केंद्रीय विद्यालय संगठन

KENDRIYA VIDYALAYA SANGATHAN

तत् त्वं पूषन् अपावृणु
केन्द्रीय विद्यालय संगठन

SKILL ENRICHMENT IN VOCATIONAL EDUCATION PRACTICAL LEARNING WITH ATL AND STEAM for TGT (WETR) -CHENNAI REGION

(30.06.2025 to 04.07.2025)

आंचलिक शिक्षा एवं प्रशिक्षण संस्थान,मैसूर

ZONAL INSTITUTE OF EDUCATION AND TRAINING, MYSURU

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ASSOCIATE COURSE DIRECTOR

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&

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MR. RISHI KAPOOR
(PM SHRI KV AFS AVADI, CHENNAI)

DIRECTOR'S MESSAGE

It gives me immense pleasure to share the e-Manual for the 5-Day Offline Workshop on "Skill Enrichment in Vocational Education: Practical Learning with ATL & STEAM," specially curated for TGTs (Work Education). This workshop underscores our ongoing dedication to promoting skill-oriented, innovative, and experiential learning, in alignment with the National Education Policy (NEP) 2020 and the National Curriculum Framework for School Education (NCF-SE).

In an era of fast-changing educational needs, the integration of Vocational Education with platforms such as Atal Tinkering Labs (ATL) and STEAM (Science, Technology, Engineering, Arts, and Mathematics) is essential for nurturing students' real-world skills, creativity, and problem-solving capabilities. This program is designed to equip Work Education teachers with practical tools, interdisciplinary approaches, and experiential teaching strategies that can turn classrooms into vibrant canter of innovation and applied knowledge.

I sincerely thank the Associate Course Director, expert Resource Persons, participants, Training Associates, and the Workshop Coordinator for their dedicated involvement and valuable contributions. Their combined efforts have made this workshop a deeply enriching and impactful professional development experience.

Wishing you all an enriching and transformative journey ahead!

MENAXI JAIN
DIRECTOR
ZIET MYSURU

Details of Participants

S. NO.	NAME OF TEACHER	DESIGNATION	NAME OF KV	REGION
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2	MS. RISHI KAPOOR	TGT(WE)	PM SHRI KV AFS AVADI	CHENNAI
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4	MS. VIJAY MAURIYA	TGT(WE)	PM SHRI KV ISLAND GROUNDS	CHENNAI
5	MS. PALLAVI RANI	TGT(WE)	PM SHRI KV MINAMBAKKAM	CHENNAI
6	MRS. NEHA SHARMA	TGT(WE)	PM SHRI KV NO. 1 TAMBARAM	CHENNAI
7	MRS. D ANANTHI	TGT(WE)	PM SHRI KV NO.2 TAMBARAM	CHENNAI
8	MR. MANSINGH MEENA	TGT(WE)	PM SHRI KV THAKKOLAM	CHENNAI
9	MR. SATPAL MEENA	TGT(WE)	PM SHRI KV ARAKKONAM	CHENNAI
10	MR. RAHUL KUMAR MITTAL	TGT(WE)	PM SHRI KV ARUVANKADU	CHENNAI
11	MRS. HEPZIBA FLORI	TGT(WE)	PM SHRI KV SULUR	CHENNAI
12	MR. ABHISHEK KUMAR SINGH	TGT(WE)	PM SHRI KV DINDIGUL	CHENNAI
13	MRS. MEGHA SHARMA	TGT(WE)	PM SHRI KV NO. 1 KALPAKKAM	CHENNAI
14	MRS. ANAMIKA GUPTA	TGT(WE)	PM SHRI KV NO.2 KALPAKKAM	CHENNAI
15	MR. SUNIL MANJHI	TGT(WE)	PM SHRI KV KARAIKUDI	CHENNAI
16	MR. SHUBHAM TRIPATHI	TGT(WE)	PM SHRI KV KARAIKKAL	CHENNAI
17	MR. RAHUL KUMAR SINGH	TGT(WE)	PM SHRI KV NO. 2 MADURAI	CHENNAI
18	MR. ARUN KUMAR SINGH	TGT(WE)	PM SHRI KV MANDAPAM	CHENNAI
19	MR. RAMACHANDRAN VARIKKOLI	TGT(WE)	PM SHRI KV MAHE	CHENNAI
20	MRS. POOJA RANI	TGT(WE)	PM SHRI KV NEYVELI	CHENNAI
21	MR. PRAKASH PR	TGT(WE)	PM SHRI OOTY	CHENNAI
22	MS. V. KAPANA	TGT(WE)	PM SHRI KV NP. 2 PONDICHERY	CHENNAI
23	MR. VINEETH KUMAR M T	TGT(WE)	PM SHRI KV RAMESWARAM	CHENNAI
24	MR. ASHUTOSH MISHRA	TGT(WE)	PM SHRI KV NO. 1 PORT BLAIR	CHENNAI
25	MR. VIJAY KUMAR YADAV	TGT(WE)	PM SHRI KV NP. 2 PORT BLAIR	CHENNAI
26	MR. VIKASH PANDEY	TGT(WE)	PM SHRI KV THIRUVANNAMALAI	CHENNAI
27	MRS. PRACHI SAHU	TGT(WE)	PM SHRI KV NO. 1 THIRUCHIRAPALLI	CHENNAI
28	MR. SAGAYARAJ	TGT(WE)	PM SHRI KV GOC TRICHY	CHENNAI
29	MR. VICTOR KUMAR	TGT(WE)	PM SHRI KV VIJAYANARAYANAM	CHENNAI
30	SMT. ASWANI .K	TGT(WE)	PM SHRI KV WELLINGTON	CHENNAI
31	MR. NEERAJ KUMAR	TGT(WE)	PM SHRI KV IDAYAPATTI	CHENNAI
32	MR. SARVJEET SINGH	TGT(WE)	PM SHRI KV ILLUPPAIKUDI	CHENNAI

GROUPS

S.No	NAME OF THE OFFICER	PHOTO
	GROUP - 1	
1	MANISH GAUTAM	
2	RISHI KAPOOR	
3	D. ANANTHI	
4	MEGHA SHARMA	
5	VIJAY KUMAR YADAV	
6	NEERAJ KUMAR	
7	NEHA SHARMA	
	GROUP - 2	
1	RAMACHANDRAN VARIKKOLI	
2	MANSINGH MEENA	
3	ANAMIKA GUPTA	
4	POOJA RANI	
5	VIKASH PANDEY	
6	SARVJEET SINGH	
7	ABHISHEK KUMAR SINGH	
	GROUP - 3	
1	SHARMILA RAVINDRAN	
2	SATPAL MEENA	
3	SUNIL MANJHI	
4	PRAKASH PR	
5	PRACHI SAHU	
6	ARUN KUMAR SINGH	
	GROUP - 4	
1	VIJAY MOURIYA	
2	RAHUL KUMAR MITTAL	
3	SHUBHAM TRIPATHI	
4	V. KALPANA	
5	VICTOR KUMAR	
6	ASHUTOSH MISHRA	
	GROUP - 5	
1	PALLAVI RANI	
2	HEPZIBA FLORI	
3	RAHUL KUMAR SINGH	
4	VINNETH KUMAR M T	
5	SAGAYARAJ	
6	ASWANI .K	

TIME TABLE

DATE	9.00-9.45 am	9.45 am -11.15 am		11.30am -1.00 pm		2.00 pm-3.30 pm		3.45 pm -5.30 pm
30.06.2025	Inauguration	Understanding and importance of 'Vocational Education'- By Bhanumathy H D (ACD)	Tea Break 11.15 am-11.30 am	Vocational skills for WE- By Sangeetha Nair	Lunch Break 1.00 pm-2.00 pm	Introduction to 'Scratch Programming' - By R. Chithra	Tea Break 3.30 pm-3.45 pm	Work with machines- Maker skills By- Sangeetha K. Nair
01.07.2025	Assembly	Basics of Arduino UNO and programming- By Rahul Kumar Mittal (TGT WE)		Digital display using Arduino UNO- By Hepziba Flori .E (TGT WE)		Introduction to ESP32- By Aswani .K (TGT WE)		TINKERCAD- By Megha Sharma (TGT WE)
02.07.2025	Assembly	Different project related to VE-By Ashutosh Mishra (TGT WE)		Hands on session- Scratch programming GEO Tagging		Line following robot using Arduino UNO- By Praksh PR (TGT WE)		Tie and Dye- By Sangeetha K. Nair
03.07.2025	Assembly	Controlling LED/Motor using ADAFRUIT Software and ESP 32- By Abhishek Kumar Singh and Vikas Pandey (TGT WE)		Sensor modules in Arduino UNO- By Manish Gautam		Breadboard basic and about the school kitchen		Plant nursery and micro green farming- By R. Chitra
04.07.2025	Assembly	Communication skills – By Ms. Vineetha N C		Vocational Education assessment- By Mrs. Bhanumathy H D		AI, Activities in VE - By Ms. Sagayaraj, Ms. Vineeth Kumar		Closing Session

DAY WISE REPORTS

DAY 1: 30/06/2025

The first day of the training programme commenced at 9:00 AM with the Kendriya Vidyalaya prayer, creating a solemn and harmonious atmosphere. This was followed by a formal introduction session at 9:10 AM, where participants were warmly welcomed and oriented towards the objectives of the programme.

The dignitaries present on the occasion included Mr. D. Sreenivasulu (Course Coordinator), Mrs. Bhanumathy H. D. (Principal, PM SHRI KV Coimbatore), Ms. Menaxi Jain (Director, ZIET Mysuru), Ms. R. Chitra, and Ms. Sangeetha K. Nair (Resource Persons). An overview of the programme structure was presented, highlighting the learning objectives, expected outcomes, and assessment process through an end-course test. The significance of this initiative in fostering Continuous Professional Development (CPD) among teachers was duly emphasized.

Session 1: Importance of Vocational Skills in Modern Education

The inaugural session was conducted by Mrs. Bhanumathy H. D., who elaborated on the crucial role of vocational education in bridging the gap between theoretical learning and real-world employment opportunities. She highlighted vocational areas such as carpentry, agriculture, tailoring, hospitality, and electrical work, explaining their relevance in today's dynamic job market. The discussion also addressed the vision of NEP 2020 in integrating vocational skills into school education and explored platforms such as the LOK VIDYA portal and NPST standards.

Session 2: Vocational Skills for Work Education

In this session, Ms. Sangeetha K. Nair underscored the importance of skill-based, practical learning for preparing students to meet workplace demands. She explained how vocational education can be integrated into Classes 6–8 through three broad domains:

- Work with Life Forms
- Materials and Machines
- Human Services

For Classes 9–12, she emphasized the introduction of electronics, tool usage, and advanced vocational practices. The session also provided insights into assessment strategies such as observation, worksheets, demonstrations, and reflective practices. Special emphasis was placed on safety measures, structured planning, and resource management to ensure the effective implementation of hands-on activities.

Session 3: Scratch Programming

The post-lunch session introduced participants to Scratch, a visual, block-based programming platform developed by MIT. Ms. R. Chitra guided participants through its key

features, such as the Stage, Sprites, and Code Blocks, and demonstrated its potential in enhancing logic-building, creativity, and digital literacy among students. Participants learned how Scratch could be integrated into vocational education by creating animated projects, simulations, and educational games. The session inspired teachers to encourage students in developing interactive projects that merge creativity with technology.

