

REGIONAL INSTITUTE OF EDUCATION, AJMER

DEPARTMENT OF EXTENSION EDUCATION,

MAJOR RESEARCH PROJECT

RESEARCH

The Institute conducts research in the recent thrust areas of Curriculum Development, Teacher Education, Science Education, Vocational Education, ICT, ECCE, Environmental Educational and in the areas of national & regional priorities at various levels. The major researches conducted by Institute in the last five years are as below:

- Implementing interventions at Middle Stage: A Block Level Research study (2018-23)
- Study of Utilization and Impact of Transport Facilities in the Secondary Schools of UT Ladakh (2022-23)
- A Study of Competencies Developed Among, Teachers and Students by the Use of Online and Digital Resources in Schools of Northern Region (2022-23)
- A Study of Pedagogical Practices for Children at ECCE with reference to Foundational Literacy and Numeracy (2022-23)
- Learning gaps, challenges and innovations in primary education during COVID-19 (2022-23)
- A study of initiatives, strategies and best practices adopted for fostering the quality education during COVID-19 period for the states of northern region (2021-22)
- Impact of Science Kits on conceptual understanding of Science at Middle stage in schools of Hurda Block of Bhilwara District ((2020-22)
- A Study of Learning Resources including Simple Explicit Animation (SEA) Approach in Understanding the Concepts of Chemistry and Reaction Mechanism in Chemistry at Senior Secondary Level (2020-21)
- Augmented Reality (AR) based Mathematics Lab activities as a sustainable supplement to traditional at secondary stage ((2020-21)
- Learning Outcome of Children with Learning Disabilities: Exploring the determinants in Inclusive Classroom (2020-21)
- A status study of Rashtriya Avishkar Abhiyan (RAA) on promotion of Science for northern region (2019-20)
- A Study of Learning Resources in Understanding the Concepts of Stereochemistry and Reaction Mechanism in Organic Chemistry at Senior Secondary Level (2019-20)

- Study of Difficulties in Learning Chemistry among prospective Teachers of B.Sc.B.Ed. Programme (2018-19)
- Learning Outcome of Children with Intellectual Disabilities: Exploring the determinants in Inclusive Classroom (2018-19)
- Effectiveness of Flipped Classroom on the learning of Concepts of Physics at Senior Secondary level (2018-19)
- Effectiveness of ICT related material for teaching of physics at senior secondary level (2018-19)

Year 2022-23

1. **Title: A Study of Pedagogical Practices for Children at ECCE with reference to Foundational Literacy and Numeracy (2022-23)**
 - (i) **Name of Project Coordinator: Dr. Rajeev Ranjan**
 - (ii) **States / UTs:** Rajasthan, Madhya Pradesh, Odisha and Karnataka
 - (iii) **Focus Areas:** (ECCE – Foundational Literacy and Numeracy)
 - (iv) **Target Group:** School Children
 - (v) **Stage:** Foundational Stage
 - (vi) **Objectives:** (a) To identify and compare the pedagogies and practices for school readiness program of various ECCE centers
(b) To find out the different aspects of school readiness among children attended ECCE at RIE, Ajmer and other centers in the cognitive, pre-academic, language, self -help, social and play areas.
 - (vii) **Brief report:** The present research study was aimed to identify and compare the pedagogies and practices for school readiness program of various ECCE centers and to find out the different aspects of school readiness among children attended ECCE at RIE, Ajmer and other centers in the cognitive, pre-academic, language, self -help, social, and play areas. For this, a tool was developed and vetted in workshop mode. The data was collected at the various ECCE centers i.e., four Anganwadi centers, Preschool and Primary centers, Demonstration Multipurpose Schools of R.I.E., Bhopal, R.I.E., Bhubaneshwar, R I.E., Mysuru and R.I.E., Ajmer. The data on the infrastructural facilities and on pedagogical practices was also collected from two private centers. It was found that there are differences in the pedagogies used by different types of ECCE centers apart from the differences in infrastructure and resources. The difference was also found in the level of Foundational Literacy and Numeracy of children attended ECCE at different centers. There is a need to standardize the pedagogies and practices at FLN level. Dr. Rajeev Ranjan, Assistant Professor was the investigator of the project.

