्रिम बुद्धिमत्ता प्रकारांचे ज्ञान घेऊन
- वेगवेगळे तंत्रज्ञनाद्वारे
- प्रशिक्षण
- योग्य प्रकारे
- गुगल सर्च वापर, गुगल मॅपचा वापर करून
- माहितीचा अध्यापनात प्रभावी वापर कसा करावा हे जाणून घेऊन.

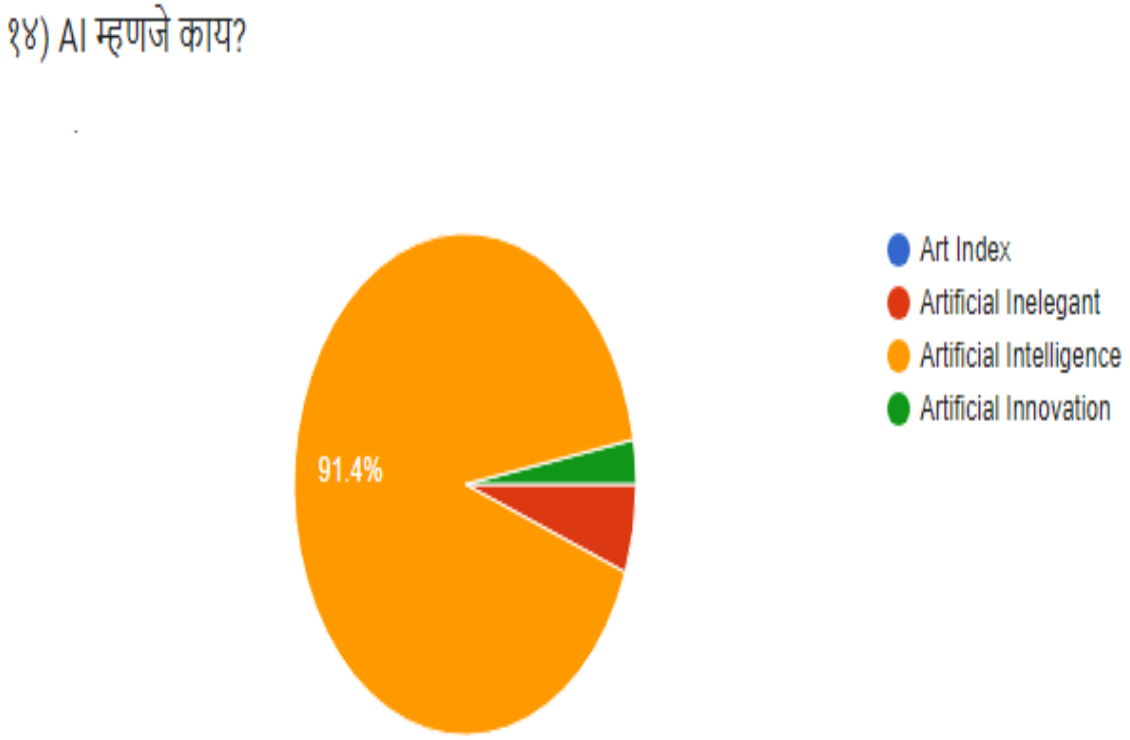
Graph No. 4.42



Graph No. 4.43

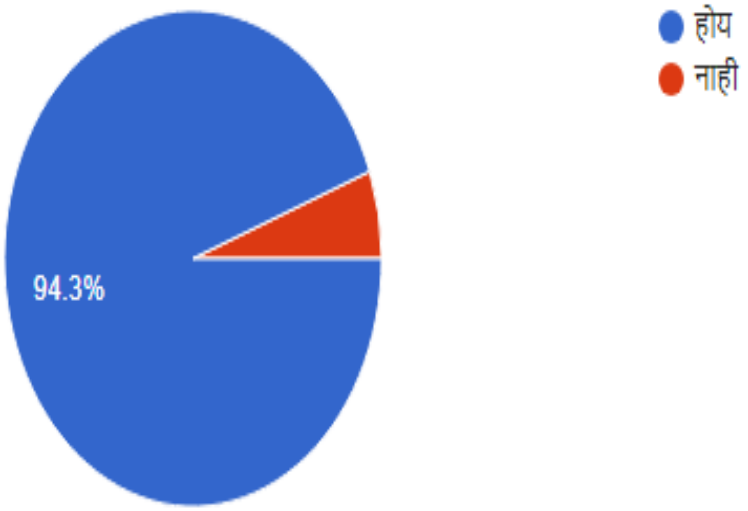


Graph No. 4.44


१४) AI म्हणजे काय?
91.4%
Art Index
Artificial Inelegant
Artificial Intelligence
Artificial Innovation

Graph No. 4.45

15) कृत्रिम बुद्धिमत्ता या तंत्रज्ञानामधील विविध साधनांच्या शिक्षण क्षेत्रातील वापराविषयी आपणास प्रशिक्षण आवश्यक आहे का?



Hypothesis testing

Hypothesis is "Researcher developed awareness programme will not be effective for primary teachers about use of artificial intelligence in science and mathematics subjects teaching – learning process".

After the pre-test and post-test result researcher rejected the null hypothesis because it proves that the researcher developed awareness program was effective to create awareness in in-service primary teachers about use of Artificial Intelligence tools on Science and Maths teaching learning process.

4.3 Findings

I. From the questionnaire researcher found out that 100% in - service teachers from selected clusters didn't had sufficient awareness about AI tools which they can use in teaching learning process of Science and Maths Subject.

II. From posttest after implementation of AI awareness program researcher found out that 90% teachers from selected sample got awareness about which and how to use AI tools in teaching learning process of Science and Maths subject. Teachers expressed the need for ongoing training and support to keep up with the rapid advancements in AI technology and its educational applications.

III. From this research researcher can say, it increased AI literacy of techers, it enhanced teaching practice, and the AI awareness program successfully enhanced the knowledge and capabilities of primary teachers in the Sindhudurg district, enabling them to effectively incorporate AI into their Science and Mathematics curricula.

IV. Finally from the all collected and analyzed data it proves that researcher developed awareness program was effective to create awareness in in-service primary teachers about use of Artificial Intelligence tools on Science and Maths teaching learning process.

4.4 Closure

In this chapter the data analysis and interpretation are presented. Data analysis is done objective wise. The conclusions are drowned and from that the r3esults of the study are yield. Discussions of conclusions are presented in the next chapter of summary.

CHAPTER V

SUMMARY FINDINGS AND RECOMMENDATIONS

5.1 Introduction

Today's classroom is different from what was 60 years ago. During the last 50 years also the scenario of our classroom has changed a good deal. The classroom of today in a nature laboratory-come-library-come a small theatre. The invention of a computer has changed your our classroom. Now a day we find all classrooms in a good school are equipped with computers. The computer provided necessary all intellectual activities. Which are useful in effective implementation of NEP 2020.And also developing 21st century skills in between students.

By integrating AI tools into primary school education, we can create a more inclusive, effective and engaging learning environment that sets students up for success in the digital age.

About the Research

5.2 Summary

5.2.1 Chapter 1

Statement of problem

Development of Artificial Intelligence(AI) Awareness programme on Science and Mathematics subjects for in-service primary teachers from Sindhudurg District

Definition of the terms

Development

Conceptual Definition

Development is the act or process of developing unfolding, a gradual growth or advancement through progressive changes.

- New Webster Dictionary (2007)

Operational Definition

In this research development means development of programme for Primary teachers from Sindhudurg district on use of artificial intelligence in school education.

Artificial Intelligence

Conceptual Definition

It is "the science and engineering of making intelligent machines, especially intelligent computer programs". John McCarthy (Father of Artificial Intelligence)

Operational Definition

In this research artificial intelligence means all tools which are using for primary school education in teaching-learning process of science and mathematics subject.

Awareness Programme

Conceptual Definition

a course, programme, lecture, etc., introducing a new situation or environment and create awareness about it

Collins English Dictionary

Operational Definition

In this research awareness programme is for primary teachers on use of artificial intelligence in science and mathematics subjects from Sindhudurg district.

It will be in modular form. Subject of modules are as follows -

F) Historical background of Artificial Intelligence.

G) Meaning of Artificial Intelligence.

H) Various tools of Artificial Intelligence which useful in education.

I) NEP 2020 and Artificial Intelligence.

J) Use of specific tool of Artificial Intelligence in science and mathematics subjects teaching- learning process.

Primary teachers

Conceptual Definition

A person whose job is teaching, especially in a primary school

- Oxford English dictionary

Operational Definition

In this research primary teacher means teachers who are teaching to standard 1st to 5th in zilha parishad schools from Sindhudurg district.

Sindhudurg District

Operational Definition

Sindhudurg is one of the districts from 36 district of Maharashtra state.

Assumptions of research

1) Everyone is updating their knowledge according to changing time.
2) Teachers are technosavy.
3) National Education Policy 2020 focuses on artificial intelligence.
4) Everyone is doing continues professional development through e-learning.
5) There is unawareness about artificial intelligence in primary teachers.

Objectives of the research

1) To find out present status of primary teachers about artificial intelligence in science and mathematics subjects teaching – learning process.
2) To finalize the tools of artificial intelligence.
3) To develop awareness programme about use of artificial intelligence in science and mathematics subjects teaching – learning process.
4) To implement the awareness programme for primary teachers.

5) To find out the effectiveness of awareness programme for primary teachers.

Hypothesis of the research

Null hypothesis - Developed awareness programme will not be effective for primary teachers about use of artificial intelligence in science and mathematics subjects teaching – learning process.

Variables of the research

1) Dependent Variables: Artificial Intelligence for primary teachers.
2) Independent Variables: Researcher developed awareness programme.