Session 4: Making Skills – Work with Machine Forms

The concluding session of the day, facilitated by Ms. Sangeetha K. Nair, was a hands-on workshop on creating simple mechanical models using ice-cream sticks and other low-cost materials. Participants enthusiastically engaged in projects such as:

- Catapults (illustrating concepts of tension and force)
- Robotic Arms (demonstrating mechanical movement)

This activity fostered teamwork, creativity, and problem-solving skills while showcasing how low-cost STEM projects can be seamlessly integrated into classroom practice. The session reinforced the value of learning by doing, enabling teachers to bring innovation and experiential learning into their pedagogy.

DAY 2: 01/07/2025

The second day of the training programme commenced at 8:50 AM with the traditional Kendriya Vidyalaya prayer, which set a serene and disciplined tone for the day. This was followed by the Pledge, the News of the Day, and a Special Programme on Doctors, acknowledging their invaluable service to society. These activities not only refreshed participants but also instilled a spirit of responsibility and reflection before the technical sessions began.

To ensure continuity, the day opened with a question-and-answer recap session, conducted by the Course Director, Ms. Menaxi Jain. Participants enthusiastically revisited the key concepts from Day 1, which helped in consolidating their learning and building a bridge to the new topics scheduled for Day 2.

Session 1: Basics of Arduino UNO Board and Programming

The first session, conducted by Mr. Rahul Kumar Mittal, introduced participants to the Arduino UNO board, one of the most widely used open-source microcontroller platforms. The session focused on:

- Installation and setup of the Arduino IDE software
- Familiarization with basic terminologies and code structure
- Writing and uploading a simple LED blinking program
- Summarizing the key applications of Arduino in education

This session was foundational, particularly for teachers new to embedded systems. By demystifying Arduino programming, participants gained confidence in implementing small, skill-based projects that can be easily adapted for classroom use.

Session 2: Building a Simple Arduino Counter with Seven-Segment Display

The second session was led by Mrs. Hepziba Flori, who guided participants through the process

of creating a digital counter using Arduino and a seven-segment display. She explained the pin configuration of the display in detail and demonstrated how the display could be controlled programmatically.
Participants carried out the activity in two stages:

- Virtual simulation on Tinkercad, which provided a safe environment to test circuits.
- Hands-on practice with hardware, reinforcing their understanding of connections and logic.

This session not only strengthened technical skills but also encouraged a problem-solving mindset, showing how theoretical concepts of electronics can be made engaging for students.

Session 3: Introduction to Microcontroller ESP32
The third session, conducted by Mrs. Ashwani, introduced participants to the ESP32 microcontroller, a versatile and advanced device used in IoT (Internet of Things) applications.
The session included:

- Installation of libraries and drivers to enable compatibility with laptops
- Overview of the features and capabilities of ESP32
- A blinking LED project, demonstrating the programming process

By the end of the session, teachers recognized the potential of ESP32 in introducing students to real-world applications such as automation, IoT devices, and robotics, thereby making learning futuristic and relevant.

Session 4: Applications of Tinkercad
The concluding session of the day was facilitated by Mrs. Megha, and it was highly interactive and hands-on. Participants explored various applications of Tinkercad, a web-based tool for 3D design and electronics simulation.
Highlights of the session included:

- Designing 3D models and preparing them for printing using Ultimaker Cura software
- Developing a calculator circuit within the Tinkercad simulation environment
- Exploring the Codeblock section of Tinkercad to create 3D designs through block-based coding

This session blended creativity with technology, enabling participants to appreciate the interdisciplinary nature of modern education, where design, coding, and electronics converge.

Integration into School Curriculum
The sessions conducted on Arduino UNO, seven-segment displays, ESP32, and Tinkercad hold immense scope for classroom integration across Classes 6–12.

- For Middle School (Classes 6–8): Simplified projects such as LED blinking or basic 3D models can be used to introduce concepts of circuits, logic, and creative design.
- For Secondary and Senior Secondary (Classes 9–12): Advanced applications such as 3D printing, microcontroller-based projects, and coding simulations can be integrated into Physics, Computer Science, Mathematics, and Art & Design.

This approach not only promotes STEM education but also aligns with the vision of NEP 2020, which emphasizes hands-on, skill-based, and multidisciplinary learning.

Conclusion
The second day of the training programme was marked by a perfect blend of theory and

practical learning. Sessions on Arduino UNO, seven-segment displays, ESP32 microcontrollers, and Tinkercad applications were engaging, insightful, and future-oriented. Each session progressively built upon the previous one, ensuring a smooth flow of knowledge and hands-on experience.

The day concluded with participants expressing their enthusiasm and readiness to implement these innovative practices in their classrooms. By equipping teachers with such 21st-century skills, the training programme reaffirmed its commitment to preparing educators to nurture creative, logical, and technologically empowered learners.

DAY 3: 02/07/2025

The third day of the training programme commenced with the Kendriya Vidyalaya prayer, followed by the Pledge, a review of the day's news, and a special programme on UFOs, which added a touch of curiosity and novelty to the morning.

The day's proceedings began with welcoming remarks and an interactive session conducted by the Course Director, Ms. Menaxi Jain. She encouraged participants to reflect on the training content from the previous days and discussed strategies for practical classroom application and planning. The Q&A session promoted active participation and set the stage for the technical sessions that followed.

Session 1: Vocational Education – Shaping Skills for Tomorrow

The first session was led by Mr. Aashutosh Mishra, who delivered a thought-provoking lecture on the significance of vocational education in shaping the workforce of the future. Key points highlighted during the session included:

- The role of vocational education within the broader educational framework
- The relevance of vocational skills to diverse job roles and industries
- A comparative analysis of vocational education systems across different countries
- An overview of vocational education schemes in India, including their scope and benefits

The session concluded with a group activity, where participating teachers collaborated to explore innovative methods of integrating vocational skills into classroom practice. This exercise fostered teamwork and encouraged educators to think creatively about curriculum enrichment.

Session 2: Scratch Programming

The second session, facilitated by Ms. R. Chitra, was a hands-on workshop on Scratch programming. Participants learned how to design and code interactive digital projects. Highlights of the session included:

- Creation of interactive birthday greeting cards
- Understanding the use of sprites, stages, and event-driven coding
- Development of simple games within the Scratch environment

The session was highly engaging, with participants actively experimenting and sharing their projects. By the end of the session, teachers recognized Scratch as a powerful tool for fostering creativity, logic-building, and digital literacy among students.

Session 3: Line-Following Robot with Arduino UNO

After the lunch break, Mr. Prakash P. R. led an interactive session on line-following robots using Arduino UNO. The session introduced the concept of autonomous robotics and its applications in real-world scenarios, such as manufacturing and logistics.
Key takeaways included:

- Understanding the working principle of line-following robots
- Exploring the sensors and coding logic required for path navigation
- A hands-on activity, where participants simulated and tested simple robotic movements

The session was highly appreciated by participants, who gained both theoretical knowledge and practical exposure to robotics. Teachers expressed enthusiasm about introducing such projects to inspire problem-solving and innovation among students.

Session 4: Tie-Dye – A Vibrant Resource for Vocational Education
The concluding session of the day, presented by Ms. Sangeetha K. Nair, showcased Tie-Dye techniques as an artistic and skill-based resource for vocational education. The session covered:

- Various traditional Indian tie-dye methods
- The importance of textile arts in cultural and vocational education
- The potential for future applications in creative industries and entrepreneurship

Participants engaged in a hands-on demonstration, experimenting with tie-dye patterns and appreciating its value as a low-cost, creative activity that promotes both artistic expression and vocational skill-building.

Conclusion
The third day of the training programme featured a diverse blend of sessions, ranging from vocational education frameworks, coding, and robotics to creative textile arts. Each session was designed to combine theoretical insights with practical activities, ensuring participants could directly relate the training content to classroom implementation and student skill development.
The day ended on a highly stimulating and positive note, leaving participants motivated to explore innovative approaches for integrating vocational skills, digital tools, and creativity into school education.

Day 4: 03/07/2025

The first session was jointly conducted by Mr. Abhishek Kr. Singh and Mr. Vikas Pandey (TGT, Work Experience). The resource persons introduced participants to the process of controlling LEDs and motors using Adafruit software in combination with the ESP32 microcontroller.
The session began with an overview of the ESP32 board, highlighting its capabilities in IoT applications. Participants were guided through the installation and configuration of Adafruit IO, a cloud-based platform for data logging, remote control, and IoT projects. Step-by-step demonstrations were provided on:

- Setting up an Adafruit account and creating feeds
- Connecting ESP32 to the cloud through Wi-Fi
- Writing and uploading simple codes to control LEDs and DC motors remotely
- Monitoring device performance and real-time data via the Adafruit dashboard

Teachers actively engaged in the hands-on practice, experimenting with controlling devices and appreciating the potential of integrating IoT-based learning into classroom activities. The session demonstrated how such projects can enhance students' understanding of electronics, coding, and

automation, thereby aligning with the goals of 21st-century skill development.

The second session was conducted by Mr. Manish Gautam (TGT, Work Experience), focusing on the use of sensor modules with Arduino UNO. The session began with an introduction to the Arduino platform, its open-source nature, and its wide applications in education, robotics, and automation projects.

Mr. Gautam explained the working principles of various commonly used sensor modules, such as:

- IR sensors for obstacle detection
- Ultrasonic sensors for distance measurement
- LDR (Light Dependent Resistor) sensors for light intensity sensing
- Temperature and humidity sensors for environmental monitoring

Participants were guided step-by-step through the process of:

- Interfacing sensor modules with Arduino UNO
- Writing and uploading simple Arduino codes to read sensor data
- Displaying outputs through the Serial Monitor
- Understanding real-life applications of sensors in automation, robotics, and smart systems

The session was highly interactive, with teachers engaging in hands-on activities and testing sensor responses in real time. Mr. Gautam also emphasized the importance of introducing students to sensor-based projects in schools, as they encourage problem-solving, logical thinking, and innovation.

The session concluded with participants sharing their observations, acknowledging the potential of Arduino-based sensor projects in making classroom learning more experiential and skill-oriented.

The third session was facilitated by Ms. Anamika Gupta (TGT, Work Experience) and was thoughtfully divided into two interconnected parts — Breadboard Basics and School Kitchen Garden.

In the first part, Ms. Gupta introduced participants to the breadboard, a fundamental tool for electronics prototyping. She explained its structure, including the power rails and terminal strips, and demonstrated how components such as resistors, LEDs, jumper wires, and sensors can be interconnected without soldering. Participants learned how breadboards enable quick experimentation, debugging, and innovation in electronics projects. Hands-on activities were conducted, where participants created simple circuits to strengthen their understanding of connections, polarity, and current flow.

The second part of the session focused on the concept of a School Kitchen Garden, emphasizing its educational and practical value. Ms. Gupta highlighted how establishing kitchen gardens in schools can promote sustainability, healthy eating habits, environmental awareness, and vocational skills among students. She explained methods for preparing soil, selecting seasonal crops, and maintaining the garden with low-cost, eco-friendly practices. The integration of garden-based learning into Work Experience education was stressed, linking it with subjects like science, life skills, and environmental studies.