2. **Title: Study of Utilization and Impact of Transport Facilities in the Secondary Schools of UT Ladakh (2022-23)**

(i) **Name of Project Coordinator: Dr. R. K. Sharma was the Principal Investigator and Prof. Ram Babu Pareek was Co-Principal Investigator.**

(ii) **States / UTs: UT Ladakh**

(iii) **Focus Areas: Secondary Schools**

(iv) **Target Group: Secondary School Children**

(v) **Stage: Secondary Classes**

(vi) **Objectives: To find out status and impact of transport facilities under Samagra Shiksha schemes of Ministry of Education, Government of India.**

Following research questions were also utilized to unravel the phenomenon more effectively:

- Is status of utilization of transport facilities in the secondary schools of UT Ladakh as per expectation of Samagra Shiksha?
- Do the transport facilities have impact on enrollment of students in the secondary schools of UT Ladakh?
- Are traditional ways and best practices of transport facilities used in the UT Ladakh under the scheme of transport?

(viii) **Brief report:** The purpose of the Research Project entitled *Study of Utilization and Impact of Transport Facilities in the Secondary Schools of UT Ladakh* was to find out status and impact of transport facilities under Samagra Shiksha schemes of Ministry of Education, Government of India. In view of the above, discussion about the study with UT functionaries of Samagra Shiksha was made and Nodal Officers were also get nominated by the UT. A workshop to finalize the tools for the study was conducted during July11- 15, 2022 and following Research Tools/ Questionnaire were developed to collect the data from sample schools –

- Questionnaire for SPD office
- Questionnaire for School Heads
- Questionnaire for Students
- Questionnaire for Parents

The developed Research Tools/ Questionnaire were validated by administering them in the Government Senior Secondary School, Narwar (Ajmer). After validation, tools were administered in 44 schools of Leh and 19 schools of Kargil districts of Ladakh during 21-25 November 2022 and data were recorded accordingly. An analysis of the data indicates the sincere efforts have made to implement the scheme as per norms of the Samagra Shiksha. However, at certain point, further attention is required for effective implementation of the scheme. The details of findings are compiled in the form of report. For the project Dr. R. K. Sharma is the Principal Investigator and Prof. Ram Babu Pareek is Co-Principal Investigator.

3. **Title: A Study of Competencies Developed among Teachers and Students by the use of Online and Digital Resources in Schools of Northern Region (202223)**
 - (i) **Name of Project Coordinator:** Prof. Ram Babu Pareek was the Principal Investigator and Dr. R. K. Sharma was Co-Investigator.
 - (ii) **States / UTs:** For all the states and UTs of the Northern Region
 - (iii) **Focus Areas:** Evaluation
 - (iv) **Target Group:** Teachers and Students
 - (v) **Stage:** All Stages
 - (vi) **Objectives:** To study the competencies developed among teachers and students by the use of online and digital resources in Schools of Northern Region.
 - (vii) **Brief report:** The present study was undertaken for all the states and UTs of the Northern Region. In the study, 10 schools from each state and UT were identified for the data collection and fulfillment of the objectives of the study. The identification of sample schools was done through the nomination of a nodal officer from the state/UTs (Union Territories). This nodal officer was a senior official within the education department from the concerned state or UT and was responsible for coordinating with this research study or the coordinators of the study to conduct the survey for the study. The nodal officer is tasked with identifying a representative sample of ten schools from the state or UT for participation in the study or survey. This involves selecting schools that are diverse in terms of location, size, type, and other relevant characteristics as proposed in the study. Once the sample schools have been identified, the nodal officer was also asked to coordinate with the schools and ensure their participation in the study or survey by the principal investigators and his team members. This includes providing information and guidance to the schools, facilitating data collection, addressing any issues or concerns that may arise during the study or survey, and obtaining accurate and representative data that can be used for policy development and decision-making in the education sector. The data collection for all the states and UTs (sample states and UTs) was done by visiting the schools by the study coordinators and JPF appointed for the said study. The data processing has been completed, and the results are being analyzed both quantitatively and qualitatively. The final output was in the form of an academic report that can be used to understand the use of online and digital resources in education and make recommendations to the education authorities to improve and modernize the resources in the schools in their state. For the project Prof. Ram Babu Pareek was the Principal Investigator and Dr. R. K. Sharma was Co-Investigator.