Scope of research:

1) This research will be related with in-service primary teachers from Maharashtra school.
2) The recommendation of this research will be applicable to in-service primary teachers.
3) This research is related with use of artificial intelligence in science and mathematics subjects teaching – learning process and its implementation.

Delimitations of research

1) This research will be limited with Zilha Parishad Primary teachers from Sindhudurg district.
2) This research will be limited with the concept of artificial intelligence.
3) This research will be limited with rural and urban area primary teachers from Sindhudurg district.
4) This research will be limited with the academic year 2023-24.
5) The medium of instruction is restricted to Marathi and English also.
6) Awareness Programme will be given through blended mode.

7) This research will be limited with the Science and Mathematics subject.

Chapterisation

- Chapter First :Introduction
- Chapter Second :Review of related research and literature
- Chapter Third : Research Methodology
- Chapter Forth : Data Analysis and Interpretation
- Chapter Fifth : Summary, prediction and recommendations

5.2.2 Chapter II

Review of related literature

1) A. Casamayor, A. Amandi, and M. Campo, "Intelligent assistance for teachers in collaborative E-learning environments," *Computers & Education*, vol. 53, no. 4, pp. 1147–1154, 2009.View at: Publisher Site | Google Scholar

2) B. Boulay, "Artificial intelligence as an effective classroom assistant," *IEEE Intelligent Systems*, vol. 31, no. 6, pp. 76–81, 2016.View at: Google Scholar

3) Chetna Arora1 & Subhash Chander2 1 Assistant Professor, Department of Education, Lady Irwin College, University of Delhi

A study of School Teachers on Adaptation to Online Education during Pandemic Period

4) Heema Parveen Ph.D Scholar, Department of Education, University of Kashmir, Jammu & Kashmir UT, India, Understanding Student Engagement and Online Learning Post Covid-19 Using Multiple Perspectives

5)Jennyphar Kahimise et al. (2019): In this study, we investigate how children's online habits and behaviors increase their vulnerability to cybercrime.

6) Khatereh Jalaliet al. (2017) : In the modern world, e-learning and distance education have attracted a lot of interest.

07) Mohamed Zulhilmi bin Mohamed 1 , Riyan Hidayat 1 * , Nurain Nabilah binti Suhaizi 1 , Norhafiza binti Mat Sabri 1 , Muhamad Khairul Hakim bin Mahmud 1 , Siti Nurshafikah binti Baharuddin

Artificial intelligence in mathematics education: A systematic literature review

Review of related research

1) Bhaskaran Dhaniya,(2019), 'Countinuous Professional Development: A Framework for Voluntary English Language Teachers Forum'.
2) C, Thaker S. (2017).'Effectiveness of Mastery Learning Programme With Reference to Science Teaching. Unpublished. Ph.D., Education. Saurashtra University, Rajkot, Gujrat.'
3) Dr. Mohd. Mamur Ali. Did research under the title of 'professional development of teachers with ICT'. Researcher recommend following things from research
4) Dr. Prakash Rao, did research under the title of 'Perception of teachers towards in-service training programmers at primary level'.
5) Kaur Ravinder,(2016).'Effectiveness of In-service Teacher Training Programs at Elementary Stage in Punjab: An Evaluative study'
6) Mr. Dolla. Prashant Mahndrabhai, did research under the title of 'APPLICATION OF ARTIFICIAL INTELLIGENCE IN ON-LINE EVALUATION'.
7) Sachdeva Uravashi, did research under the title of "Development of Self Learning Material (SLM) on Web Tools for Teaching and Learning".

5.2.3 Chapter III

Research Methodology

Method of Research

Researcher used survey method and experimental method for present study.

Sample Selection

In this research researcher used purposeful sampling method from non-probability type of sampling. One cluster from 4 blocks and all primary teachers from that clusters.

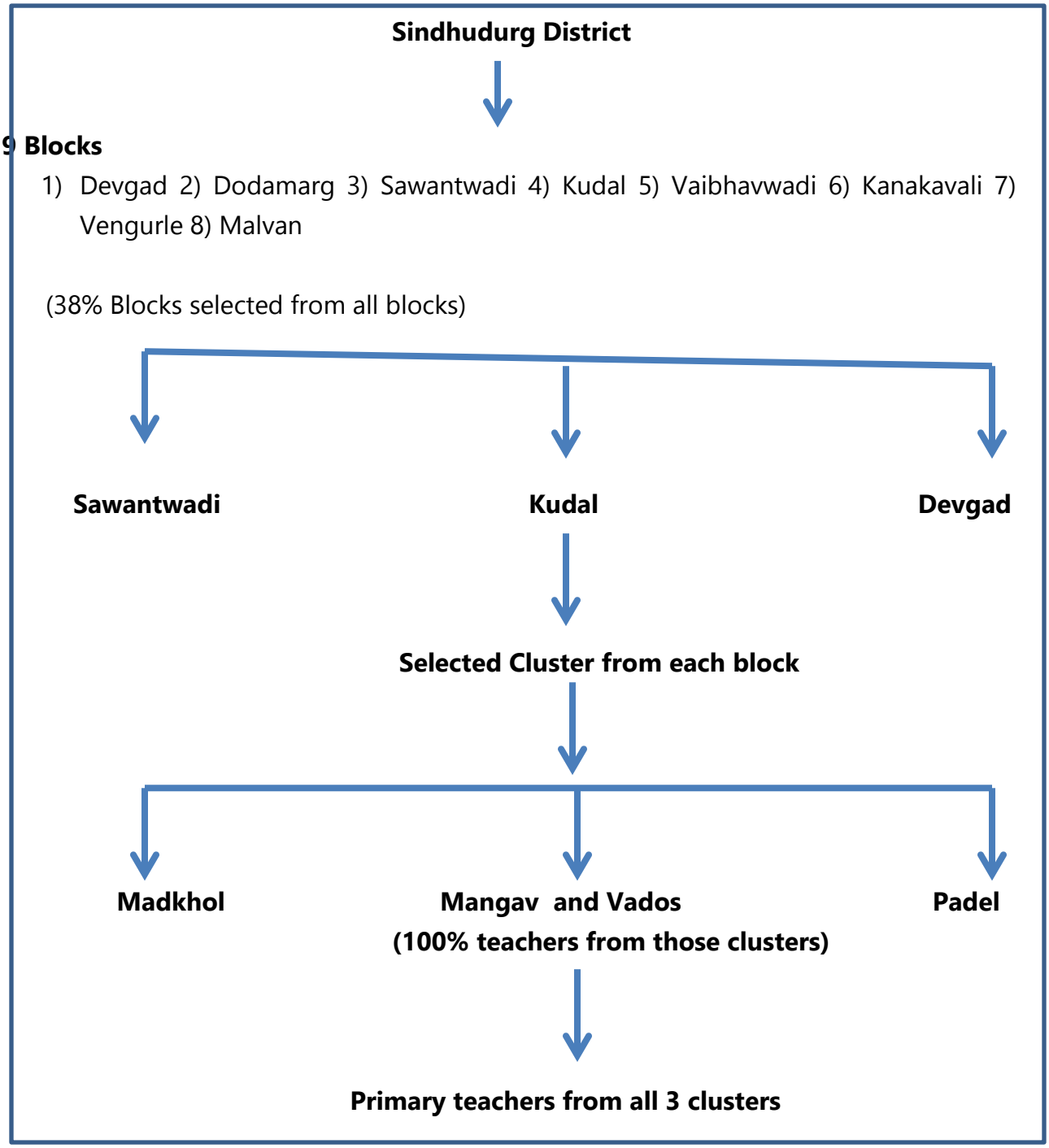


Figure No. 5.1: Sample Selection

Tools and Techniques

Researcher used questionnaire, pre-test, post-test, for data collection.

Analysis of data

Researcher used percentage tool for analyze the data.

5.3 Findings

Objectives of the research:-

- To find out present status of primary teachers about artificial intelligence in science and mathematics subjects teaching – learning process.
- To finalize the tools of artificial intelligence.
- To develop awareness programme about use of artificial intelligence in science and mathematics subjects teaching – learning process.
- To implement the awareness programme for primary teachers.
- To find out the effectiveness of awareness programme for primary teachers.

Results / Findings:-

V. From the questionnaire researcher found out that 100% in - service teachers from selected clusters didn't had sufficient awareness about AI tools which they can use in teaching learning process of Science and Maths Subject.

VI. Before implementation from pretest researcher found out that in – service primary teachers didn't having awareness about tools of AI and which they can use in teaching learning process of Science and Maths Subject, also they wanted training and orientation about it.

VII. From posttest after implementation of AI awareness program researcher found out that 90% teachers from selected sample got awareness about which and how to use AI tools in teaching learning process of Science and Maths subject. Teachers expressed the need for ongoing training and support to keep up with the rapid advancements in AI technology and its educational applications.

VIII. From this research we can say, it increased AI literacy of techers, it enhanced teaching practice, and the AI awareness program successfully enhanced the knowledge and capabilities of primary teachers in the Sindhudurg district, enabling them to effectively incorporate AI into their Science and Mathematics curricula.

5.4 Recommendations

For School Education:

1. Enhanced Curriculum Design: The study underscores the need to integrate AI tools into the Science and Mathematics curriculum, enhancing interactive and personalized learning experiences.

2. Improved Student Engagement: The positive impact on student engagement suggests that schools should incorporate AI applications that make learning more interactive and engaging, potentially leading to improved academic performance in Science and Mathematics.

3. Resource Allocation: To effectively implement AI in classrooms, schools need to invest in the necessary technological infrastructure.