The session was well-received, as it combined technical knowledge (breadboard skills) with practical life skills (kitchen gardening), inspiring teachers to adopt interdisciplinary approaches in their classrooms.

The fourth session was conducted by Ms. R. Chithra (TGT, Work Experience & Resource Person), focusing on the twin themes of Plant Nursery Management and Microgreen Farming.
In the first part, Ms. Chithra explained the fundamentals of setting up and maintaining a plant nursery. She highlighted key aspects such as seed selection, soil preparation, sowing techniques, irrigation methods, transplantation, and plant care practices. The session emphasized how nursery activities can be effectively integrated into school Work Experience programmes, providing students with hands-on exposure to agriculture, environmental awareness, and sustainable practices.
The second part of the session introduced participants to microgreen farming, an innovative and sustainable method of cultivating young edible greens packed with nutrients. Ms. Chithra demonstrated simple techniques for growing microgreens in limited spaces using trays, soil, and water. She explained the nutritional benefits, short harvest cycles, and potential of microgreen farming as a vocational and entrepreneurial activity for students.
Participants actively engaged in discussions, shared their ideas, and expressed enthusiasm for adopting such practices in schools. The session effectively connected traditional agricultural practices with modern sustainable farming methods, highlighting opportunities for skill development, entrepreneurship, and healthy lifestyle promotion.

Day 5: 04/07/2025

The fifth and final day of the training programme began at 8:50 AM with the Kendriya Vidyalaya prayer, followed by the Pledge, News of the Day, and a special skit on mental well-being performed by participants. The skit, presented with enthusiasm, underscored the importance of mental health in schools and set an inspiring tone for the day's activities.

The Course Director, Ms. Meenaxi Jain, addressed the gathering and outlined the upcoming Master Training schedule on mental well-being. She also emphasized the need for gender sensitization across all areas of school activities and highlighted the crucial role of Work Experience teachers in ensuring the safety and security of schools. This opening message provided valuable direction and reinforced the holistic responsibilities of educators.

Session 1: Objectives of Assessment and Lesson Plan Organizer
The first session was conducted by Mrs. Bhanumathy H. D. (Assistant Course Director and Principal, PM SHRI KV Coimbatore). She delivered an insightful session on the Objectives of Assessment, explaining the significance of evaluating students across different domains of learning. Key points included:

- Designing and applying assessment rubrics
- Use of methods and tools such as projects, assignments, and oral tests
- Importance of portfolios as a reflection of a learner's progress
- Grading criteria applicable from Classes VI to XII

She further elaborated on the Lesson Plan Organizer, which integrates pedagogical strategies, post-teaching reflections, and self-assessment by teachers. This comprehensive approach encouraged participants to view assessment not merely as evaluation, but as a tool for holistic learning and growth.

Session 2: Enhancing Effective Communication Skills
The second session was led by Mrs. Vineetha C., Training Associate (English), on the theme

“Enhancing Effective Communication Skills”. She emphasized that effective communication is the cornerstone of successful teaching and outlined essential benchmarks such as:

- Clarity
- Conciseness
- Completeness
- Relevance

She explained the different types of communication—verbal, non-verbal, and visual—and their significance in classroom contexts. An interactive activity followed, where participants identified and interpreted various gestures and expressions, which not only added a lively element but also strengthened understanding of non-verbal cues in effective teaching.

Session 3: Introduction to Artificial Intelligence (AI)

The third session, conducted by Mr. Vineeth Kumar (TGT, Work Experience, KV Rameswaram), introduced teachers to Artificial Intelligence (AI) as per the Class VII Kaushal Bodh textbook.

Highlights of the session included:

- An overview of AI concepts and terminology
- Demonstration of how to create a simple AI model
- Exploration of AI’s applications in education and everyday life

The session provided participants with basic awareness of rapidly evolving AI technologies, underscoring their growing relevance in education. Teachers appreciated the opportunity to understand AI in a simplified manner, preparing them to introduce these concepts to their students.

Session 4: Assessment and Valedictory Function

The concluding session of the training programme involved the assessment of participants’ learning through an online test, designed to evaluate their understanding of the five-day training content. This was followed by the Valedictory Function, where participants shared their impressions, experiences, and reflections.

The valedictory session included expressions of gratitude, acknowledgment of the collective efforts of resource persons and organizers, and a formal Vote of Thanks. The atmosphere was one of fulfillment and optimism, with participants highlighting how the programme had strengthened their knowledge, skills, and confidence.

Conclusion

The fifth day of the training successfully combined reflective discussions, skill-focused sessions, and assessment, culminating in a meaningful closure to the programme. The sessions on assessment techniques, communication skills, artificial intelligence, and reflective practices enriched teachers’ professional competencies.

The day, much like the programme as a whole, effectively integrated theory with practical activities, thereby promoting skill-based, creative, and future-ready learning. Participants departed with a renewed commitment to innovative teaching practices and a stronger vision for contributing to the holistic development of their students.

SESSIONS

Introduction of vocational skills in modern education

By: Mrs. Bhanumathy H D
Principal
PM SHRI KV Coimbatore

Introduction to Vocational Education

Vocational education refers to specialized training programs designed to equip learners with practical skills, technical expertise, and knowledge required for specific trades or professions. Unlike purely academic learning, vocational education emphasizes hands-on experience, problem-solving abilities, and real-world applications, bridging the gap between school knowledge and industry requirements.

In today's rapidly evolving economic and technological landscape, vocational skills are as crucial as academic qualifications. Students who acquire vocational competencies are better prepared for employment, entrepreneurship, and personal development, ensuring they remain adaptable and competitive in an ever-changing job market.

Examples of vocational education areas include:

- Carpentry and woodworking
- Tailoring and garment construction
- Agriculture and horticulture
- Hospitality and food services
- Electronics and electrical work
- IT and computer-based skills

Importance of Vocational Skills in Modern Education

Vocational education plays a pivotal role in enhancing the employability and skill sets of students. Its relevance in modern education can be understood through the following points:

- Bridging the Skills Gap

  Many graduates possess theoretical knowledge but lack the practical skills demanded by industries. Vocational education connects theory with practice, ensuring that students are equipped with actionable skills for the workplace.

- Employment-Oriented Training

  Vocational skills prepare students to enter the workforce confidently, reducing the gap between education and employment. Hands-on exposure allows learners to gain experience, competence, and industry readiness, improving their career prospects.

- Encouraging Entrepreneurship

  Vocational education cultivates self-reliance and innovation, enabling learners to start small businesses, freelance, or provide specialized services. For example, a student trained in

tailoring or baking can establish a home-based venture, contributing to local economic development.

- Reducing Dropout Rates

  Students who struggle with purely academic subjects often find vocational training more engaging and meaningful. Exposure to practical skills keeps them motivated, reducing school dropout rates and promoting continued learning.

- Adaptability to Technological Advancements

  With rapid technological changes, continuous skill development is essential. Vocational education instills adaptability and lifelong learning habits, preparing students to handle new tools, machinery, and emerging technologies efficiently.

Why We Need Vocational Education

- Tackling Youth Unemployment

  Despite higher education, many graduates remain unemployed due to lack of job-ready skills. Vocational training provides practical experience, ensuring that young learners become employable.

- Meeting Industrial Demand

  Industries require a skilled workforce proficient in trades such as electrical work, IT, hospitality, or agriculture, which academic education alone does not provide. Vocational training bridges this gap by offering specialized skill sets.

- Inclusive Development

  Vocational education ensures equitable opportunities, particularly for students from rural, economically weaker, or marginalized backgrounds. By offering skill-based pathways, it promotes social inclusion and economic empowerment.

- Promoting Dignity of Labour

  Skill-based work, whether manual or technical, is essential for society. Vocational education helps students respect all professions, breaking the stigma associated with manual labor.

- Supporting Nation-Building

  A skilled workforce contributes to national productivity, innovation, and competitiveness. By creating employable citizens, vocational education supports sustainable economic growth and strengthens the country's infrastructure and industries.

Objectives of Vocational Education in NEP 2020

The National Education Policy (NEP) 2020 has given vocational education a prominent place in India's schooling system. Its objectives include:

- Integration with Mainstream Education

  Vocational education is now integrated from Grade 6 onwards, blending academic knowledge

with practical skills to ensure a holistic learning experience.

- Target for Vocational Exposure

  By 2025, NEP aims for at least 50% of learners to have exposure to vocational education, ensuring that practical skill development becomes widespread across schools.

- Multiple Entry and Exit Options

  NEP promotes flexibility in learning pathways, allowing students to enter or exit vocational courses as per their interest while earning credits for modular learning, fostering lifelong learning habits.

- Collaboration with Industry and Professionals

  Schools are encouraged to partner with local artisans, industry experts, and professionals, providing learners with real-world exposure, mentorship, and practical knowledge.

- Promoting Internships and Hands-On Learning

  Introducing internships from middle school onwards familiarizes students with workplace culture, practical challenges, and potential career opportunities.

- Use of Technology and Digital Platforms

  Digital platforms and online resources are increasingly used to deliver vocational training, ensuring accessibility and bridging geographic gaps.

- Ensuring Skill Development for All

  NEP 2020 emphasizes inclusive vocational education, catering to students from diverse socio-economic backgrounds and fostering equity in skill-building opportunities.

Practical Applications and Examples in Schools

Vocational education can be applied across multiple areas in schools:

- Workshops and Labs: Carpentry, electronics, tailoring, and robotics labs for hands-on learning.
- School Gardens: Agriculture, kitchen gardens, and microgreen cultivation to teach environmental science, nutrition, and entrepreneurship.
- Digital Skills: Coding, robotics, 3D printing, and AI-based projects to align with modern technological trends.
- Artisan Crafts: Tie-dye, pottery, or handloom weaving to promote cultural heritage and creativity.
- Hospitality and Life Skills: Cooking, event management, and basic healthcare skills for life preparedness.

Teachers can integrate vocational skills with core subjects, e.g., mathematics for measurements in carpentry, science for circuits and gardening, and art for creative textile design, making learning interdisciplinary and engaging.

Vocational skills for work education: CBSE class 6-12 NEP 2020

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Introduction

The Class 6 vocational education textbook, 'Kaushal Bodh', introduces students to foundational vocational skills that complement their academic learning. It provides an opportunity for students to develop practical abilities, problem-solving skills, and social awareness from an early age.

The book contains six projects, designed to expose students to different areas of vocational learning. Each student is required to complete at least two projects, allowing flexibility and personalization based on interest and aptitude. These projects are carefully structured to ensure that students gain hands-on experience while developing critical thinking and life skills.

Overview of Projects

Project 1: Work with Life Forms

This project focuses on caring for plants, animals, or the environment. Key objectives include:

- Encouraging observation, empathy, and responsibility.
- Learning about growth, nutrition, and environmental conservation.
- Applying practical skills such as watering plants, feeding animals, or maintaining cleanliness in surroundings.

Project 2: Work with Material and Machine

Students engage in activities that involve handling tools, simple machines, and working with different materials. This project aims to:

- Develop creativity and technical understanding.
- Enhance problem-solving skills through crafting, building models, or experimenting with materials.
- Foster manual dexterity and spatial awareness, essential for technical and vocational work.

Project 3: Work in Human Service

This project emphasizes community engagement and social responsibility. Activities may include:

- Helping elders or peers in daily tasks.
- Organizing community events or cleanliness drives.
- Learning proper hygiene and safety practices.