4. **Title: Learning gaps, Challenges and Innovations in Primary Education during COVID-19 in the state of Uttarakhand (2022-23)**

(i) Name of Project Coordinator: Dr. Anand Arya, RIE, Ajmer

(ii) States/UTs: Uttarakhand

(iii) Focus Areas: Evaluation

(iv) Target Group: Primary School Children

(v) Stage: Primary

(vi) Objectives: To study the gaps in the holistic development (cognitive, health & wellbeing, socio-personal) of students due to the Covid

(vii) Brief report: The present research was aimed to study the gaps in the holistic development (cognitive, health & wellbeing, socio-personal) of students due to the Covid. The challenges faced and innovation adapted by teachers, head teachers, parents, students and education functionaries in teaching learning during Covid were the pertinent research questions. The study has followed the mixed research design and survey method and the sampling has been selected by using multi-stage sampling techniques. For the research study, the 40 schools of two districts of Uttarakhand namely - TehriGarhwal as general district and Haridwar as aspirational have been identified. The questionnaire for students about health & wellbeing, socio-personal development of students, questionnaire for studying challenges faced by teachers, head teachers, education functionaries, parents & students, questionnaire for studying innovations done by teachers, head teachers, education functionaries and parents and focused group discussion with students to study challenges faced during Covid have been used. The tools developed in workshop mode have used for data collection in total 40 schools; 05 schools from rural and urban block of each district. The data from 20 Head teachers@01 per school, 40 Teachers@ 2 per school, 400 Students@20 per school, 100 Parents@ 5 per school, 10 Educational functionaries@ 10 per districts have collected. The result of NAS 2021 was used for identification of learning gaps at Class 3 and 5. The study has presented a comparative analysis of the learning gaps of subject specific LOs as per the district report card of NAS 2021. The lack of internet connectivity/digital gadgets, as well as lack of parental support, limited teacher response and proper training of teachers were some of the major challenges that were reported. The major findings of the study in terms learning gaps in their cognitive, health & wellbeing, socio-personal, vocational development are

- In regard to holistic development of learners, the check list interpretation expressed learning gaps in the emotional wellbeing of learners and revealed that more than 56% of students were found irritated when their internet connection got interrupted. Around 35% of students agreed to get angry easily and 32% of students showed fear of examinations.
- Learning gaps are discernible in the area of vocational skills such as handwriting, completion of school tasks and work independently.

- In context to socio-personal development, learning gaps have seen as only 76% of students are found to be easily communicative with their teachers and plan time to manage their homework and play.
- The level specific reading, writing, speaking, listening and numeracy skills have lacked among students. The physical and mental wellbeing of the students is also reported to be affected. It has also expressed by stakeholders that students have addicted with smartphone and felling problems related to poor eye sight, lack of concentration and irritation. It was a common observation that communication skills, and non-readiness for completing homework are the major one. The research study was the part of national study being conducted by all RIEs. Dr. Anand Arya, RIE, Ajmer was the principal Investigator of the project.

Year 2021-22

1. **Title: A study of initiatives, strategies and best practices adopted for fostering the quality education during COVID-19 period for the states of northern region (2021-22)**
 - (i) **Name of Project Coordinator: Dr. Anand Kumar Arya, Dr. O. P. Meena and Dr. Ved Prakash Arya were the Investigators of this research study.**
 - (ii) **States / UTs: States of Northern Region**
 - (iii) **Focus Areas: Evaluation**
 - (iv) **Target Group: School Children**
 - (v) **Stage: All Stages**
 - (vi) **Objectives: To study various initiatives, strategies and best practices adopted for fostering the quality education during COVID-19 period for the states of northern region.**
 - (vii) **Brief report: The research study highlighted the various initiatives (digital/ nondigital/online/ offline/ distance/ alternative ways of schooling) and their effectiveness by interaction with more than 18903 students, 8438 parents, and 2270 teachers of the states of northern region. The effectiveness of initiatives in attaining objectives such as catering the need, context, accessibility, the overall reported responses of teachers were 56% for online, 61% for offline and 55% for blended. Only 52% of teachers believed that the planned initiatives met the students' needs and have the scope for the development of 21st-century skills. Regarding the NCERT initiatives, 56% of teachers have utilized Alternative Academic Calendar (AAC), 36% followed the Live sessions at SWAYAM Prabha, 41% utilized the NCERT's OERs and e-Content and 72% adopted NISHTHA for their teachinglearning. Among the students, 42.5 % feel it is easy to learn through**