For Teacher Education:

1. Curriculum Enhancement:- Teacher education programs should include specific modules on AI and its applications in education.

2. Continuous Professional Development:- Teacher education institutions should provide ongoing training and workshops on emerging AI technologies and their pedagogical applications, ensuring that teachers remain current with technological advancements.

5.5 New Topic for further research

Present study puts forth following topics for further study.

i. Development of Artificial Intelligence (AI) Awareness programme on Language subjects for in-service primary teachers
ii. Development of Artificial Intelligence (AI) Awareness programme on Science and Mathematics subjects for in-service Secondary teachers
iii. Development of Artificial Intelligence (AI) Awareness programme on Social Science subjects for in-service secondary teachers
iv. Development of Artificial Intelligence (AI) Awareness programme on Language subjects for in-service Secondary teachers
v. Development of Artificial Intelligence (AI) Awareness programme for Anganwadi Sevika on teaching learning process at Foundational Stage.

5.6 Closure

In 5th chapter there was a summary of research, findings and recommendation also researcher suggest some subject for further research.

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.निर्मिती मंडळ

सप्रेनीलिमा,,पाटीलप्रीती, आणि पाटीलज्योती, गतिमान शिक्षणासाठी विचारप्रवाह .(२००९).

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APPENDIXES

Appendix No.1. List of name of In-service Primary Teachers

No.	Name of Teacher	Name of School	Cluster	Block
1	Dinkar Talavanekar	ZPPS vados No.1	Vados	Kudal
2	Swapnali Warang	ZPPS Amberi No.1	Vados	Kudal
3	Ganapat Shirodkar	ZPPS Amberi No.1	Vados	Kudal
4	Sujata Mhadgut	ZPPS Amberi No.1	Vados	Kudal
5	Snehal gunjal	ZPPS Amberi No.1	Vados	Kudal
6	Krushna Kharat	ZPPS Amberi No.1	Vados	Kudal
7	Ramchandr Tawade	ZPPS Gothos No.1	Vados	Kudal
8	Vishwas Nerurkar	ZPPS Gothos No.1	Vados	Kudal
9	Sunilkumar gunjal	ZPPS Gothos No.1	Vados	Kudal
10	Sandip Pednekar	ZPPS Gothos No.1	Vados	Kudal
11	Ramchandr Dhuri	ZPPS Gothos Manjardora	Vados	Kudal
12	Sonali Dhuri	ZPPS Gothos Manjardora	Vados	Kudal
13	Vilas Gothoskar	ZPPS Kanduli	Vados	Kudal
14	Rajaram Shedage	ZPPS More No.1	Vados	Kudal
15	Rajkumar Ghavanalkar	ZPPS More No.1	Vados	Kudal
16	Sachin Bhoi	ZPPS More No.2	Vados	Kudal
17	Anagha Sawant	ZPPS Nileli No.2	Vados	Kudal
18	Pranita Karekar	ZPPS Nileli No.2	Vados	Kudal
19	Vijay Dhamapurakar	ZPPS Niwaje No.1	Vados	Kudal
20	Rajan Aair	ZPPS Niwaje No.1	Vados	Kudal

21	Mohini gawade	ZPPS Niwaje No.1	Vados	Kudal
22	Ramchandr Naik	ZPPS Niwaje Ozarwadi	Vados	Kudal
23	Milan Kalavankar	ZPPS Niwaje Ozarwadi	Vados	Kudal
24	Madukar Shinde	ZPPS Vados No.1	Vados	Kudal
25	Samruddhi Mhadgut	ZPPS Vados No.1	Vados	Kudal
26	Yahswant Rane	ZPPS Vados No.1	Vados	Kudal
27	Savitri Bhadav	ZPPS Vados No.1	Vados	Kudal
28	Manisha Sawant	ZPPS Vados Ekunda	Vados	Kudal
29	Kadambari Warang	ZPPS Mangav No.2	Mangav	Kudal
30	Sangita Raul	ZPPS Mangav No.2	Mangav	Kudal
31	Dipali Sawant	ZPPS Mangav No.2	Mangav	Kudal
32	Shashikant Dangare	ZPPS Mangav No.2	Mangav	Kudal
33	Anil Chavan	ZPPS Kaleli	Mangav	Kudal
34	Shamal Dhuri	ZPPS Kaleli	Mangav	Kudal
35	Digambar Nanache	ZPPS Kaleli	Mangav	Kudal
36	Vaibhavi Chopadekar	ZPPS Kaleli	Mangav	Kudal
37	Bhaskar Gunjal	ZPPS Mangavtali	Mangav	Kudal
38	Gita Korane	ZPPS Mangavtali	Mangav	Kudal
39	Snehankitaz Jadhav	ZPPS Ghavnale Wayngani	Mangav	Kudal
40	Rupesh Walavalakaar	ZPPS Ghavnale Wayngani	Mangav	Kudal
41	Paravej Beg	ZPPS Mangav Urdu	Mangav	Kudal
42	Vishada Wahanbhavkar	ZPPS Madkhol No.1	Madkhol	Sawantwadi

43	Rashmi Sawant	ZPPS Madkhol No.1	Madkhol	Sawantwadi
44	Vilas Kale	ZPPS Madkhol No.1	Madkhol	Sawantwadi
45	Swapna Khanolkar	ZPPS Madkhol No.1	Madkhol	Sawantwadi
46	Dipak Pandit	ZPPS Madkhol No.1	Madkhol	Sawantwadi
47	Bhavana Gawade	ZPPS Madkhol No.2,Dhawadaki	Madkhol	Sawantwadi
48	Samiksha Raul	ZPPS Madkhol No.2,Dhawadaki	Madkhol	Sawantwadi
49	Vaidahi Sawant	ZPPS Madkhol No.2,Dhawadaki	Madkhol	Sawantwadi
50	Aravind Saranobat	ZPPS Madkhol No.2,Dhawadaki	Madkhol	Sawantwadi
51	Prashant Kode	ZPPS Madkhol Dhuriwadi	Madkhol	Sawantwadi
52	Pramodini Shirasath	ZPPS Madkhol Dungewadi	Madkhol	Sawantwadi
53	Nutan ranganekar	ZPPS Madkhol Dungewadi	Madkhol	Sawantwadi
54	Supriya Ambesakar	ZPPS Madkhol Metwadi	Madkhol	Sawantwadi
55	Amisha Kumbhar	ZPPS Madkhol Bamanadevi	Madkhol	Sawantwadi
56	Nikita Paste	ZPPS Kariwade No.1	Madkhol	Sawantwadi
57	Vilas Ambolakar	ZPPS Kariwade No.1	Madkhol	Sawantwadi
58	Dipa Chodanakar	ZPPS Kariwade No.1	Madkhol	Sawantwadi
59	Umesh Chvhan	ZPPS Kariwade No.1	Madkhol	Sawantwadi
60	Uma Tawade	ZPPS Kariwade Katta	Madkhol	Sawantwadi
61	Sudam Dhole	ZPPS Kariwade Katta	Madkhol	Sawantwadi

62	Satish raul	ZPPS Karivade Aa. Galu	Madkhol	Sawantwadi
63	Shubhada Warang	ZPPS Kariwade Dung	Madkhol	Sawantwadi
64	Ujjwala Pednekar	ZPPS Kariwade Bhairav	Madkhol	Sawantwadi
65	Laxman Raul	ZPPS Kariwade Bhairav	Madkhol	Sawantwadi
66	Ravindr Gurav	ZPPS Kariwade Bhairav	Madkhol	Sawantwadi
67	Mangesh Thakur	ZPPS Kariwade Bhairav	Madkhol	Sawantwadi
68	Aaditi Sawnt	ZPPS Kariwade Bhairav	Madkhol	Sawantwadi
69	Ravikant Shivalkar	ZPPS	Padel	Devgad
70	Firoj Pawaskar	ZPPS	Padel	Devgad
71	Ashok Kaskar	ZPPS	Padel	Devgad
72	Sudesh Golatkar	ZPPS	Padel	Devgad
73	Sumedh Jadhav	ZPPS	Padel	Devgad
74	Santosh Bidave	ZPPS	Padel	Devgad
75	Uttam Mohite	ZPPS	Padel	Devgad
76	Tushar Auti	ZPPS	Padel	Devgad
77	Jorj Farnandis	ZPPS	Padel	Devgad
78	Jamir Shekh	ZPPS	Padel	Devgad
79	Rajendr Bhosale	ZPPS	Padel	Devgad
80	Sudha Raktade	ZPPS	Padel	Devgad
81	Niwas Shinde	ZPPS	Padel	Devgad
82	Nakushi Erudkar	ZPPS	Padel	Devgad
83	Tanuja Ghadi	ZPPS	Padel	Devgad

84	Vedika Ghadi	ZPPS	Padel	Devgad
85	Suryakant Salunkhe	ZPPS	Padel	Devgad
86	Vijay Patil	ZPPS	Padel	Devgad
87	Jagan Bahiram	ZPPS	Padel	Devgad
88	Satish Utmare	ZPPS	Padel	Devgad
89	Ravindr Mane	ZPPS	Padel	Devgad
90	Dipak Dawar	ZPPS	Padel	Devgad
91	Alara Bhatakar	ZPPS	Padel	Devgad
92	Priya Bhaotikar	ZPPS	Padel	Devgad
93	Asha Mohite	ZPPS	Padel	Devgad
94	Nilam Nemanekar	ZPPS	Padel	Devgad
95	Sanika More	ZPPS	Padel	Devgad
96	Saomya Kale	ZPPS	Padel	Devgad