The project promotes values such as service, cooperation, empathy, and teamwork, preparing students to become responsible and socially aware citizens.

Assessment Methods

Assessment in vocational education focuses on practical skills, participation, and reflective learning rather than rote memorization. Teachers can use the following methods:

- Observation
    - Teachers monitor student participation, teamwork, and handling of tools.

- Observation helps assess interest, attitude, safety awareness, and engagement in practical tasks.

- Worksheet
  - Students complete step-by-step worksheets after finishing project activities.
  - Worksheets allow evaluation of process understanding, documentation skills, and conceptual clarity.
- Demonstration
  - Students perform or present a part of their project in class.
  - Demonstrations assess skill application, confidence, and communication.
- Reflection
  - Students write or verbally express their learning experiences.
  - Reflections help teachers evaluate critical thinking, personal growth, and understanding of the real-world relevance of vocational tasks.

Safety Precautions in Vocational Education

Safety is a key component of vocational training, particularly for young learners. Teachers should:

- Clearly explain safety rules before starting any activity.
- Use age-appropriate tools and materials in good condition.
- Maintain continuous supervision during all hands-on activities.
- Provide protective gear, such as gloves, aprons, or masks where necessary.
- Encourage clean-up and hygiene after each activity.
- Teach students how to report accidents or hazards immediately to prevent injuries.

Empowering Students with Vocational Skills

Vocational education not only develops practical skills but also empowers students to become confident, independent, and creative individuals.

- Enhances problem-solving abilities and critical thinking.
- Prepares students for real-life challenges and future career options.
- Encourages entrepreneurial thinking and innovation.
- Instills social values, including teamwork, discipline, empathy, and responsibility.
- Builds self-confidence and practical competence, fostering lifelong learning and adaptability.

By integrating vocational education into early schooling, students gain a holistic understanding of work, life skills, and civic responsibility.

Making skills- work with machine form.

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Introduction to Machine Basics

A machine is a tool or device that helps make work easier by changing the direction, magnitude, or application of force. Machines can be simple, like levers, pulleys, and inclined planes, or complex, such as engines, robots, and computers.

Simple machines include:

- Lever – a rigid bar that rotates around a fixed point to lift or move loads.
- Wheel and Axle – reduces friction and eases movement.
- Pulley – changes the direction of force to lift or move objects.
- Inclined Plane – allows heavy objects to be moved upward with less effort.
- Screw – converts rotational motion into linear motion.
- Wedge – separates or holds objects using force.

Understanding basic machines helps students grasp fundamental concepts of motion, force, and energy. It also enhances logical thinking, creativity, and problem-solving skills while fostering interest in science, technology, engineering, and mathematics (STEM).

Hands-On Projects with Simple Machines

Project 1: Making a Catapult Using Ice-Cream Sticks

A catapult is an excellent example of a lever-based simple machine, demonstrating how force and tension can be applied to launch objects.

Materials Needed:

- Ice-cream sticks (6–8)
- Rubber bands
- Small spoon or bottle cap

Process:

1. Stack 6–8 ice-cream sticks and secure them tightly using rubber bands.
2. Place one stick perpendicular across the stack to act as the launching arm.
3. Attach a small spoon or bottle cap at one end of the arm.
4. Use rubber bands to create tension and test the launch.

Learning Objectives:

- Understand how force, angle, and tension affect motion.
- Explore the concepts of potential and kinetic energy.

- Develop fine motor skills, creativity, and mechanical reasoning.

Project 2: Mini Spinner or Propeller Toy

This project demonstrates rotational motion, tension, and energy release using simple materials.

Objective: Create a small spinner or propeller using recyclable materials.

Materials Needed:

- Water bottle cap
- Rubber band
- Stick (pencil or skewer)
- Tape or glue

Process:

1. Punch a hole in the center of the bottle cap.
2. Insert the stick through the cap to act as an axle.
3. Wrap a rubber band around the stick and twist it to build tension.
4. Release the rubber band to observe the rotation or motion.

Learning Objectives:

- Understand rotation, energy storage, and release mechanisms.
- Encourage innovation and recycling of everyday materials.
- Apply basic physics concepts practically.

Learning Outcomes from the Projects

By completing these projects, students can:

- Gain a practical understanding of simple machines like levers and rotational motion.
- Develop problem-solving, critical thinking, and design skills.
- Improve hand-eye coordination and teamwork through group activities.
- Foster curiosity, experimentation, and observational skills.
- Utilize low-cost, eco-friendly materials for creative learning.

Skills Developed

These hands-on projects contribute to the development of several key skills:

- Mechanical Awareness: Understanding how everyday objects function.
- Creative Thinking: Transforming simple items into functional devices.
- Scientific Reasoning: Exploring cause-effect relationships through experiments.
- Communication: Explaining project functionality and underlying principles.
- Sustainability: Learning to reuse materials effectively for educational purposes

Basics of Arduino UNO board and programming

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Introduction to Arduino UNO

- Arduino UNO is an open-source microcontroller board used for building digital devices and interactive objects.
- It is widely used in STEM education, robotics, and DIY electronics projects.
- The board is based on the ATmega328P microcontroller.

Key Features of Arduino UNO

- 14 digital input/output pins (6 can be used as PWM outputs).
- 6 analog input pins.
- USB connection for uploading code and power supply.
- Power jack for external power source (7-12V).
- Reset button to restart the program.
- LED indicator connected to pin 13 for quick testing.

Understanding Components on the Board

- Microcontroller (ATmega328P): The brain of the board, executes the program.
- USB Port: Connects the Arduino to the computer for programming.
- Voltage Regulator: Controls the voltage supplied to the board.
- Crystal Oscillator (16 MHz): Keeps timing accurate for the microcontroller.
- TX/RX LEDs: Indicate data transmission and reception.
- Power LED: Lights up when the board is powered on.

Setting Up Arduino UNO

- Install the Arduino IDE (Integrated Development Environment) on the computer.
- Connect the Arduino UNO board to the computer via a USB cable.
- In the IDE, select the correct board type (Arduino UNO) and COM port.

Basics of Arduino Programming

- Arduino uses a simplified version of C/C++ programming language.
- Every Arduino program (called a sketch) has two main functions:
- void setup(): Runs once when the board is powered on; used to initialize settings.
- void loop(): Runs continuously; used to write the main logic.

Example:

cpp

```
CopyEdit
void setup() {
  pinMode(13, OUTPUT);
}
void loop() {
  digitalWrite(13, HIGH);
  delay(1000);
  digitalWrite(13, LOW);
  delay(1000);
}
```

- This code makes an LED connected to pin 13 blink every second.

Uploading Code to Arduino

- Write the code in the Arduino IDE.
- Click the Verify button to check for errors.
- Click the Upload button to transfer the code to the Arduino board.
- The board executes the code immediately after uploading.

Applications of Arduino UNO

- Home automation systems (e.g., controlling lights).
- Smart agriculture tools (e.g., soil moisture sensor).
- Robotics (e.g., line-following robot).
- Science projects and electronics learning kits.

Learning Benefits

- Encourages hands-on learning and logical thinking.
- Enhances coding skills and hardware understanding.
- Builds a foundation for IoT, robotics, and automation.

Conclusion

- Arduino UNO is a powerful yet beginner-friendly tool for learning electronics and programming.
- With its simple setup and vast community support, it empowers students to create innovative tech-based solutions.

Building a simple Arduino counter with 7 segment display

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Objective

- To build a simple digital counter using Arduino UNO and a single 7-segment display.
- The counter will count from 0 to 9, then reverse from 9 to 0, and repeat continuously.

Components Required

- 1 × Arduino UNO board
- 1 × Common cathode 7-segment display
- 8 × 220Ω resistors (for current limiting)
- Jumper wires
- Breadboard
- USB cable for programming

Understanding the 7-Segment Display

- A 7-segment display has 8 pins: 7 for segments (a to g) and 1 for the decimal point (dp).
- Each segment lights up to display numbers.
- The common cathode type connects all LEDs' cathodes to ground.

Wiring Diagram (Segment to Arduino Pins)

- Segment A → Pin 2
- Segment B → Pin 3
- Segment C → Pin 4
- Segment D → Pin 5
- Segment E → Pin 6
- Segment F → Pin 7
- Segment G → Pin 8
- Common cathode → GND
- Each segment is connected via a 220Ω resistor.

Logic Behind the Counter

- Each number (0–9) corresponds to a specific pattern of segments.

- The Arduino sends HIGH or LOW signals to light the appropriate segments.
- After reaching 9, the counter reverses back to 0.

Full Arduino Code

cpp

CopyEdit

```
// Arduino pins connected to segments a to g
int segmentPins[] = {2, 3, 4, 5, 6, 7, 8};

// Segment patterns for digits 0–9 (common cathode)
byte digits[10][7] = {
  {1,1,1,1,1,1,0}, // 0
  {0,1,1,0,0,0,0}, // 1
  {1,1,0,1,1,0,1}, // 2
  {1,1,1,1,0,0,1}, // 3
  {0,1,1,0,0,1,1}, // 4
  {1,0,1,1,0,1,1}, // 5
  {1,0,1,1,1,1,1}, // 6
  {1,1,1,0,0,0,0}, // 7
  {1,1,1,1,1,1,1}, // 8
  {1,1,1,1,0,1,1}  // 9
};

void setup() {
  // Set all segment pins as OUTPUT
  for (int i = 0; i < 7; i++) {
    pinMode(segmentPins[i], OUTPUT);
  }
}

void loop() {
```

```
  // Count from 0 to 9
  for (int i = 0; i <= 9; i++) {
    displayDigit(i);
    delay(500);
  }
  // Count from 9 to 0
  for (int i = 9; i >= 0; i--) {
    displayDigit(i);
    delay(500);
  }
}

// Function to display a digit on 7-segment
void displayDigit(int num) {
  for (int i = 0; i < 7; i++) {
    digitalWrite(segmentPins[i], digits[num][i]);
  }
}
```

Learning Outcomes

- Understand how to interface Arduino with output devices.
- Learn about segment control logic and looping constructs in code.
- Gain hands-on experience with digital electronics and programming.

Conclusion

- This project helps students apply basic Arduino programming to create a functional electronic device.
- It promotes practical learning, problem-solving, and interest in embedded systems.

ESP 32 Microcontroller

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Introduction

- ESP32 is a powerful and low-cost Wi-Fi and Bluetooth-enabled microcontroller developed by Espressif Systems.
- It is widely used in IoT (Internet of Things) projects due to its high performance, low power consumption, and wireless connectivity features.
- ESP32 is the successor to the popular ESP8266, with more capabilities and peripherals.

Key Features of ESP32

- Dual-core 32-bit CPU (Xtensa LX6) – can run two tasks simultaneously.
- Clock speed up to 240 MHz.
- Built-in Wi-Fi and Bluetooth (Classic + BLE).
- 520 KB SRAM and support for external flash.
- Multiple GPIO pins for input/output operations.
- Integrated sensors: Hall sensor, temperature sensor, capacitive touch sensors.
- Support for various communication protocols like SPI, I2C, UART, ADC, DAC, PWM, CAN.

Technical Specifications

- Operating voltage: 3.3V.
- Number of GPIO pins: 34 (depending on the model).
- ADC channels: 12-bit resolution, up to 18 channels.
- DAC channels: 2 × 8-bit.
- Flash memory: Varies from 4MB to 16MB depending on the board.