online classes, 32.9% think it inspires them to learn more through online classes, and only 15.5% found it interesting. The lack of internet connectivity/digital gadgets, as well as lack of parental support, limited teacher response and proper training of teachers were some of the major challenges that were reported. The findings of the study help to explore the suitable implementation strategy for online and digital mode for sustainable learning expressed in the NEP-2020, along with framing alternative modes of learning not only in the times of pandemic but also in normalcy. Dr. Anand Kumar Arya, Dr. O. P. Meena and Dr. Ved Prakash Arya were the Investigator of this research study.

Year (2020-21)

1. **Title: Impact of Science Kits on conceptual understanding of Science at Middle stage in schools of Hurda Block of Bhilwara District (2020-22)**
 - (i) **Name of Project Coordinator: Dr. Anil Kumar Nainawat, Associate Professor, chemistry; Dr. V. P. Arya, Assistant Professor, Physics and Dr. O. P. Meena, Assistant professor, Chemistry were the principal investigators of this project.**
 - (ii) **States / UTs: Rajasthan**
 - (iii) **Focus Areas: Evaluation**
 - (iv) **Target Group: School Children**
 - (v) **Stage: Middle Stage**
 - (vi) **Objectives: To find the impact of science kits on conceptual understanding of science at middle stage in Hurda Block, Bhilwara district, Rajasthan.**
 - (vii) **Brief report: For finding the impact of science kits on conceptual understanding of science, the institute conducted a research study titled 'Impact of Science Kits on conceptual understanding of Science at middle stage' in schools of Hurda block of Bhilwara district of Rajasthan state. For the research study, 10 schools of rural block of Bhilwara district were identified. As a part of study, the observation tools and interview schedule for gathering the requisite information for effective use of science kit in the class room were developed in-house and finalized in workshop mode after pilot testing. The procured kits developed by NCERT were delivered in the selected schools and their usability and impact were studied in the next session. Dr. Anil Kumar Nainawat, Associate Professor, chemistry, Dr. V. P. Arya, Assistant Professor,**

Physics and Dr. O. P. Meena, Assistant professor, Chemistry were the principal investigators of this project.

2. Title: A Study of Learning Resources including Simple Explicit Animation (SEA) Approach in Understanding the Concepts of Chemistry and Reaction Mechanism in Chemistry at Senior Secondary Level (2020-21)

- (i) Name of Project Coordinator: Dr. Ram Babu Pareek, Professor, Chemistry and Dr. R. K. Sharma, Assistant Professor, Chemistry were the investigators of the project.**
- (ii) States / UTs:** Rajasthan
- (iii) Focus Areas:** Science
- (iv) Target Group:** School Children
- (v) Stage:** Senior Secondary Stage
- (vi) Objectives: (a)** To find out effectiveness of new dimensions of teaching methods focused on understanding the concepts of chemistry and reaction mechanism in chemistry.
- (vii) Brief report:** With the objectives to find out effectiveness of new dimensions of teaching methods focused on understanding the concepts of chemistry and reaction mechanism in chemistry, a research project titled 'A Study of Learning Resources including Simple Explicit Animation (SEA) Approach in Understanding the Concepts of Stereochemistry and Reaction Mechanism in Organic Chemistry at Senior Secondary was conducted by the institute by mixed method (qualitative and quantitative). For the study, the 10 schools of Bhilwara district were selected on the basis of identified parameters. The quality enabled conditions for teaching learning in the schools were observed through questionnaire and personal interviews of the principals/teachers.

The study highlighted the lack of resource material, proper capacity building of teachers in content and pedagogy and also reflected the need for specific interventions in the areas of stereochemistry and reaction mechanism. Addressing the concerns, the resource material for capacity building program and test items were developed in the workshop mode. Resource material in the form of models, kits etc. were also procured from DEK, NCERT and other agencies. The interventions were imparted on the identified areas through capacity building and its impact find out by administering the pre- and post-test of the students. The detailed analysis indicated a significant improvement in the quality enabling conditions and teaching learning process in the schools. The study recommended that teachers should be made equipped with suitable learning resources and, their professional development must be a continued process. The capacity building and peer learning opportunities of the teachers must be given for achieving the quality enabling teaching learning process. Dr. Ram Babu Pareek, Professor, Chemistry and Dr. R. K. Sharma, Assistant Professor, Chemistry were the investigators of the project.