Appendix No.2. List of name of experts

Sr.No.	Name of Expert	Post	Office
1	Dr. Shweta Sachin Chougale	Principal	Ashokrao Mane B.Ed.College, Peth Wadgav, Kolhapur
2	Dr. Bhagawan Shinde	Professor	Swami Sahajanand Bharti College of Education, Ahamadnagar
3	Dr.Ram Chatte	Lecturer	D.El.Ed.College, Rukadi, Kolhapur
4	Dr. Vinayk More	Professor	Goa Vidyaprasarek Manda's Dr.Dada Vaidya College of Education
5	Dr. Jyoti Jambhale-Patil	Lecturer	Junior College Of education, Petala, Kolhapur
6	Dr.Imran Mulla	Professor	Singhagad Technichal Education Sosity's Shrimati Kashibai Nawale College of Education and Trening, Kusagav Budruk Lonavala
7	Dr. Santosh Jambhale	Lecturer	Yashwantrao Chavhan Warana Mahavidyalay, Warananagar, Kolhapur

Appendix No.3. List of Selected Clusters

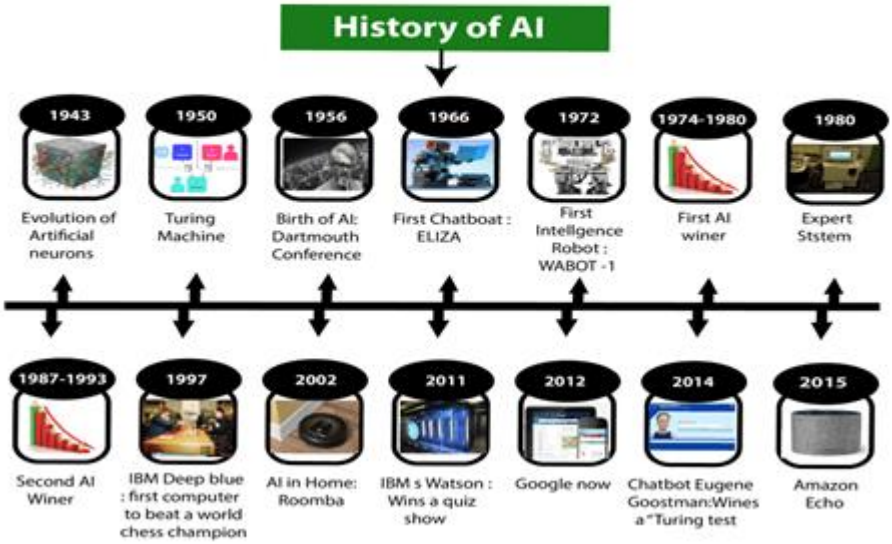
Sr.No	Name of Cluster	Name of Block
1	Vados	Kudal
2	Managav	Kudal
3	Madakhol	Sawantwadi
4	Padel	Devgad

Appendix No.4. Researcher developed awareness program

शिक्षणामधील कृत्रिम बुद्धिमत्तेचा प्रभावी वापर

मार्गदर्शक :- श्रीमती स्नेहल विलासराव पेडणेकर
अधिव्याख्याता,
जिल्हा शिक्षण व प्रशिक्षण संस्था,सिंधुदुर्ग

कृत्रिम बुद्धिमत्तेचा इतिहास/ उगम



भारतात कृत्रिम बुद्धिमत्तेचा प्रथम वापर करणा-या काही संस्था-

अ.क्र.	संस्था	ठिकाण	वापर
१	'निरामयी'	बेंगलुरू	२०१६ पासून वेदना विरहित स्तनाच्या कर्करोगासंबंधीच्या चाचण्या करीत आहे.
२	'Advancells'	नॉयडा	अवयव रोपणाविषयक बाबींसाठी हे तंत्र वापरत आहेत.
३	Portea	बेंगलुरू	जे रुग्ण स्वतःहून रुग्णलयात जाण्यसाठी असमर्थ आहेत अशांना मदत मिळवून देण्यासाठी या तंत्राचा वापर करीत आहेत.
४	'Address Health'	बेंगलुरू	शालेय विद्यार्थ्यांच्या विविध चाचण्या देण्यासाठी या तंत्राचा वापर करीत आहेत.
५	'Live Health'	पुणे	रुग्णाची माहिती गोळा करणे, त्यांच्या विविध चाचण्यांसाठी नमुने गोळा करणे, त्यांची चिकित्सा करून रोगनिदान करणे, आणि अहवाल तयार करणे हे काम करीत आहेत.

कृत्रिम बुद्धिमत्ता संकल्पनेचा अर्थ

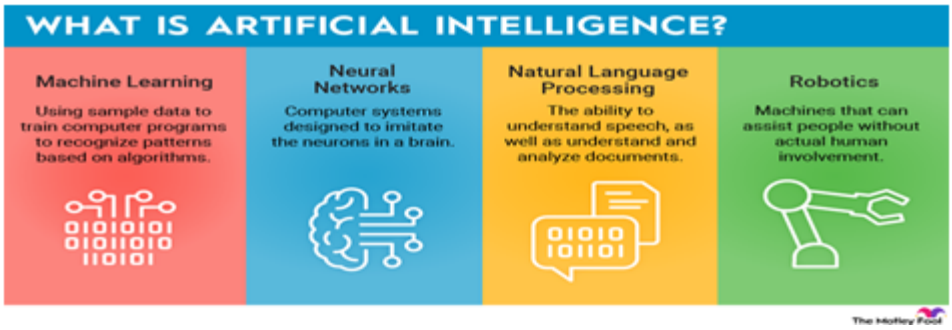
- एआय" या शब्दाचे श्रेय MIT (मॅसॅच्युसेट्स इन्स्टिट्यूट ऑफ टेक्नॉलॉजी) च्या जॉन मॅककार्थी यांना दिले जाऊ शकते, ज्याची व्याख्या मार्विन मिन्स्की (कार्नेगी-मेलॉन युनिव्हर्सिटी) यांनी "संगणक प्रोग्राम्सचे बांधकाम अशी केली आहे,जी सध्या मानवाकडून अधिक समाधानकारकपणे पार पाडली जात आहे.

- कारण त्यांना उच्च-स्तरीय मानसिक प्रक्रिया आवश्यक आहेत जसे की: ग्रहणक्षम शिक्षण, स्मृती संघटना आणि गंभीर तर्कशास्त्र (रॉकफेलर इन्स्टिट्यूट द्वारे अनुदानित) ची समर 1956 परिषद, हे लक्षात घेण्यासारखे आहे .

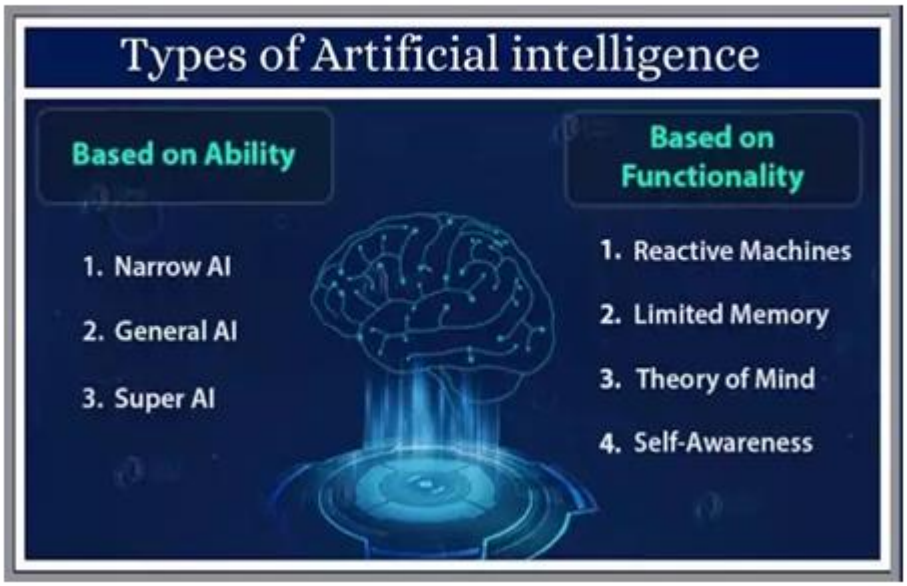
- Artificial intelligence is the science and technology which making machines those are intelligent; particularly smart computer programs as indicated by the scientist *John McCarthy, Who is father of Artificial Intelligence.*

- कृत्रिम बुद्धिमत्ता (AI) म्हणजे मानवाप्रमाणे विचार करण्यासाठी आणि कार्य करण्यासाठी प्रोग्राम केलेल्या मशीनमधील मानवी बुद्धिमत्तेचे अनुकरण आहे. शिकणे, तर्क करणे, समस्या सोडवणे, समज आणि भाषेचे आकलन ही सर्व संज्ञानात्मक क्षमतांची उदाहरणे आहेत.

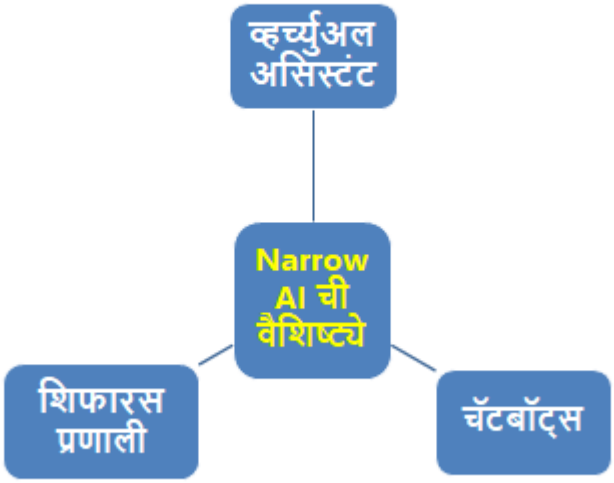
- आर्टिफिशियल इंटेलिजन्स म्हणजे संगणक, संगणक-नियंत्रित रोबोट किंवा सॉफ्टवेअर बनवण्याची एक पद्धत आहे जी मानवी मनाप्रमाणे बुद्धिमानपणे विचार करते. मानवी मेंदूच्या नमुन्यांचा अभ्यास करून आणि संज्ञानात्मक प्रक्रियेचे विश्लेषण करून AI पूर्ण केले जाते. या अभ्यासाचे परिणाम बुद्धिमान सॉफ्टवेअर आणि प्रणाली विकसित करतात.