Popular ESP32 Development Boards

- ESP32 DevKit v1
- NodeMCU-32S
- TTGO and Wemos boards (some with displays or battery support)
- These boards have USB-to-serial converters for easy programming via computer.

Programming the ESP32

- ESP32 can be programmed using the Arduino IDE, Espressif IDF, MicroPython, or PlatformIO.
- The Arduino IDE is beginner-friendly and widely used for quick prototyping.
- Programs (called “sketches”) are written in C/C++.
- Code is uploaded via USB using a micro USB cable and the ESP32 board must be selected in the IDE settings.

Example Code – Blink an LED

cpp

CopyEdit

```
void setup() {
  pinMode(2, OUTPUT); // Built-in LED on many ESP32 boards
}

void loop() {
  digitalWrite(2, HIGH);
  delay(500);
  digitalWrite(2, LOW);
  delay(500);
}
```

Applications of ESP32

- Smart home automation: controlling lights, fans, appliances remotely.
- IoT devices: sensors, data logging, remote monitoring.
- Wearables and health trackers.
- Wireless communication projects: Bluetooth beacons, Wi-Fi data transfers.
- Robotics and automation systems.

Advantages of Using ESP32

- All-in-one solution: combines MCU, Wi-Fi, and Bluetooth in one chip.
- Energy-efficient: supports multiple sleep modes for battery-powered applications.
- Low-cost and readily available.
- Large community support and a wide range of tutorials and libraries.

Tinker cad

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Introduction to Tinker cad

- Tinker cad is a free, web-based platform developed by Autodesk.
- It allows users to create 3D models, design electronic circuits, and write Arduino code in a virtual environment.
- Ideal for beginners, students, and hobbyists to explore electronics and design without physical components.

Features of Tinker cad

- 3D Design: Create simple to complex 3D models for printing or conceptual design.
- Circuits Simulation: Build and test electronic circuits, including components like LEDs, resistors, Arduino, sensors, and more.
- Code Blocks & Arduino Coding: Write code in text format (C/C++) or use visual programming (blocks).
- Simulation Tool: Instantly run and test your circuits and code virtually.
- Online Platform: No software installation needed—accessible via a browser.

Steps to Make a Project in Tinker cad

- Step 1: Create an Account on www.tinkercad.com.
- Step 2: Choose a Workspace – "Circuits" for electronics or "3D Design" for modelling.
- Step 3: Drag and Drop Components – Select and place electronic components like Arduino, breadboard, LEDs, sensors, etc.
- Step 4: Wiring the Circuit – Connect components just like in real life using virtual wires.
- Step 5: Write the Code – Use either block-based coding or text-based Arduino code.
- Step 6: Run Simulation – Click "Start Simulation" to test the project.
- Step 7: Debug and Improve – Modify code or connections based on the output.

Popular Projects You Can Make

- Blinking LED using Arduino.
- Traffic Light System using LEDs and timers.
- Automatic Street Light using LDR and transistor.
- Temperature Monitor using LM35 sensor and Arduino.

- Digital Counter using 7-segment display.
- Obstacle Detector using ultrasonic sensor.
- Simple Alarm System using buzzer and motion sensor.

Benefits of Using Tinker cad

- Safe and cost-free: No risk of damaging real components.
- Beginner-friendly interface: Drag-and-drop tools make it easy to learn.
- Immediate feedback: Run simulations to see the result in real-time.
- Supports learning: Great for understanding electronics, coding, and design.
- Remote learning tool: Ideal for students and teachers working online.

Skills Developed Through Tinker cad

- Circuit design and understanding of electronic components.
- Arduino programming and logical thinking.
- 3D design and spatial understanding.
- Troubleshooting and debugging skills.
- Creativity and innovation through hands-on digital practice.

Educational Use

- Widely used in schools, STEM programs, and coding workshops.
- Teachers can assign virtual labs and projects.
- Encourages self-paced and experiential learning.

Conclusion

- Tinker cad is a powerful, beginner-friendly tool for learning and making projects in electronics and design.
- It enables students to explore real-world technology concepts in a virtual, risk-free, and fun environment.
- With Tinker cad, anyone can start building, simulating, and coding innovative projects—anytime, anywhere.

Vocational education: Shaping skills for tomorrow

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Introduction

- Vocational skills are practical or job-specific skills that prepare individuals for various trades and professions.
- These skills focus on hands-on training, making learners job-ready and self-reliant.
- In today's fast-changing world, vocational education is key to bridging the gap between education and employment.

Importance of Vocational Skills

- Provide direct entry into the workforce.
- Encourage entrepreneurship and self-employment.
- Develop technical, mechanical, creative, and service-based abilities.
- Help reduce unemployment by creating a skilled workforce.
- Support national growth through a productive and skilled population.

Examples of Vocational Skills

- Technical Skills: Electrical work, computer repair, plumbing, carpentry.
- Creative Skills: Graphic design, fashion designing, baking.
- Service Skills: Retail, hospitality, healthcare, beauty and wellness.
- Digital Skills: Coding, web development, social media management.

Vocational Skills in Schools

- Introduced through vocational subjects and practical projects.
- Students learn by doing – e.g., making models, handling tools, coding simple apps.
- Encourages early exposure to career-oriented learning.
- Helps identify individual strengths and interests.

Shaping Skills for Tomorrow

- The future demands multi-skilled individuals who can adapt to change.
- Integration of digital literacy, communication, problem-solving, and critical thinking with core vocational training is essential.
- Skills such as AI awareness, renewable energy knowledge, and smart agriculture are becoming increasingly relevant.

Role of Technology in Vocational Education

- Use of platforms like Tinkercad, Arduino, virtual labs, and simulations to enhance hands-on learning.
- Online courses and certifications make vocational learning more accessible.
- Blended learning combines theory with practical application.

Benefits for Students

- Builds confidence, discipline, and a sense of responsibility.
- Encourages innovation and creativity through real-world problem solving.
- Offers early work exposure and career guidance.
- Improves employability after school or higher education.

Vocational Skills and Nation Building

- A skilled population supports industries, services, and economic growth.
- Vocational training helps in creating jobs, not just seeking them.
- Strengthens the Make in India and Skill India missions.

Challenges and Solutions

- Challenge: Lack of awareness, resources, and trained teachers.
- Solution: Curriculum reform, industry collaboration, and teacher training.
- Need for counseling and career planning for students.

Conclusion

- Vocational skills are no longer an option—they are a necessity for the future.
- Empowering students with these skills ensures they are future-ready, confident, and capable.
- By integrating vocational education with mainstream schooling, we prepare youth to be active contributors to society and the economy.

Scratch Programming

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Objective of the Game

- The goal is to create a catch game using Scratch.
- When an apple sprite falls and is caught by a bowl sprite, the player gets +1 score.
- If the apple misses the bowl, the score resets to zero.

Platform Used

- The game is made using Scratch Programming – a visual, block-based coding platform ideal for beginners.
- Available online at https://scratch.mit.edu.

Sprites Required

- Apple: A falling object.
- Bowl: A movable object controlled by the player.
- (Optional) Backdrop for aesthetics.

Step-by-Step Process

A. Setup

- Open Scratch → Click "Create".
- Delete the default cat sprite.
- Add new sprites: Apple and Bowl from Scratch Library.
- Set a backdrop (optional) to enhance visual appeal.

B. Programming the Bowl

- Use keyboard arrows or mouse to move the bowl:

```
scratch
CopyEdit
when green flag clicked
forever
  if <key [left arrow] pressed?> then
     change x by (-10)
  end
  if <key [right arrow] pressed?> then
     change x by (10)
  end
end
```

C. Programming the Apple

- Apple falls continuously from the top:

```
scratch
CopyEdit
when green flag clicked
forever
  go to x: (pick random -200 to 200) y: 180
  repeat until <touching [Bowl v]>
     change y by -5
     wait (0.05) seconds
  end
  if <touching [Bowl v]> then
     change [Score v] by (1)
  else
     set [Score v] to (0)
  end
end
```

D. Creating the Score Variable

- Go to "Variables" tab → Click "Make a Variable" → Name it Score.
- This will show the score on the screen.

E. Adding Game Logic

- Apple checks if it touches the bowl.
- If yes → Score increases by 1.
- If no → Score is reset to 0.

Optional Enhancements

- Add a sound effect when apple touches the bowl.
- Use a timer or difficulty increase as the score increases.
- Add lives or game over conditions for more complexity.

Learning Outcomes

- Understand how to use control blocks, variables, and conditional logic in Scratch.
- Learn game design concepts like scoring, object movement, and collision detection.
- Develop logical thinking and creativity.

Conclusion

- This project demonstrates a simple yet interactive game using basic Scratch programming.
- It teaches students how to combine sprites, motion, logic, and variables to create a working game.
- Such games are fun, educational, and excellent for building problem-solving and coding skills.

Line following Robot with Arduino UNO

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TGT WE
PM SHRI KV Ooty

Objective

- To design and build a Line Following Robot using Arduino UNO.
- The robot should detect and follow a black line on a white surface (or vice versa) using IR sensors.
- It uses sensor data to control motors and stay on the path.

Required Components

- 1 × Arduino UNO board
- 2 × IR sensors (TCRT5000 or similar)
- 1 × Motor Driver Module (L298N or L293D)
- 2 × DC Motors with wheels
- 1 × Chassis
- 1 × Caster wheel (for balance)
- Jumper wires, battery (9V or 12V), and black electrical tape (for track line)

Principle of Working

- IR Sensors detect reflected light from the surface:
    - White surface reflects IR light → Sensor reads HIGH (1)
    - Black line absorbs IR light → Sensor reads LOW (0)
- The Arduino reads the IR sensor values and controls the motors accordingly:
    - If the robot veers off the line, it corrects its direction.

Wiring Instructions

- IR Sensor Left (IR_L) → Connect OUT pin to Arduino pin 2
- IR Sensor Right (IR_R) → Connect OUT pin to Arduino pin 3
- L298N Motor Driver:
    - IN1 → Arduino pin 8
    - IN2 → Arduino pin 9
    - IN3 → Arduino pin 10
    - IN4 → Arduino pin 11
- Connect motors to OUT1/OUT2 and OUT3/OUT4 of motor driver.

- Connect 12V power to motor driver and 5V from Arduino for sensors.

Arduino Code

cpp

CopyEdit

```
// IR sensor pins
#define IR_L 2
#define IR_R 3
// Motor driver pins
#define IN1 8
#define IN2 9
#define IN3 10
#define IN4 11
void setup() {
  pinMode(IR_L, INPUT);
  pinMode(IR_R, INPUT);
  pinMode(IN1, OUTPUT);
  pinMode(IN2, OUTPUT);
  pinMode(IN3, OUTPUT);
  pinMode(IN4, OUTPUT);
}
void loop() {
  int leftSensor = digitalRead(IR_L);
  int rightSensor = digitalRead(IR_R);
  if (leftSensor == 0 && rightSensor == 0) {
    // Both on line: Move forward
    forward();
  } else if (leftSensor == 0 && rightSensor == 1) {
    // Right off: Turn left
    turnLeft();
  } else if (leftSensor == 1 && rightSensor == 0) {
    // Left off: Turn right
    turnRight();
  } else {
    // Lost line: Stop or spin
    stopRobot();
  }
```

```
}
void forward() {
  digitalWrite(IN1, HIGH);
  digitalWrite(IN2, LOW);
  digitalWrite(IN3, HIGH);
  digitalWrite(IN4, LOW);
}
void turnLeft() {
  digitalWrite(IN1, LOW);
  digitalWrite(IN2, LOW);
  digitalWrite(IN3, HIGH);
  digitalWrite(IN4, LOW);
}
void turnRight() {
  digitalWrite(IN1, HIGH);
  digitalWrite(IN2, LOW);
  digitalWrite(IN3, LOW);
  digitalWrite(IN4, LOW);
}
void stopRobot() {
  digitalWrite(IN1, LOW);
  digitalWrite(IN2, LOW);
  digitalWrite(IN3, LOW);
  digitalWrite(IN4, LOW);
}
```

Testing the Robot

- Place black electrical tape in a curving line on a white board.
- Power the robot and place it at the start.
- Adjust motor speed or sensor sensitivity if needed.