3. **Title: Augmented Reality (AR) based Mathematics Lab activities as a sustainable supplement to traditional at secondary stage (2020-21)**

- (i) **Name of Project Coordinator:** Dr. Praveen Kumar Chaurasia, Professor, Mathematics and Dr. Patanjali Sharma, Assistant professor were the investigator of this project.
- (ii) **States / UTs:** Rajasthan
- (iii) **Focus Areas:** Mathematics
- (iv) **Target Group:** School Children
- (v) **Stage:** Secondary Stage
- (vi) **Objectives: (a)** To utilize Augmented Reality (AR) based Mathematics Lab activities as a sustainable supplement to traditional at secondary stage.
- (vii) **Brief report:** Augmented Reality (AR) is one kind of Virtual Reality (VR) technologies that can be used to help students who have difficulties to imagine geometrical objects in three-dimension way. Augmented Reality can be applied in mobile learning which will improve the efficiency and effectiveness in learning process. Students face difficulty in certain topics of mathematics for e.g., volume and geometry as they are not to imagine in a three-dimensional way. The institute developed an AR app, 'RIE, (NCERT) Ajmer Mathematics Application' which provides a better mathematical solution in 3-D way for Class IX and X students. Institute has developed 66 AR materials for class IX and X. Dr. Praveen Kumar Chaurasia, Professor, Mathematics and Dr. Patanjali Sharma, Assistant professor were the investigator of the project.

4. **Title: Learning Outcome of Children with Learning Disabilities: Exploring the determinants in Inclusive Classroom (2020-21)**

- (i) **Name of Project Coordinator:** Dr. Rajeev Ranjan, Assistant Professor, Education was the investigator of this project.
- (ii) **States / UTs:** Rajasthan
- (iii) **Focus Areas:** Evaluation
- (iv) **Target Group:** Children with Learning Disabilities
- (v) **Stage:** Primary Stage
- (vi) **Objectives: (a)** To find out the teaching learning determinants of children with disabilities in inclusive setting.
- (vii) **Brief report:** With the objectives to find out the teaching learning determinants of children with disabilities in inclusive setting, to explore the existing pedagogical processes and classroom climate leading to learning outcomes of children with disabilities in inclusive setting at primary level, and to explore the status of children with disabilities under the category of Under Representative Group (URG) in inclusive set up, and to suggest the innovative strategies to fulfil the various needs of children with disabilities in Inclusive schools, a research study was conducted in the institute. Using purposive

sampling technique, a total of 20 students with Learning Disabilities were selected. Out of this, the ratio of Boy: Girl was 14: 6. Learning Disability Checklist by National Center for Learning Disabilities has used for specific learning disabilities. the Diagnostic Test of Learning Disability (DTLD), developed by Smriti Swarup and Dharmishta H. Mehta at SNDT Women's University was also used for this study.

The test was standardized on a sample of 1050 children with the age range of 8-11 years. Learning Outcome checklist was also used for assessment of the Learning Outcome and understanding the various pedagogical processes. Responses were recorded manually; Teachers/special educators' views were also collected. The study revealed that the responses of children with Learning Disabilities towards different stimuli differ significantly against all the activities as well as all the stimulus modalities, however in case of children with ID and LD groups; difference is found mainly during the self-help activities like during lunch time activities. Among children with Intellectual Disabilities, unique and no response towards in different situations were comparatively low when compared with ASD. Dr. Rajeev Ranjan, Assistant Professor, Education was the investigator of the project.

Year 2019-20

1. Title: A status study of Rashtriya Avishkar Abhiyan (RAA) on promotion of Science for northern region (2019-20)

- (i) Name of Project Coordinator: Dr. A.K. Arya, Dr. A. K. Nainawat and Dr. Patanjali Sharma were the principal investigator of this project.**
- (ii) States / UTs:** Himachal Pradesh, Uttarakhand and Jammu & Kashmir of Northern Region
- (iii) Focus Areas:** Nurturing creativity among students and teachers for Science & Mathematics
- (iv) Target Group:** School Children
- (v) Stage:** All Stages
- (vi) Objectives: (a)** To identify the best practices including initiatives, strategies and practices adopted by northern states under **Rashtriya Avishkar Abhiyan (RAA).**
- (vii) Brief report:** The present study was aimed to identify the best practices including initiatives, strategies and practices adopted by northern states under Rashtriya Avishkar Abhiyan (RAA), a MHRD convergent framework that aims at nurturing a spirit of inquiry and creativity among teachers and students at school level. The basic information of implementation status of quality interventions was explored through questionnaires (interview schedule and survey) from the various stake holders of abhiyan of Himachal, Uttarakhand and Jammu & Kashmir states of northern region. The RAA interventions are being implemented by the states to make learning of Science and Mathematics