कृत्रिम बुद्धिमत्तेचे प्रकार

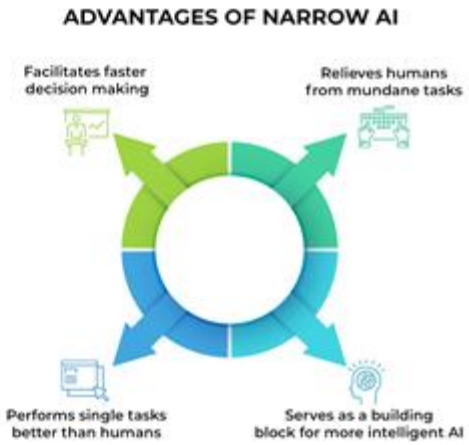


प्रकार १ Narrow AI



Narrow AI ची ताकद

- स्पेशलायझेशन
- कार्यक्षमता
- वापरकर्ता-अनुकूल



Narrow AI च्या मर्यादा

- सामान्यीकरणाचा अभाव
- मर्यादित समज
- डेटावरील अवलंबित्व

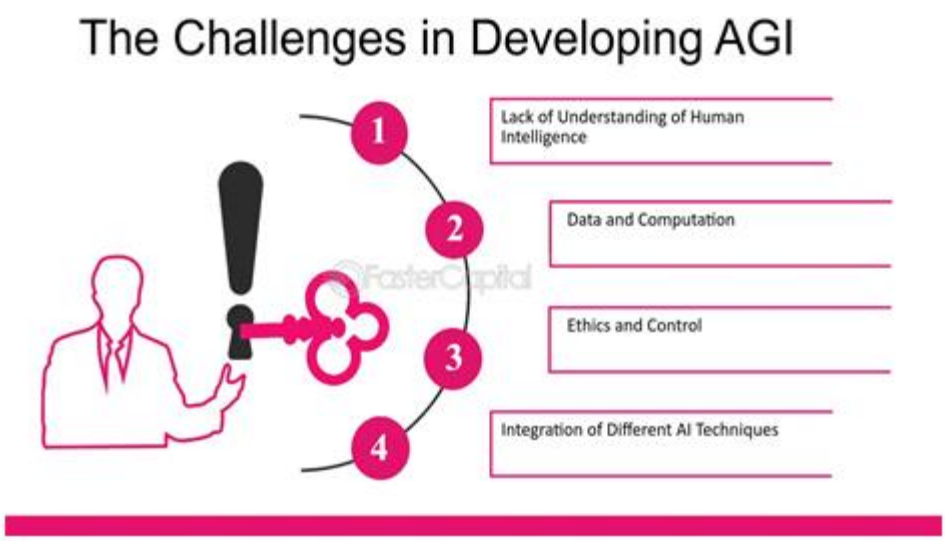
प्रकार २ - Genral AI (AGI)

AGI ची रचना मानवाप्रमाणेच विविध कार्ये आणि डोमेनमधील ज्ञान समजून घेण्यासाठी, शिकण्यासाठी आणि लागू करण्यासाठी केली गेली आहे.

AGI चे संभाव्य परिणाम:

- अष्टपैलुत्व
- ऑटोमेशन
- नवोपक्रम
- मानवी समानता
- आव्हाने

AGI च्या मर्यादा

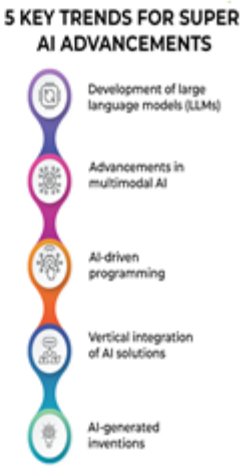


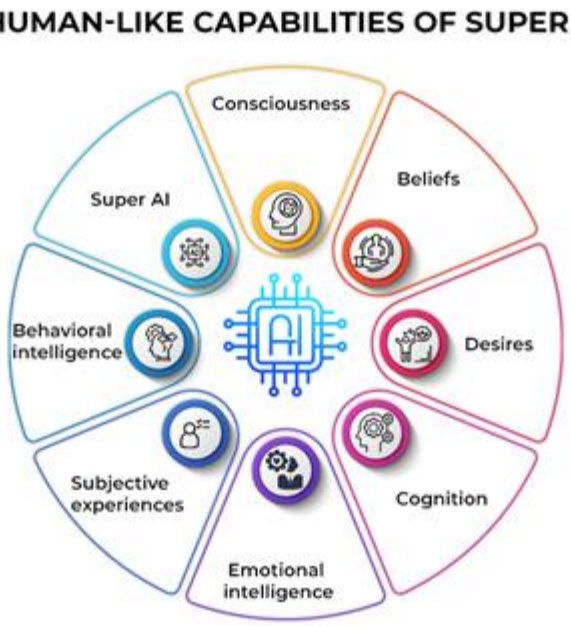
प्रकार ३ Super intelligent AI

- सुपरइंटेलिजंट एआय: हे AI यशाच्या शिखराचे प्रतिनिधित्व करते, जिथे मशीन्समध्ये आपल्या स्वतःच्या पलीकडे संज्ञानात्मक क्षमता असतात.

- **सुपरइंटेलिजंट एआय ची दृष्टी:**

सुपरइंटेलिजंट एआय, बहुतेकदा विज्ञान कथा आणि भविष्यवादी साहित्यात चित्रित केले जाते, ही एक काल्पनिक रचना आहे जी मानवी कल्पनाशक्तीला मोहित करते.
या व्हिजनमध्ये, AI सिस्टीम मानवी बुद्धिमत्तेच्या पलीकडे जाते केवळ कच्च्या संगणकीय शक्तीचे प्रदर्शन करत नाही तर प्रगत समस्या सोडवण्याची कौशल्ये, सर्जनशीलता आणि आपल्यापेक्षा जास्त असलेल्या जगाची समज देखील प्रदर्शित करते.





सुपरइंटिलिजंट एआयच्या अंमलबजावणी मधील आव्हाने:

1. नियंत्रण आणि सुरक्षितता
2. नैतिक चिंता
3. बुद्धिमत्ता समजून घेणे
4. संसाधन आवश्यकता

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AI च्या वापरातील फायदे

मदत

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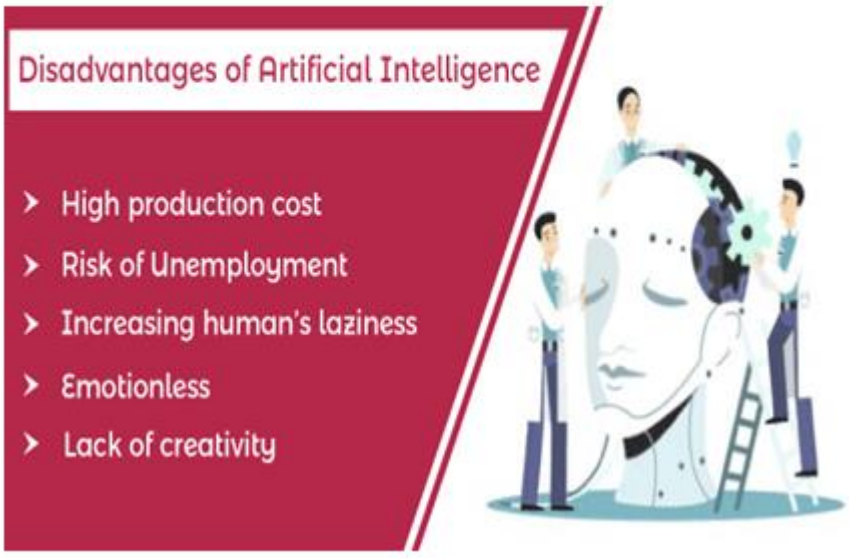
वैयक्तीकरण

संदर्भ

AI च्या वापरातील मर्यादा



कृत्रिम बुद्धिमत्ता अंतर्गत विविध साधने

- Google Search
- Google Assistar
- Google maps
- Google Photos
- You Tube
- Facebook
- Smart Watch
- Chat bot
- Chat gpt
- Virtual classes

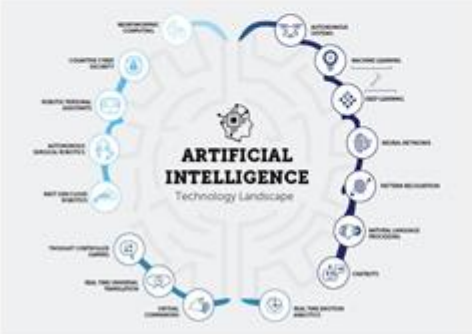
कृत्रिम बुद्धिमत्ता अंतर्गत विविध साधने

- Online meet on Zoom, Google meet, Webex, Microsoft Teams
- Drone Camera
- Face Recognition
- AI Online PPT maker
- AI online Video Maker
- Interactive Panel
- Online Payment eg. Gpay,phonpay etc.
- Smart TV
- Robots
- Online अभ्यासक्रम eg. MOOC , DIKSHA , SWAYAM etc

कृत्रिम बुद्धिमत्ता आणि राष्ट्रीय शैक्षणिक धोरण २०२०

मुद्दा क्रमांक २३ तंत्रज्ञानाचा वापर आणि एकात्मीकरण (२३.७ ते २३.१३)

23.5. तंत्रज्ञानाच्या वापराचा भर प्रामुख्याने अध्यापन-अध्ययन आणि मूल्यांकन प्रक्रिया सुधारणे, शिक्षकांच्या तयारीस आणि व्यावसायिकांच्या विकासास सहाय्य करणे, शिक्षणाची उपलब्धता वाढवणे आणि प्रवेश, उपस्थिती, मूल्यांकन इत्यादींशी संबंधित प्रक्रियांसह शैक्षणिक नियोजन, व्यवस्थापन व प्रशासन सुलभ करणे यांवर असेल.