Applications and Learning Outcomes

- Teaches automation, sensor integration, and embedded logic.
- Foundation for autonomous vehicle design.
- Encourages STEM learning, robotics, and problem-solving.

Tie- Dye a vibrant resource for vocational education

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Why Tie-Dye in Vocational Education?

- Tie-dye is a creative textile technique taught in vocational education to develop practical, artistic, and entrepreneurial skills.
- Encourages hands-on learning, color theory, and fabric manipulation.
- Helps students understand traditional art forms, cultural heritage, and their application in modern fashion and design.
- Useful for self-employment, starting small-scale businesses (scarves, garments, home decor, etc.).
- Boosts creativity, patience, and fine motor skills.

Types of Dye Used in Tie-Dye

- Reactive Dye: Bonds with fabric (cotton, rayon) and gives vibrant, long-lasting colors.
- Direct Dye: Simple to apply but less wash-fast; good for beginners.
- Acid Dye: Used for silk and wool fabrics.
- Natural Dyes: Eco-friendly, made from plant or mineral sources (e.g., turmeric, indigo).
- Vat Dyes: Require special treatment; used for professional-quality dyeing.

Traditional Tie-Dye Techniques in India and the World

A. Bandhani (Bandhnani) Dyeing

- Origin: Gujarat and Rajasthan, India.
- Meaning: Derived from the word "Bandhna" (to tie).
- Process:
    1. Fabric (usually cotton or silk) is tied tightly at several points using threads.
    2. The tied fabric is then dyed, and the tied sections resist dye, creating patterns.
    3. After dyeing, the fabric is dried and knots are opened to reveal dot-based motifs.
- Designs: Dots, waves, circles, and square patterns.

B. Leheriya Dyeing

- Origin: Rajasthan, India.
- Meaning: "Leher" means wave – reflects wave-like patterns.
- Process:
    1. Fabric is rolled diagonally and tied at regular intervals.

2. Dyed in bright colors such as red, yellow, green, or blue.
3. After dyeing and drying, the ties are opened to reveal diagonal striped patterns.

- Used in: Dupattas, turbans, sarees.

C. Shibori Dyeing

- Origin: Japan.
- Meaning: "To wring, squeeze or press".
- Process:
    1. Multiple techniques like folding, twisting, binding, and stitching the fabric.
    2. Common patterns: circles, spirals, and waves.
    3. Indigo is often used as the dye, but modern versions use various colors.
    4. After dyeing, the fabric is rinsed, dried, and untied.
- Results in: Abstract, artistic patterns with a handcrafted look.

General Tie-Dye Process (Basic Steps)

1. Pre-wash the fabric to remove any dirt or starch.
2. Tie or bind the fabric using strings, rubber bands, or clips.
3. Prepare the dye solution (as per dye type).
4. Apply the dye using bottles, brushes, or dip method.
5. Let the fabric sit and absorb the dye (4–8 hours or as recommended).
6. Rinse, untie, and wash the fabric in cold water.
7. Dry in shade to preserve colors.

Conclusion

- Tie-dye connects students to traditional crafts and modern fashion.
- It is an important part of vocational education that promotes artistry, skill development, and income generation.
- Understanding different tie-dye forms like Bandhani, Leheriya, and Shibori enhances cultural appreciation and hands-on learning.

IOT for everyone- Bridge the physical and digital world with Adafruit and IFTTT

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1. IoT for Everyone – Bridging the Physical and Digital World with Adafruit and IFTTT

- Internet of Things (IoT) refers to the interconnection of everyday physical devices via the internet, enabling them to send and receive data.
- The aim is to bridge the physical and digital world, allowing real-world actions (like turning on a light) to be triggered by digital commands (like a mobile app, voice assistant, or website).
- Adafruit IO is an IoT platform that allows you to:
    - Send and receive data from sensors or devices.
    - Visualize data using dashboards.
    - Trigger actions like turning on an LED.
- IFTTT (If This Then That) is a free automation tool that connects different platforms and services. It is used to:
    - Trigger Adafruit feeds using voice assistants like Google Assistant.
    - Set up rules like: "If I say 'Turn on light', then send data to Adafruit."
- ESP32 and Arduino UNO are microcontroller boards capable of receiving internet data and responding (e.g., turning an LED on/off).

2. Project: Controlling One LED Using ESP32 and Adafruit IO

Components Required:

- ESP32 board
- LED + 220 ohm resistor
- Jumper wires
- Breadboard
- Wi-Fi connection
- Adafruit IO account

Steps:

A. Adafruit IO Setup

1. Go to https://io.adafruit.com/ → Create an account.
2. Create a new Feed (e.g., name: ledcontrol).

3. Go to Dashboards → Create a new dashboard.
4. Add a Toggle Switch to the dashboard linked to the ledcontrol feed.

B. Circuit Diagram

- Connect LED anode to GPIO 2 of ESP32 through a resistor.
- Connect LED cathode to GND.

C. Arduino IDE Setup

1. Install ESP32 board support in Arduino IDE.
2. Install Adafruit MQTT library.

D. Arduino Code (ESP32 + Adafruit IO)

```
cpp
CopyEdit
#include <WiFi.h>
#include "Adafruit_MQTT.h"
#include "Adafruit_MQTT_Client.h"

#define WLAN_SSID       "your_SSID"
#define WLAN_PASS       "your_PASSWORD"
#define AIO_SERVER      "io.adafruit.com"
#define AIO_SERVERPORT  1883
#define AIO_USERNAME    "your_adafruit_username"
#define AIO_KEY         "your_adafruit_aio_key"

WiFiClient client;
Adafruit_MQTT_Client mqtt(&client, AIO_SERVER, AIO_SERVERPORT, AIO_USERNAME, AIO_KEY);
Adafruit_MQTT_Subscribe ledControl = Adafruit_MQTT_Subscribe(&mqtt, AIO_USERNAME "/feeds/ledcontrol");
#define LED_PIN 2
void setup() {
  Serial.begin(115200);
  pinMode(LED_PIN, OUTPUT);
```

```
  WiFi.begin(WLAN_SSID, WLAN_PASS);
  while (WiFi.status() != WL_CONNECTED) {
    delay(500); Serial.print(".");
  }
  Serial.println("WiFi connected");
  mqtt.subscribe(&ledControl);
}
void loop() {
  mqtt.processPackets(10000);
  mqtt.ping();
  Adafruit_MQTT_Subscribe *subscription;
  while ((subscription = mqtt.readSubscription(1000))) {
    if (subscription == &ledControl) {
      String value = (char *)ledControl.lastread;
      if (value == "ON") {
        digitalWrite(LED_PIN, HIGH);
      } else {
        digitalWrite(LED_PIN, LOW);
      }
    }
  }
}
```

3. **Project: Controlling One LED Using Google Assistant, Arduino UNO, Adafruit IO, and IFTTT**

Components Required:

- Arduino UNO board
- ESP8266 Wi-Fi Module (NodeMCU can be used as a Wi-Fi bridge)
- LED + 220-ohm resistor
- Jumper wires
- IFTTT account
- Adafruit IO account

- Google Assistant (via phone or Google Home)

Steps:

A. Adafruit IO Setup

1. Create a new feed named ledcontrol.
2. Note your Adafruit IO username and AIO Key.

B. IFTTT Setup

1. Go to https://ifttt.com/ → Create an account.
2. Create an Applet:
    - If This: Choose Google Assistant.
        - Trigger: “Say a phrase with a text ingredient”
        - Example phrase: *"Turn the light $"* where $ can be "on" or "off".
    - Then That: Choose Webhooks → Make a web request.
        - URL: https://io.adafruit.com/api/v2/YOUR_USERNAME/feeds/ledcontrol/data
        - Method: POST
        - Content-Type: application/json
        - Body: {"value":"{{TextField}}"}

C. Arduino UNO + ESP8266 Wiring

- Connect ESP8266 TX to Arduino RX and RX to Arduino TX via voltage divider (or use 3.3V logic).
- Power ESP8266 with 3.3V.
- LED connected to Arduino pin 13.

D. Arduino Code for Reading from Adafruit

Use Arduino + ESP8266 as an Internet interface:

cpp

CopyEdit

```
#include <SoftwareSerial.h>
#include <ESP8266WiFi.h>
#include "Adafruit_MQTT.h"
#include "Adafruit_MQTT_Client.h"
#define WLAN_SSID       "your_SSID"
#define WLAN_PASS       "your_PASSWORD"
```

```
#define AIO_SERVER      "io.adafruit.com"
#define AIO_SERVERPORT  1883
#define AIO_USERNAME    "your_adafruit_username"
#define AIO_KEY         "your_aio_key"
WiFiClient client;
Adafruit_MQTT_Client mqtt(&client, AIO_SERVER, AIO_SERVERPORT, AIO_USERNAME, AIO_KEY);
Adafruit_MQTT_Subscribe ledFeed = Adafruit_MQTT_Subscribe(&mqtt, AIO_USERNAME "/feeds/ledcontrol");
#define LED_PIN 13

void setup() {
  Serial.begin(115200);
  pinMode(LED_PIN, OUTPUT);

  WiFi.begin(WLAN_SSID, WLAN_PASS);
  while (WiFi.status() != WL_CONNECTED) {
    delay(500); Serial.print(".");
  }

  mqtt.subscribe(&ledFeed);
}

void loop() {
  mqtt.processPackets(10000);
  mqtt.ping();

  Adafruit_MQTT_Subscribe *subscription;
  while ((subscription = mqtt.readSubscription(1000))) {
    if (subscription == &ledFeed) {
      String value = (char *)ledFeed.lastread;
```

```
    if (value == "on") {
      digitalWrite(LED_PIN, HIGH);
    } else if (value == "off") {
      digitalWrite(LED_PIN, LOW);
    }
   }
  }
}
```

4. Learning Outcomes

- Understanding how cloud platforms like Adafruit IO can connect to physical devices via Wi-Fi modules.
- Learn to create IFTTT applets to automate actions using voice commands.
- Develop skills in coding, electronics, networking, and cloud communication.
- Realize how IoT helps in home automation, smart cities, and real-time monitoring.

5. Conclusion

IoT empowers learners to interact with physical hardware using digital services like Adafruit IO and IFTTT. These projects showcase the potential of IoT to simplify tasks, build real-world solutions, and enhance digital literacy. Using basic components like LEDs, ESP32, Arduino, and software platforms like Adafruit and IFTTT, anyone can start building their own smart systems, bridging the gap between imagination and innovation.