a joyful and meaningful activity. Among the key initiatives of the Abhiyan, the strengthening of science and mathematics laboratories, development of resource material, and encouraging science and mathematics through alternative strategy, via initiatives like science/mathematics clubs, outreach program, collaborating with local resources like science centres, museums etc. are adopted in the model schools of the states. Further, as per the suggestive guidelines, the government schools of states have science club, student participation in Inter-school, State/National Maths and Science Competitions and student outreach program or visit to Science Museums and Science fairs. The initiatives such as school mentoring for Science & Mathematics teaching by Higher Education Institutions, promotion of teacher circle for peer learning and community engagement needs more emphasize. Dr. A.K. Arya, Dr. A. K. Nainawat and Dr. Patanjali Sharma were the principal investigator of the project.

2. Title: A Study of Learning Resources in Understanding the Concepts of Stereochemistry and Reaction Mechanism in Organic Chemistry at Senior Secondary Level (2019-20)

- (i) Name of Project Coordinator: Prof. R. B. Pareek and Dr. R. K. Sharma were the principal investigator of the project.**
- (ii) States / UTs: Rajasthan**
- (iii) Focus Areas: Science**
- (iv) Target Group: School Children and Teachers**
- (v) Stage: Senior Secondary Stage**
- (vi) Objectives: (a) To find out effectiveness of learning resources (3-D Models, Kits, e-resources) on the understanding of concepts of stereochemistry and reaction mechanism.**
- (vii) Brief report: The present study was aimed to find out effectiveness of learning resources (3-D Models, Kits, e-resources) on the understanding of concepts of stereochemistry and reaction mechanism and to improve pedagogical skills of PGTs by capacity building in use of Learning Resources on the concepts of stereochemistry and reaction mechanism. For the study, 10 schools of Ajmer district were identified as sample. Resource material developed in workshop mode was used to impart training in the capacity building of the teachers of identified schools in the area of reaction mechanism and stereochemistry.**

The study reveals that there is a significant improvement in the performances of students after teaching reaction mechanism and stereochemistry using innovative method including models and multimedia. Teachers and students also realized that interventions have been successful in creating an active learning environment. Interventions also motivated students and increased their interests in learning of such important concepts in joyful manner. Prof. R. B. Pareek and Dr. R. K. Sharma were the principal investigator of the project.

Year 2018-19

1. **Title: Study of Difficulties in Learning Chemistry among prospective Teachers of B.Sc. B.Ed. Program (2018-19)**

- (i) **Name of Project Coordinator: Prof. R. B. Pareek**
- (ii) **States / UTs: Rajasthan**
- (iii) **Focus Areas: Evaluation**
- (iv) **Target Group: Students and Teachers**
- (v) **Stage: B.Sc. B.Ed. Program**
- (vi) **Objectives: To study the Difficulties in Learning Chemistry among prospective Teachers of B.Sc. B.Ed. Program**
- (vii) **Brief report:** The major objectives of this study were to study content related learning difficulties in chemistry among four year B.Sc. B.Ed. Prospective teachers; to study the difficulties experienced by prospective teachers in performing practical Skills in chemistry laboratory; to identify possible alternative conceptions causing in learning difficulties by prospective teachers; and to suggest learning strategies for dealing with the alternative conceptions and difficulties in chemistry. The sample constituted 80 trainees from first year and 65 trainees from second year of B.Sc. B.Ed. program of RIE Ajmer which was selected by purposive sampling technique. A test paper was developed for the study which contained 45 objective type questions from different topics of chemistry course for first and second year. The research findings suggest that the main learning difficulty faced by the students is in understanding of the following; Schrödinger equation and its application, concept of Nucleophilic reaction and energy aspects in Thermodynamics. The students also face difficulty in interpreting of graphical data and numerical calculations. Prof. R. B. Pareek was the principal investigator of this research study.