कृत्रिम बुद्धिमत्तेच्या अध्ययन – अध्यापनाम्धील वापराबाबत शिक्षक म्हणून माझी भूमिका

- केव्हा ?
- कोठे?
- कसे?
- कोणते?

कृत्रिम बुद्धिमत्तेचे प्रकार

१) Narrow AI म्हणजेच अरुंद AI

अरुंद AI आपल्या आजूबाजूला आढळू शकते, जे आपल्या दैनंदिन जीवनातील विविध पैलू वाढवते. येथे काही उल्लेखनीय उदाहरणे आहेत:आर्टिफिशियल इंटेलिजेंसचे काही प्रकार आर्टिफिशियल इंटेलिजन्स (AI) च्या स्पेक्ट्रमच्या केंद्रस्थानी असतात, हा एक प्रकार आहे जो नॅरो एआय म्हणून ओळखला जातो, ज्याला अनेकदा कमकुवत AI म्हणून संबोधले जाते. येथूनच AI प्रकार समजून घेण्याचा प्रवास खऱ्या अर्थाने सुरू होतो. नॅरो एआय हे एआय सिस्टीमचे प्रतिनिधित्व करते जे त्यांच्या विशिष्ट डोमेनमध्ये तज्ञ आहेत, पूर्वनिर्धारित कार्यांमध्ये उत्कृष्ट आहेत, परंतु मानवी बुद्धिमत्तेशी संबंधित व्यापक संज्ञानात्मक क्षमतांचा अभाव आहे.

1. **व्हर्च्युअल असिस्टंट:** कदाचित नॅरो एआयचा सर्वात ओळखण्यायोग्य प्रकार, Siri, Alexa, Google सहाय्यक आणि Cortana सारखे आभासी सहाय्यक स्मरणपत्रे सेट करणे, प्रश्नांची उत्तरे देणे आणि स्मार्ट होम डिव्हाइसेस नियंत्रित करणे यासारख्या कार्यांमध्ये मदत करण्यासाठी डिझाइन केलेले आहेत. आपले जीवन अधिक सोयीस्कर बनवून ते व्हॉइस कमांड्स समजून घेण्यात आणि त्यांना प्रतिसाद देण्यात उत्कृष्ट आहेत.

2. **शिफारस प्रणाली:** जेव्हा तुम्हाला Netflix वर वैयक्तिकृत मूव्ही शिफारसी किंवा Amazon वर उत्पादन सूचना प्राप्त होतात, तेव्हा तुम्ही अरुंद AI कृतीत अनुभवता. या सिस्टम तुमच्या पूर्वीच्या वर्तनाचे आणि प्राधान्यांचे विश्लेषण करतात जेव्हा तुमच्या अभिरुचीनुसार खास तयार केलेली सामग्री ऑफर करण्यासाठी.

3. **चॅटबॉट्स:** तुम्ही वेबसाइटवर ग्राहक समर्थन शोधत असाल किंवा सोशल मीडियावर मैत्रीपूर्ण बॉटशी संभाषण करत असाल, चॅटबॉट्स सर्वत्र आहेत. मजकूर-आधारित संभाषणांमध्ये व्यस्त राहण्यासाठी, रीअल-टाइममध्ये माहिती आणि सहाय्य प्रदान करण्यासाठी ते नैसर्गिक भाषा प्रक्रिया (NLP) वापरतात.

अरुंद AI ची ताकद:

- **स्पेशलायझेशन:** अरुंद AI हे ज्या कार्यांसाठी डिझाइन केले आहे त्यामध्ये अपवादात्मकपणे चांगले आहे. हे अचूकता आणि कार्यक्षमता प्रदान करून विशिष्ट डोमेनमध्ये मानवांना मागे टाकू शकते.
- **कार्यक्षमता:** या AI प्रणाली थकवा किंवा कंटाळवाणेपणा न करता अथकपणे काम करू शकतात, त्यांना पुनरावृत्ती आणि अचूक कृती आवश्यक असलेल्या कार्यांसाठी आदर्श बनवतात.

- **वापरकर्ता-अनुकूल:** अरुंद AI ऍप्लिकेशन्स बहुतेकदा वापरकर्ता-अनुकूल असतात आणि तांत्रिक नसलेल्या वापरकर्त्यांसाठी प्रवेशयोग्य असतात, ज्यामुळे तंत्रज्ञान अधिक सुलभ होते.

अरुंद AI च्या मर्यादा:

- **सामान्यीकरणाचा अभाव:** अरुंद AI त्याच्या डोमेनमध्ये उत्कृष्ट असताना, ते त्याचे ज्ञान किंवा कौशल्ये त्याच्या विशिष्ट फोकसच्या पलीकडे असलेल्या कार्यांसाठी सामान्यीकृत करू शकत नाही. उदाहरणार्थ, एक आभासी सहाय्यक अचानक वैद्यकीय निदानात तज्ञ होऊ शकत नाही.
- **मर्यादित समज:** अरुंद AI मध्ये खरे आकलन किंवा जाणीव नसते. हे नमुने आणि अल्गोरिदमवर आधारित डेटावर प्रक्रिया करते परंतु मानवासारखी समज नसते.
- **डेटावरील अवलंबित्व:** या AI सिस्टीम त्यांना प्रशिक्षित केलेल्या डेटाच्या गुणवत्तेवर आणि प्रमाणावर मोठ्या प्रमाणावर अवलंबून असतात. त्यांना अपरिचित परिस्थिती किंवा त्यांच्या प्रशिक्षण कार्यक्षेत्राबाहेरील डेटाचा सामना करावा लागतो.

२) जनरल AI (AGI) म्हणजे काय?

- एखाद्या AI प्रणालीची कल्पना करा जी एखाद्या विशिष्ट डोमेनमध्ये केवळ समजते आणि उत्कृष्ट नाही तर तिच्याकडे मानवाची संज्ञानात्मक क्षमता आणि अनुकूलता आहे. हे जनरल एआयचे सार आहे. AGI ची रचना मानवाप्रमाणेच विविध कार्ये आणि डोमेनमधील ज्ञान समजून घेण्यासाठी, शिकण्यासाठी आणि लागू करण्यासाठी केली गेली आहे.
- **AGI चे संभाव्य परिणाम:**
- AGI ची संकल्पना मनमोहक आहे आणि तिचे सखोल परिणाम आहेत:
- 1. **अष्टपैलुत्व:** AGI वैद्यकीय निदानापासून ते संगीत तयार करण्यापर्यंत किंवा जटिल वैज्ञानिक समस्या सोडवण्यापर्यंतच्या कार्यांमध्ये सहजतेने संक्रमण करून उद्योगांमध्ये क्रांती घडवू शकते.
- 2. **ऑटोमेशन:** AGI सह, ऑटोमेशन अभूतपूर्व पातळीपर्यंत पोहोचू शकते. सध्या मानवी हस्तक्षेपाची आवश्यकता असलेली अनेक कार्ये पूर्णपणे स्वयंचलित होऊ शकतात.
- 3. **नवोपक्रम:** AGI च्या सर्जनशील समस्या सोडवण्याच्या क्षमतेमुळे वैद्यक, विज्ञान आणि तंत्रज्ञान यांसारख्या क्षेत्रात प्रगती होऊ शकते.
- 4. **मानवी समानता:** AGI साध्य करणे हे सूचित करते की AI प्रणाली मानवी बुद्धिमत्तेशी समानता मिळवू शकतात, काही बाबींमध्ये कदाचित त्यास मागे टाकू शकतात.

- 5. **आव्हाने:** AGI च्या विकासामध्ये महत्त्वाची आव्हाने येतात, ज्यात मानवी आकलनशक्ती, नैतिक चिंता, आणि सुरक्षितता सुनिश्चित करणे यासह समजून घेणे आणि त्याचे अनुकरण करणे समाविष्ट आहे.

-

AGI: एक सैद्धांतिक सीमा:

- AGI ची संकल्पना उत्साहवर्धक असताना, ती एक सैद्धांतिक सीमा राहते हे लक्षात घेणे महत्त्वाचे आहे. आत्तापर्यंत, AGI ची जाणीव झालेली नाही, आणि अशी प्रणाली तयार करणे खूप गुंतागुंतीचे आहे. मानवी बुद्धिमत्ता ही जैविक उत्क्रांती आणि गुंतागुंतीच्या तंत्रिका प्रक्रियांचे उत्पादन आहे जे आपल्याला आताच समजू लागले आहे.