Sensor modules used with Arduino UNO: Unlocking innovation

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Introduction

- Arduino UNO is a popular microcontroller board used in electronics, robotics, and automation projects.
- One of its greatest strengths is its compatibility with a wide range of sensor modules, enabling innovative real-world applications.
- Sensors collect data from the environment, which Arduino can process and respond to, making it essential for developing smart systems.

Why Sensor Modules with Arduino?

- Unlocks creativity and innovation in STEM education, DIY projects, and industry solutions.
- Provides real-time feedback from the environment.
- Enables automation, data logging, and interactive systems.
- Promotes hands-on learning and prototyping in vocational and technical education.

Commonly Used Sensor Modules with Arduino UNO

A. Ultrasonic Sensor (HC-SR04)

- Measures distance using sound waves.
- Used in obstacle detection, parking systems, and robotics.

B. Temperature and Humidity Sensor (DHT11/DHT22)

- Captures ambient temperature and humidity data.
- Used in weather stations, greenhouses, and smart homes.

C. IR Sensor (Infrared)

- Detects motion or line presence (reflective surface).
- Common in line-following robots and obstacle sensors.

D. PIR Sensor (Passive Infrared)

- Detects human motion via infrared heat.
- Used in security systems and automatic lights.

E. Gas Sensor (MQ Series)

- Detects gases like LPG, CO2, CO, smoke.
- Applied in safety alarms and environmental monitoring.

F. Light Sensor (LDR - Light Dependent Resistor)

- Measures ambient light levels.
- Used in automatic lighting systems and solar trackers.

G. Sound Sensor

- Detects sound levels or claps.
- Used in voice-controlled or clap-activated devices.

H. Soil Moisture Sensor

- Measures water content in soil.
- Essential in smart irrigation and agriculture automation.

I. Rain Sensor

- Detects presence of rain or water.
- Useful in weather monitoring and automatic window systems.

J. Accelerometer (ADXL345, MPU6050)

- Detects orientation, tilt, and motion.
- Used in wearables, fall detection, and motion tracking.

How Sensors Unlock Innovation

- Education: Helps students understand data collection, programming, and hardware integration.
- Smart Homes: Enable lights, alarms, and appliances to respond intelligently.
- Agriculture: Optimizes watering, temperature control, and crop monitoring.
- Health Monitoring: Tracks body movement, heart rate, and environment conditions.
- Robotics: Provides sensory feedback for autonomous navigation and interaction.

Example: Using Ultrasonic Sensor with Arduino

Basic Code:

cpp

CopyEdit

```
const int trigPin = 9;
const int echoPin = 10;
long duration;
int distance;

void setup() {
  pinMode(trigPin, OUTPUT);
```

```
  pinMode(echoPin, INPUT);
  Serial.begin(9600);
}

void loop() {
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);

  duration = pulseIn(echoPin, HIGH);
  distance = duration * 0.034 / 2;

  Serial.print("Distance: ");
  Serial.println(distance);
  delay(1000);
}
```

Conclusion

- Sensor modules with Arduino UNO are powerful tools for innovation, enabling students, hobbyists, and engineers to create smart, automated systems.
- These modules act as the bridge between the physical world and digital logic, helping us collect, analyze, and act on real-world data.
- Mastering sensors opens the door to building future-ready technology projects in every domain—from homes to industries.

Kaushal Bodh (School kitchen garden) and Breadboard Basics

Mrs. Anamika Gupta
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PM SHRI KV No. 2 Kalpakkam

Work with Life Forms

School Kitchen Garden

What is a Kitchen Garden?

A kitchen garden, also known as a vegetable garden or home garden, is a small garden where vegetables, herbs, fruits, and sometimes flowers are grown for household use. It is typically located close to the kitchen or within a home's backyard or front yard for easy access.

Why Have a Kitchen Garden?

There are many reasons to have a kitchen garden, but one of the simplest reasons is that it can make you:

"Healthy, Wealthy, and Wise"

How Does It Make Us Healthy?

- Provides fresh air
- Serves as a place for exercising
- Produces healthy vegetables that are fresh and rich in vitamins and minerals

How Does It Make Us Wealthy?

- Helps in family budgeting and saving
- Reduces the need to visit doctors by ensuring availability of fresh fruits and vegetables right at home

"A healthy man is a wealthy man."

Planning Your Garden: What & Where

➢ Sunlight is Key

- Choose a spot that receives at least six hours of direct sunlight daily.
- This is crucial for most vegetables and herbs to grow well and produce fruit.

➢ Space Smartly

- Use pots, containers, or a small garden patch.
- Even a sunny windowsill can become a productive mini-garden.

➢ Easy Plants for Beginners

- Radishes: Ready for harvest in just 3-4 weeks, a quick and rewarding crop.

- Lettuce: Harvest outer leaves as needed; continues producing for weeks.
- Cherry Tomatoes: Grow well in pots; harvest in 60–80 days.
- Herbs (Mint, Basil): Easy to grow from cuttings; add fresh flavor to meals.

➢ Essential Tools for Your Garden

- Trowel – For planting and transplanting small plants.
- Hand Fork – For loosening soil and weeding in tight spots.
- Pruning Shears – For trimming, shaping, and harvesting.
- Gardening Gloves – Protect hands from dirt and thorns.
- Watering Can/Hose – For efficient and targeted watering.
- Wheelbarrow – To transport soil, compost, and produce.

➢ Safety While Gardening

- Wear gloves to protect your hands; ensure proper grip.
- Follow instructions when using tools and materials.
- Pay attention during demonstrations to learn correct techniques.
- Ask for help if unsure how to use any tool.

What Can You Grow?

Vegetables:

- Tomato, Spinach, Chili, Brinjal

Herbs:

- Coriander, Mint, Basil

Fruits (space permitting):

- Lemon, Papaya, Banana

How to Start a Kitchen Garden

1. Choose a sunny location
2. Select easy-to-grow plants
3. Prepare healthy soil
4. Use compost or organic fertilizer
5. Water regularly and protect from pests

Waste to Wealth

- Use kitchen waste like vegetable peels and fruit skins to make natural compost.
- Compost improves soil fertility and reduces waste.

Nurturing Your Garden: Care & Maintenance

Watering

- Check soil daily.
- Water only when top 2 cm of soil is dry.

Weeding

- Gently pull out unwanted plants that compete for water and nutrients.

Pest Control

- Inspect plants regularly for pests like aphids.
- Wipe them off or use a mild soapy water spray.

Sunlight & Air

- Ensure proper sunlight and air circulation to prevent diseases and promote healthy growth.

Benefits of School Kitchen Garden

Freshness & Flavor

- Enjoy the unmatched taste of freshly picked produce.

Health Benefits

- Avoid pesticides and promote healthier food choices.

Cost Savings

- Reduce grocery bills by growing your own food.

Sustainable Living

- Reduce carbon footprint and build a connection with nature.

Benefits for Children

- Learn responsibility and care for nature.
- Encourages healthy eating habits.
- Makes gardening a fun and educational activity.

Conclusion

Kitchen gardens offer numerous benefits:

- Promote healthier eating habits
- Enhance environmental sustainability
- Foster community engagement
- Empower individuals to take control of their own food production

Key Takeaways:

- Health and Nutrition
- Environmental Benefits
- Economic Benefits
- Social and Community Benefits

What is a Breadboard?

- A breadboard is a rectangular plastic board with holes used to build and test electronic circuits without soldering.
- It allows quick assembly and modification of circuit designs, making it ideal for prototyping.

Structure of a Breadboard

- Consists of rows and columns of tiny holes.
- Divided into two main areas:
  a) Terminal strips (middle area) – for placing components.
  b) Bus strips (side areas) – for power supply connections (positive and negative rails).

How It Works

- Holes in each horizontal row (A–E and F–J) are electrically connected.
- The power rails run vertically and are usually marked with red (+) and blue/black (–) lines.
- No electrical connection between the left and right halves unless connected with jumper wires.

Advantages of Using a Breadboard

- No soldering required – ideal for beginners.
- Reusable – components can be inserted and removed easily.
- Helps in learning and testing basic and advanced electronic circuits.

Common Uses

- Used in STEM education, Arduino projects, and DIY electronics.
- Allows testing of sensors, LEDs, resistors, microcontrollers, etc.

Safety Note

- Always check wiring and ensure correct polarity to avoid short circuits or damaging components.

Maintenance and repair of school
&
About PA System connection and maintenance

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1. Maintenance and Repair of School

A. Importance of School Maintenance

- Ensures a safe, clean, and functional environment for students and teachers.
- Improves learning outcomes by providing a well-maintained physical space.
- Reduces long-term repair costs by addressing issues early.

B. Areas of School Requiring Regular Maintenance

1. Classrooms – Furniture, blackboards, fans, lights, windows.
2. Toilets and Washrooms – Water supply, drainage, cleanliness, hygiene.
3. Playground and Sports Equipment – Safety checks, surface levelling.
4. Electrical Systems – Light fixtures, fans, wiring inspection.
5. Water Facilities – Tanks, pipelines, drinking water stations.
6. School Building – Paint, wall cracks, flooring, roof leaks.

C. Common Repair Activities

- Fixing broken furniture (desks, benches, chairs).
- Replacing fused bulbs or non-functional fans.
- Plumbing repairs like leaking taps and toilets.
- Removing moss, weeds, and repairing playground swings or slides.
- Repainting and patching damaged walls.

D. Role of Students and Staff

- Students can be involved in cleanliness drives and basic observation of issues.
- Staff and maintenance workers handle technical and skilled repairs.
- Creating a reporting system for damage helps take timely action.

2. Connection and Maintenance of PA System in School Morning Assembly

A. Purpose of PA (Public Address) System

- Used to address the entire school during morning assemblies.
- Helps in announcements, speeches, national anthem, and emergency messages.

B. Components of PA System

1. Microphone – For speaking.
2. Amplifier – Boosts the audio signal.
3. Speakers – Output device to cover large areas like assembly ground.
4. Mixer (optional) – To balance sound levels.
5. Cables and Wiring – Connect different components.

C. Setting Up the PA System

- Place speakers at strategic locations for uniform sound.
- Connect microphone to amplifier, then to speakers.
- Perform a sound check before the assembly begins.
- Ensure electricity supply or backup (inverter/generator) is available.

D. Maintenance of PA System

- Regularly check cables and connectors for wear or damage.
- Keep microphone and amplifier dust-free using covers.
- Avoid keeping devices in damp areas to prevent corrosion.
- Train selected staff or students to operate and troubleshoot the system.
- Conduct monthly testing of the system to avoid last-minute failures.

E. Common Issues and Troubleshooting

- No sound – Check power source, volume settings, and connections.
- Distorted sound – May require adjusting the microphone distance or amplifier gain.
- Loose connections – Inspect and re-plug wires properly.

Conclusion

Proper maintenance and timely repair of school infrastructure and PA systems contribute to a safe, organized, and effective learning environment. Involving students and training basic maintenance skills can promote responsibility and teamwork.

Work with life form (Plant Nursery)

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What is a Plant Nursery?

- A plant nursery is a place where plants are propagated, grown, and nurtured until they are ready to be planted in gardens, farms, or landscapes.
- It serves as a starting point for growing a wide variety of plants including flowers, vegetables, herbs, ornamental plants, and trees.