2. **Learning Outcome of Children with Intellectual Disabilities: Exploring the determinants in Inclusive Classroom (2018-19)**

- (i) **Name of Project Coordinator: Dr. Rajiv Ranjan**
- (ii) **States / UTs: Rajasthan and Uttar Pradesh**
- (iii) **Focus Areas: Evaluation**
- (iv) **Target Group: School Children**
- (v) **Stage: All Stages**
- (vi) **Objectives: To study Learning Outcome of Children with Intellectual Disabilities.**
- (vii) **Brief report:** The objectives of the study were; to find out the determinants of learning outcomes of children with Intellectual disabilities in Inclusive setting at primary level and to explore the existing pedagogical processes and classroom climate leading to learning outcome in Inclusive setting at primary level. The sample constituted 30 *children with intellectual disabilities* from five inclusive schools of Ajmer, Agra and Lucknow. They were selected by

purposive sampling technique. A tool was developed by comparing with the Learning Outcome checklist of class I to V of NCERT. The draft tool was vetted in the workshop mode. The research findings suggest that at least 20% items of Mathematics need to be modified and/or reduced for students with mild to moderate Intellectual Disabilities.

It was found that there were students with differences in the methods and materials, teachers design and provide the learning situations/opportunities as per the need of CWSNs in an inclusive classroom, when compared with the Learning Outcome checklist. The research also suggests that the facility of Resource Room/Supplementary services in regular schools need to be implemented for Mathematics and Language. Apart from this the revised Instructions on Exemptions/Concessions being extended to Differently Abled should be implemented at upper primary level with required modifications to support the study of children with Intellectual Disabilities. Dr. Rajeev Ranjan was the principal investigator of this research study.

3. Effectiveness of Flipped Classroom on the learning of Concepts of Physics at Senior Secondary level (2018-19)

(i) Name of Project Coordinator: Dr. V. P. Arya

(ii) States / UTs: Rajasthan

(iii) Focus Areas: Evaluation

(iv) Target Group: School Children

(v) Stage: Senior Secondary Stage

(vi) Objectives: To study effectiveness of Flipped Classroom on the learning of Concepts of Physics at Senior Secondary level

(vii) Brief report: The mentioned research study was conducted with the objective of identifying/developing various resources for flipped classroom and to find the effect of Flipped Classroom on the learning of Physics at Senior Secondary level. The sample of the study comprised of 30 students of class XI of Demonstration Multipurpose School, Regional Institute of Education, Ajmer. The research was based on experimental method including control group and experimental group. Two chapters (Motion in a plane and Laws of motion) from NCERT Physics textbook of Class XI were chosen for the Flipped classroom strategy. Online resources were identified on these chapters. The assessment of the groups was carried out through the pre-test and post-test. It was found that the flipped classroom had positive effect on students' understanding of concepts of physics. Nonavailability of internet access to many students at home was however an issue which needs further attention. Dr. V. P. Arya was the principal investigator of this research study.

4. Effectiveness of ICT related material for the teaching of physics at the senior secondary level (2018-19)

Name of Project Coordinator: Dr. V. P. Arya

(iii) States / UTs: Rajasthan

(iv) Focus Areas: Evaluation

(v) Target Group: School Children

(vi) Stage: Senior Secondary Stages

(vii) Objectives: To study effectiveness of ICT related material for the teaching of physics at the senior secondary level

(viii) Brief report: The objective of the research study was to integrate ICT related material for teaching and learning of Physics at senior secondary level and assess the effectiveness of the intervention. For this study total 51 science stream students comprising of 28 students of class 11th and 23 students of class 12th of Demonstration Multipurpose School, Regional Institute of Education, Ajmer were selected for this experimental study. The Hard spots of physics content of senior secondary level were identified by administering a questionnaire through Google forms and manually in four schools including three other schools of the Ajmer city. It is a two-year programme incited in the year 2018-19 and in the first year, pre-test has been developed and administered to the sample. Pre-test data has been analysed and interventions have been planned for the next year. The ICT content on hard sports has been collected from available open education resources. The post-test will be conducted and final report will be submitted in the year 2019-20. Dr. V. P. Arya was the principal investigator of this research study.