- AGI चा पाठपुरावा करणे हे एक मोठे आव्हान आहे आणि ते गहन नैतिक, तात्विक आणि व्यावहारिक प्रश्न निर्माण करते. आम्ही AGI चा नैतिक वापर कसा सुनिश्चित करू? आपण त्याच्या वर्तनावर नियंत्रण कसे ठेवू? अनपेक्षित परिणाम टाळण्यासाठी कोणत्या सुरक्षा यंत्रणा आहेत?

- AGI एखाद्या मशीनमध्ये मानवी बुद्धिमत्तेसारखे काहीतरी तयार करण्याच्या आकांक्षेचे प्रतिनिधित्व करते, असे कार्य जे संशोधक आणि भविष्यवाद्यांना मोहित करत असते. ही एक सीमा आहे जी अभूतपूर्व शक्यता आणि अभूतपूर्व आव्हाने या दोन्हींचे वचन देते, ज्यामुळे तो कृत्रिम बुद्धिमत्तेच्या क्षेत्रात गहन शोध आणि चर्चेचा विषय बनतो.

- जसजसे आम्ही आमच्या AI प्रकारांच्या शोधात पुढे जात आहोत, तसतसे आम्ही AGI चे सैद्धांतिक शिखर आणि Superintelligent AI ची सट्टा क्षमता यासह या परिवर्तनकारी तंत्रज्ञानाचे गुंतागुंतीचे पैलू उलगडत राहू.

३) सुपरइंटेलिजंट एआय: कृत्रिम बुद्धिमत्तेच्या शिखराचे अनावरण

- आर्टिफिशियल इंटेलिजेंस (AI) च्या स्पेक्ट्रममध्ये खोलवर जात असताना, आम्हाला कल्पनाशक्तीच्या सीमारेषा पसरवणारी संकल्पना समोर येते: सुपरइंटेलिजेंट एआय. ही उल्लेखनीय कल्पना AI प्रणालींची कल्पना करते जी केवळ प्रतिस्पर्धीच नाही तर मानवी बुद्धिमत्तेला प्रत्येक कल्पनीय पैलूंमध्ये मागे टाकते. हे AI यशाच्या शिखराचे प्रतिनिधित्व करते, जिथे मशीन्समध्ये आपल्या स्वतःच्या पलीकडे संज्ञानात्मक क्षमता असतात.

- **सुपरइंटेलिजंट एआय ची दृष्टी:**

- सुपरइंटेलिजंट एआय, बहुतेकदा विज्ञान कथा आणि भविष्यवादी साहित्यात चित्रित केले जाते, ही एक काल्पनिक रचना आहे जी मानवी कल्पनाशक्तीला मोहित करते. या व्हिजनमध्ये, AI सिस्टीम मानवी बुद्धिमत्तेच्या पलीकडे जाते, केवळ कच्च्या संगणकीय शक्तीचे प्रदर्शन करत नाही तर प्रगत

समस्या सोडवण्याची कौशल्ये, सर्जनशीलता आणि आपल्यापेक्षा जास्त असलेल्या जगाची समज देखील प्रदर्शित करते.

- **एक सैद्धांतिक संकल्पना:**
- तथापि, Superintelligent AI ही एक सैद्धांतिक संकल्पना राहिली आहे यावर जोर देणे आवश्यक आहे. आत्तापर्यंत, आम्हाला सर्व डोमेनवर अतिमानवी बुद्धिमत्ता प्रदर्शित करणाऱ्या AI सिस्टीमची जाणीव झालेली नाही. यंत्रांमध्ये बुद्धिमत्तेची ही पातळी गाठणे ही महत्त्वाची आव्हाने आणि सखोल नैतिक विचार वाढवते.
- **सुपरइंटिलिजंट एआयच्या पाठपुराव्यातील आव्हाने:**
- 1. **नियंत्रण आणि सुरक्षितता:** सुपरइंटिलिजंट AI सिस्टीम आमच्या सर्वोत्तम हितासाठी कार्य करतात आणि जोखीम निर्माण करत नाहीत याची खात्री करणे हे एक महत्त्वाचे आव्हान आहे. अतिमानवी बुद्धिमत्तेसह अनियंत्रित AI चे अनपेक्षित परिणाम होऊ शकतात.
- 2. **नैतिक चिंता:** Superintelligent AI च्या सभोवतालचे नैतिक विचार सर्वोपरि आहेत. अशा संस्थांसाठी अधिकार, जबाबदाऱ्या आणि नैतिक निर्णय घेण्याबाबतचे प्रश्न जटिल आहेत आणि काळजीपूर्वक विचार करणे आवश्यक आहे.
- 3. **बुद्धिमत्ता समजून घेणे:** मानवी बुद्धिमत्ता ही जीवशास्त्र, संस्कृती आणि अनुभव यांचा एक जटिल संवाद आहे. एआय सिस्टीममध्ये बुद्धिमत्तेच्या या पातळीची प्रतिकृती बनवणे किंवा ओलांडणे हे एक मोठे उपक्रम आहे.
- 4. **संसाधन आवश्यकता:** सुपरइंटिलिजंट AI विकसित आणि राखण्यासाठी प्रचंड संगणकीय संसाधने आणि उर्जेची आवश्यकता असू शकते, ज्यामुळे टिकाऊपणाची चिंता वाढू शकते.

शिक्षणातील AI चे पाच तोटे

- **पक्षपाती** आर्टिफिशियल इंटेलिजन्स ही माहिती जितकी प्रशिक्षित आहे तितकीच माहिती आहे. जर ChatGPT सारखा प्रोग्राम पक्षपाती माहितीवर प्रशिक्षित असेल, तर विद्यार्थ्याने जेव्हा प्रश्न विचारला तेव्हा त्यांना पक्षपाती प्रतिसाद मिळू शकतो, ज्यामुळे रूढीवादी आणि सामाजिक असमानता कायम राहते. वर्गीकरणासाठी पक्षपाती AI साधन वापरले असल्यास, विद्यार्थ्यांना त्यांच्या वंश किंवा लिंगावर आधारित कमी ग्रेड मिळू शकतात. [2]
- **चुका** . पूर्वाग्रहाव्यतिरिक्त, कृत्रिम बुद्धिमत्ता चुकीची माहिती निर्माण करू शकते. AI ने काढलेल्या डेटामध्ये त्रुटी असू शकतात, तो जुना असू शकतो किंवा चुकीची माहिती पसरवू शकतो. AI द्वारे प्रदान केलेली माहिती अचूक आहे असे विद्यार्थ्यांनी किंवा शिक्षकांनी गृहीत धरू नये. [3]

- **फसवणूक** . विद्यार्थी संपूर्ण निबंध लिहिण्यासाठी, क्विझ प्रश्नांची उत्तरे देण्यासाठी किंवा त्यांचा गृहपाठ करण्यासाठी ChatGPT वापरू शकतात. गंमत म्हणजे, आता असे AI प्रोग्राम आहेत जे शिक्षकांना त्यांचे विद्यार्थी फसवत आहेत की नाही हे निर्धारित करण्यात मदत करण्यासाठी AI लेखन शोधू शकतात. परंतु काहीवेळा ते कार्यक्रम एखाद्या विद्यार्थ्याचे मूळ कार्य साहित्यिक चोरी म्हणून ओळखू शकतात.
- **अलगीकरण** . विद्यार्थ्यांनी शिक्षकापेक्षा सॉफ्टवेअर प्रोग्रामशी अधिक संवाद साधल्यास, ते डिस्कनेक्ट आणि वेगळे वाटू शकतात. त्यांची प्रेरणा आणि व्यस्तता कमी होऊ शकते, ज्यामुळे गळतीचे प्रमाण वाढू शकते. [4]
- **नोकऱ्या** आर्टिफिशियल इंटेलिजन्समध्ये एक शक्तिशाली शिक्षण साधन असण्याची क्षमता आहे. काही शिक्षकांना काळजी वाटते की AI त्यांची जागा घेईल.

शिक्षणातील AI चे पाच फायदे

- **मदत** . ज्या शिक्षकांनी AI चा प्रयत्न केला आहे त्यांना असे आढळून आले आहे की ते धडे योजना आणण्यापासून ते विद्यार्थी प्रकल्प कल्पना तयार करण्यापासून क्विझ तयार करण्यापर्यंत त्यांची कामे सुलभ करण्यात मदत करू शकतात. कृत्रिम बुद्धिमत्तेच्या सहाय्याने, शिक्षक त्यांच्या विद्यार्थ्यांसोबत घालवण्यासाठी अधिक वेळ मिळवू शकतात.3
- **वेग** . एखाद्या विद्यार्थ्याला असाइनमेंटवर काम करताना "अडकले" असे वाटत असल्यास, शिक्षक किंवा काळजीवाहक उपलब्ध नसल्यास कृत्रिम बुद्धिमत्ता कार्यक्रम त्वरित, उपयुक्त मदत देऊ शकतात. उदाहरणार्थ, एखादा विद्यार्थी विचारू शकतो, "मी X साठी कसे सोडवू?" समीकरण सोडवण्याच्या चरणांची आठवण करून देणे. एखादा विद्यार्थी असेही विचारू शकतो, "माझे निबंध लेखन सुधारण्यासाठी काही प्रभावी धोरणे काय आहेत?" आणि ChatGPT लगेच सल्ला आणि संसाधने देऊ शकते.
- **वैयक्तिकरण** . AI कार्यक्रम विद्यार्थ्यांसाठी शिकण्याच्या संधी वैयक्तिकृत करण्यात मदत करू शकतात. उदाहरणार्थ, ChatGPT त्वरीत आणि सहजपणे सामग्री दुसऱ्या भाषेत अनुवादित करू शकते, ज्यामुळे दुसरी भाषा बोलणाऱ्या विद्यार्थ्यांना असाइनमेंट समजणे सोपे होते. ChatGPT सामग्रीची उजळणी देखील करू शकते जेणेकरुन ते वेगवेगळ्या ग्रेड स्तरांसाठी आणि विद्यार्थ्यांच्या कौशल्य आणि आवडीनुसार तयार केलेल्या प्रकल्पांसाठी योग्य असतील.
- **संदर्भ** . 2023 च्या TED टॉकमध्ये, खान अकादमीचे संस्थापक आणि सीईओ सल खान यांनी एआय ट्यूटरचे उदाहरण शेअर केले ज्याने विद्यार्थ्याला एफ. स्कॉट फिट्झगेराल्डच्या *द ग्रेट गॅट्सबी* मधील हिरव्या प्रकाशाचे प्रतीक समजण्यास मदत केली . विद्यार्थ्याने एआय ट्यूटरला जे गॅटस्बी या पात्राप्रमाणे वागण्यास सांगितले आणि तिच्या प्रश्नाचे उत्तर दिले, "तुम्ही हिरव्या दिव्याकडे का पाहत राहता?" एआय ट्यूटरने गॅट्सबी म्हणून उत्तर दिले, तिला एक प्रतिसाद दिला जो केवळ अचूकच नाही तर मोहक आणि संदर्भित होता. [5] भविष्यातील विद्यार्थी AI चा वापर ॲन