Purpose of a Plant Nursery

- To provide healthy, disease-free, and well-grown seedlings and saplings.
- To make different plant varieties available for home gardening, landscaping, agriculture, and reforestation.
- Acts as a learning center for students and gardeners interested in horticulture.

Types of Plant Nurseries

- Home Nursery: Small-scale, usually managed in backyards or kitchen gardens.
- Commercial Nursery: Large-scale production for business purposes.
- Retail Nursery: Sells plants directly to customers.
- Wholesale Nursery: Supplies plants in bulk to garden centers or landscapers.

Activities in a Nursery

- Seed sowing and germination.
- Transplanting seedlings to pots or beds.
- Watering, weeding, and fertilizing.
- Pest and disease control.
- Packaging and selling of plants.

Types of Plants Grown

- Flowering plants (rose, marigold, hibiscus)
- Vegetables (tomato, brinjal, chilli)
- Fruits (guava, lemon, banana)
- Medicinal plants (tulsi, aloe vera, neem)
- Ornamental plants (money plant, snake plant)

Tools and Materials Required

- Watering can or hose

- Trowel and hand fork
- Gardening gloves
- Seed trays, pots, polybags
- Compost, soil mix, fertilizers

Conditions for Healthy Nursery

- Proper sunlight: At least 4–6 hours of daily sunlight.
- Adequate watering: Plants must be watered regularly but not over-watered.
- Good air circulation to prevent fungal diseases.
- Pest-free environment through natural or chemical protection.

Benefits of a Plant Nursery

- Helps in afforestation and greening the environment.
- Encourages self-employment and entrepreneurship.
- Promotes eco-awareness and responsibility among students.
- Supports kitchen gardens and home-based farming.

School Plant Nursery (Educational Purpose)

- Students learn about plant life cycle, soil, fertilizers, and climate effects.
- Encourages hands-on learning and teamwork.
- Can be integrated with vocational and science education.

Safety and Care Tips

- Wear gloves while handling soil and tools.
- Use clean and disease-free seeds and tools.
- Be gentle while transplanting seedlings to avoid damage.
- Avoid standing water to prevent root rot and mosquito breeding.

Conclusion

A plant nursery is a foundation of sustainable gardening and agriculture. It not only contributes to environmental conservation but also opens up opportunities for education, income generation, and community involvement.

Vocational education Assessment

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PM SHRI KV Coimbatore

Objective of Assessment

- The primary goal of assessment is to evaluate student learning, skills, and understanding of curriculum content.
- It helps teachers identify learning gaps, provide feedback, and adjust teaching strategies accordingly.
- Assessments are designed to promote continuous learning and improvement rather than simply ranking students.
- They guide both formative (ongoing) and summative (final) evaluation processes.
- Assessment also supports inclusive education by identifying individual strengths and areas of development.

Class 6 to 8 Grading – 5 Point Scale (A to E)

- For middle school (Classes 6 to 8), a 5-point grading scale is used to reflect overall performance.
- The scale is as follows:
    - A – Excellent
    - B – Very Good
    - C – Good
    - D – Satisfactory
    - E – Needs Improvement
- This system encourages holistic development, focusing not only on academics but also on life skills and values.
- It promotes a non-threatening evaluation environment, reducing exam pressure on students.

Class 9 to 12 Grading – 5 Point Scale (A to E)

- For secondary and senior secondary levels (Classes 9 to 12), the same 5-point scale (A-E) is used.
- The purpose remains consistent: to assess comprehension, application, and critical thinking abilities.
- The grading criteria may be more stringent at this stage to reflect higher academic expectations.
- This method aids in standardized reporting across schools and helps in college admission processes.

- Like in lower classes, it reduces stress and encourages conceptual understanding over rote learning.

How to Make a Lesson Plan

- A lesson plan is a structured outline that guides teaching in the classroom.
- Steps to create an effective lesson plan:
    1. Define Objectives: Clearly state what students should know or be able to do by the end of the lesson.
    2. Identify Materials Needed: List textbooks, worksheets, digital tools, or any teaching aids.
    3. Plan the Introduction: Begin with an engaging activity or question to activate prior knowledge.
    4. Outline Teaching Procedures: Break down the content into steps. Include explanation, demonstration, and guided practice.
    5. Student Activities: Design activities like group work, discussions, or experiments to reinforce learning.
    6. Assessment: Plan how you will check students' understanding (e.g., quiz, oral questioning, worksheet).
    7. Time Allocation: Assign time to each section of the lesson to manage the classroom effectively.
    8. Closure: Conclude with a summary or reflection task to consolidate learning.
    9. Follow-Up: Note homework, projects, or further reading to extend learning beyond the classroom.
- A good lesson plan should be flexible, student-centered, and aligned with curriculum goals.

Enhancing effective communication skills

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Introduction

- Communication is the process of sharing information, ideas, thoughts, or feelings between individuals or groups.
- Effective communication is essential in all areas of life, including education, workplace, and personal relationships.
- Enhancing communication skills improves understanding, reduces conflicts, and fosters cooperation.

Importance of Effective Communication

- Builds strong interpersonal relationships.
- Enhances teamwork and collaboration.
- Increases clarity and reduces misunderstandings.
- Helps in expressing ideas confidently and persuasively.
- Boosts academic and professional success.

Key Components of Communication

- Sender: The person who initiates the message.
- Message: The content being communicated.
- Medium: The method used to send the message (e.g., speech, writing, gestures).
- Receiver: The person for whom the message is intended.
- Feedback: The response from the receiver confirming understanding.

Types of Communication

- Verbal Communication: Spoken or written words (e.g., conversations, emails).
- Non-Verbal Communication: Body language, facial expressions, gestures, tone of voice.
- Visual Communication: Use of images, charts, diagrams to convey ideas.
- Listening: An active part of communication that ensures mutual understanding.

Strategies to Enhance Communication Skills

- Practice Active Listening:
  - Pay full attention to the speaker.
  - Avoid interrupting and provide thoughtful feedback.
- Improve Vocabulary and Language Skills:

- Read regularly to learn new words.
- Use appropriate and clear language based on the audience.

- Maintain Eye Contact and Positive Body Language:
  - It shows confidence and interest in the conversation.
- Organize Thoughts Before Speaking:
  - Think clearly and structure your message logically.
- Be Concise and Clear:
  - Avoid using too many words or complicated language.
  - Focus on delivering the main message effectively.
- Encourage Two-Way Communication:
  - Invite feedback and questions to ensure mutual understanding.
- Use Technology Appropriately:
  - Learn to use digital communication tools (emails, video calls, etc.) effectively.
- Build Empathy and Respect:
  - Understand others' perspectives and communicate with sensitivity.

Barriers to Effective Communication

- Language differences or poor language skills.
- Emotional distractions or stress.
- Cultural misunderstandings.
- Lack of attention or interest.
- Technical issues in digital communication.

Role of Communication in Education and Career

- Helps teachers convey lessons clearly and motivate students.
- Enables students to ask questions, participate, and collaborate.
- In professional life, it aids in presentations, negotiations, and teamwork.

Conclusion

- Effective communication is a vital life skill that can be developed through regular practice and self-awareness.
- Enhancing communication leads to better relationships, increased confidence, and improved success in all spheres of life.

PHOTOS


केविसं
ವಲಯ ಶಿಕ್ಷಣ ಮತ್ತು ತರಬೇತಿ ಸಂಸ್ಥೆ
आंचलिक शिक्षा एवं प्रशिक्षण संस्थान
ZONAL INSTITUTE OF EDUCATION AND TRAINING
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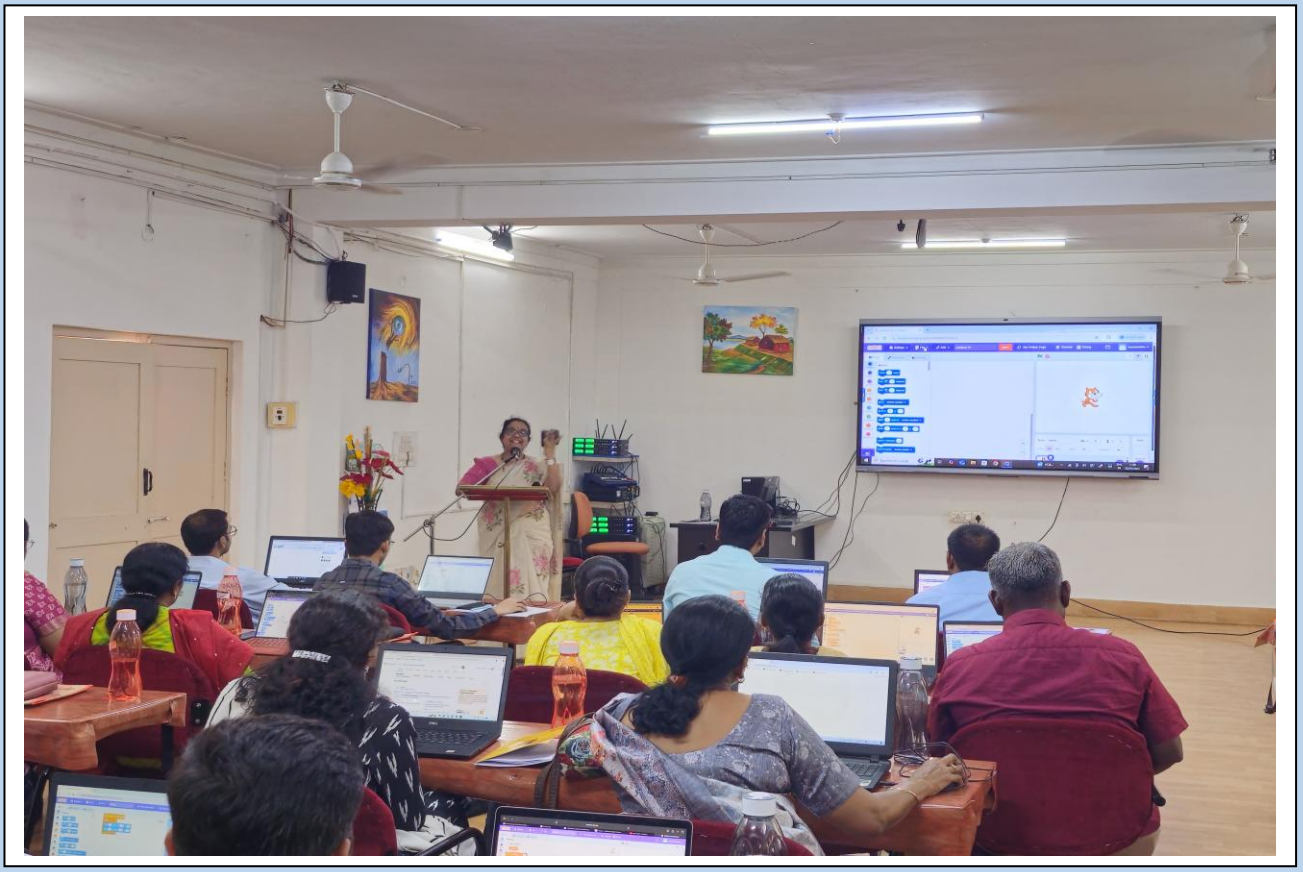
Thank you




THANK
YOU