फ्रँकशी तिच्या जीवनाबद्दल, मेरी क्युरीशी तिच्या वैज्ञानिक शोधांबद्दल आणि शेक्सपियरशी त्याच्या नाटकांबद्दल बोलण्यासाठी करू शकतात.

- **वैयक्तिकरण** . आर्टिफिशियल इंटेलिजन्समुळे विद्यार्थ्यांच्या शिक्षणाचे वैयक्तिकरण देखील होऊ शकते. विद्यार्थ्यांच्या कामगिरीच्या डेटाचे विश्लेषण करून, एआय-संचालित साधने निर्धारित करू शकतात की कोणत्या विद्यार्थ्यांना त्यांचा शिकण्याचा अनुभव सुधारण्यासाठी समर्थनाची आवश्यकता आहे आणि त्या विद्यार्थ्यांना मदत करण्याचे सर्वोत्तम मार्ग आहेत.

Appendix No.5. Questionnaire

	Teachers Primary Information • **Name Of Teacher** • **Name of School** • **Mobil Number** • **Email Id** • **Area of School** • **Name Of Cluster** • **Name of Block** • **Teaching Class**
Sr. No.	**Questions**
1	कृत्रिम बुद्धिमत्ता ही संकल्पना कोणत्या क्षेत्राशी सबंधित आहे?
2	कृत्रिम बुद्धीमत्ता या संकल्पनेच्या शिक्षणातील वापराविषयी माहिती आहे का?
3	खालीलपैकी कोणत्या कृत्रिम बुद्धीमत्तेच्या साधनाचा आपण अध्ययन अध्यापनामध्ये वापर केला आहे-?
4	वरील साधनांव्यातिरिक्त इतर साधनाचा वापर केला असेल तर येथे त्याचे नाव नोंदवावे.
5	या विधानाशी "अध्यापनामध्ये कृत्रिम बुद्धिमत्तेचा वापर करता येतो-अध्ययन"तुम्ही सहमत आहात का?
6	प्राथमिक शिक्षण घेत असताना विद्यार्थ्यांना स्वयं अध्ययनासाठी कृत्रिम बुद्धिमत्ता उपयुक्त आहे असे आपणास वाटते का?
7	विद्यार्थांचा अध्ययन क्षय भरून काढण्यासाठी कृत्रिम बुद्धिमत्ता उपयुक्त आहे असे आपणास वाटते का?
8	होय असेल तर कसे उपयुक्त आहे ते स्पष्ट करा.
9	अध्ययन अध्यापनामध्ये - कृत्रिम बुद्धिमत्तेचा वापर करताना काय फायदे होतात ?
10	अध्यन अध्यपनामध्ये - कृत्रिम बुद्धिमत्तेचा वापर करताना कोणत्या आव्हानांना सामोरे जावे लागते?
11	राष्ट्रीय शैक्षणिक धोरण २०२० आणि कृत्रिम बुद्धिमत्ता याचा काही सहसबंध आहे का?
12	अटल टिंकरिंग लॅब, रोबोटिक्स लॅब विषयी माहिती आहे का?

13	रोबोटिक्स लॅब कोणत्या शाळेला शासनाकडून देण्यात आलेल्या आहेत?
14	AI म्हणजे काय?
15	कृत्रिम बुद्धिमत्ता या तंत्रज्ञानाविषयी आपणास प्रशिक्षण आवश्यक आहे का?

Appendix No.6. Pre- test

	Teachers Primary Information • **Name Of Teacher** • **Name of School** • **Mobil Number** • **Email Id** • **Area of School** • **Name Of Cluster** • **Name of Block** • **Teaching Class**
Sr. No.	**Questions**
1	खालीलपैकी कृत्रिम बुद्धिमत्तचे जनक कोणाला म्हंटले जाते?
2	Artificial intelligence is the ---------- and technology which making machines those are intelligent
3	खालीलपैकी कृत्रिम बुद्धीमत्तेचे प्रकार कोणते?
4	"Chatbot हे एक Narrow AI चे वैशिष्ट्य आहे?" सत्य की असत्य
5	खालीलपैकी कृत्रिम बुद्धीमत्ता अंतर्गत आपण कोणते साधन वापरू शकतो?
6	राष्ट्रीय शैक्षणिक धोरण २०२० मधील कोणत्या क्रमांकाच्या मुद्द्यामध्ये तंत्रज्ञान व एकात्मीकरण यावर विवेचन केलेले आहे?
7	जिल्हा परिषद शाळांमध्ये कृत्रिम बुद्धिमत्तेचा वापर अध्ययन अध्यापनामध्ये केला जात आहे का?
8	होय असेल तर कोणत्या प्रकारे ते स्पष्ट करा.
9	अध्ययन - अध्यापनामध्ये कृत्रिम बुद्धिमत्तेचा वापर करून आपण आंतरारष्ट्रीय शिक्षण देवू शकू असे वाटते का ?

10	अध्यन - अध्यपनामध्ये कृत्रिम बुद्धिमत्तेचा वापर करून विद्यार्थ्यामधील कोणत्या क्षमता/कौशल्य विकसित करता येतील ?
11	राष्ट्रीय शैक्षणिक धोरण २०२० नुसार कृत्रिम बुद्धिमत्ता अंमलबजावणी यशस्वी करण्यासाठी मी स्वतः अद्ययावत कशाप्रकारे राहू शकतो?
12	कृत्रिम बुद्धिमत्तेचा वापर करून आपण कोणते प्रशिक्षण घेतले आहे का?
13	Can technology replace teacher?
14	AI म्हणजे काय?
15	कृत्रिम बुद्धिमत्ता या तंत्रज्ञानामधील विविध साधनांच्या शिक्षण क्षेत्रातील वापराविषयी आपणास प्रशिक्षण आवश्यक आहे का?

Appendix No.7. Post –test

	Teachers Primary Information • **Name Of Teacher** • **Name of School** • **Mobil Number** • **Email Id** • **Area of School** • **Name Of Cluster** • **Name of Block** • **Teaching Class**
Sr. No.	**Questions**
1	खालीलपैकी कृत्रिम बुद्धिमत्तचे जनक कोणाला म्हंटले जाते?
2	Artificial intelligence is the ---------- and technology which making machines those are intelligent
3	खालीलपैकी कृत्रिम बुद्धीमत्तेचे प्रकार कोणते?
4	"Chatbot हे एक Narrow AI चे वैशिष्ट्य आहे?" सत्य की असत्य
5	खालीलपैकी कृत्रिम बुद्धीमत्ता अंतर्गत आपण कोणते साधन वापरू शकतो?
6	राष्ट्रीय शैक्षणिक धोरण २०२० मधील कोणत्या क्रमांकाच्या मुद्द्यामध्ये तंत्रज्ञान व एकात्मीकरण यावर विवेचन केलेले आहे?
7	जिल्हा परिषद शाळांमध्ये कृत्रिम बुद्धिमत्तेचा वापर अध्ययन अध्यापनामध्ये केला जात आहे का?
8	होय असेल तर कोणत्या प्रकारे ते स्पष्ट करा.
9	अध्ययन - अध्यापनामध्ये कृत्रिम बुद्धिमत्तेचा वापर करून आपण आंतरारष्ट्रीय शिक्षण देवू शकू असे वाटते का ?

10	अध्यन - अध्यपनामध्ये कृत्रिम बुद्धिमत्तेचा वापर करून विद्यार्थ्यामधील कोणत्या क्षमता/कौशल्य विकसित करता येतील ?
11	राष्ट्रीय शैक्षणिक धोरण २०२० नुसार कृत्रिम बुद्धिमत्ता अंमलबजावणी यशस्वी करण्यासाठी मी स्वतः अद्ययावत कशाप्रकारे राहू शकतो?
12	कृत्रिम बुद्धिमत्तेचा वापर करून आपण कोणते प्रशिक्षण घेतले आहे का?
13	Can technology replace teacher?
14	AI म्हणजे काय?
15	कृत्रिम बुद्धिमत्ता या तंत्रज्ञानामधील विविध साधनांच्या शिक्षण क्षेत्रातील वापराविषयी आपणास प्रशिक्षण आवश्यक आहे का?

Appendix No.8. Photos of Awareness program workshop

Madkhol Cluster Block Sawantwadi

Appendix No.9. Completion Letter