

UNIT 35

AUTOMATION

Objectives: at the end of the lesson, students will be able to:

1. understand and use basic vocabulary related to automation;
2. recognize and describe common examples of automation in their daily lives;
3. list the advantages and disadvantages of automation.

Lead-in: Brainstorming

Have students brainstorm and discuss examples such as automatic doors, email filters, or smart home devices.

Vocabulary Building

Key Terms

CAM – (Computer Aided Manufacturing) is the use of computers to control production equipment

Embedded system – is a combination of hardware and software designed to perform a specific task

Automation – is the use of programmed machines to perform tasks without human assistance

Integrated circuit – is a small chip that has several electronic devices attached to it

Encoders – are devices that convert mechanical information into electronic signals

Ethernet network – is a high-speed network that links computers together

Redundancy – is the inclusion of duplicate components in a system to maintain production when one component fails

Fault-tolerant – is the ability to continue functioning even though an error has occurred

Priority inversion – is a delay that occurs in a computer system when a low-priority task is dealt with before a high-priority task

Oscilloscope – is a device that allows the user to view the electrical voltage of a machine

Latency – is the time between the end of one computer communication and the start of another

Open system – is a system that can use many different types of machines

Activity: Robust Vocabulary

Ask students to recall and jot down all the target words and phrases they have learned so far within two minutes. After the time has passed, ask them to count their words. The winner is whoever has written the most words.

Reading

Activity: Reading the article

Ask students to read the article about the cons and pros of automation by Akshay Badkar to be ready for discussion.

<https://www.simplilearn.com/advantages-and-disadvantages-of-automation-article>

Speaking

Group Work Activity: Discussion and Presentation

In small groups, let students discuss the advantages and disadvantages of automation after brainstorming together in the class.

Advantages of automation:

1. Increased Efficiency

Explanation: Automation can perform tasks faster and more accurately than humans, leading to higher productivity and efficiency.

Example: Automated manufacturing lines produce goods more quickly and consistently than manual labor.

2. Cost Savings

Explanation: Reduces labor costs and minimizes errors that could lead to costly mistakes.

Example: Automated checkouts in stores can reduce the need for cashiers, saving on labor costs.

3. Improved Quality and Consistency

Explanation: Automation ensures that tasks are performed the same way each time, leading to consistent quality.

Example: Automated quality control systems in factories can detect defects more reliably than manual inspections.

4. Enhanced Safety

Explanation: Automation can handle dangerous tasks, reducing the risk of injury for human workers.

Example: Robotic arms in manufacturing can handle hazardous materials or work in extreme environments.

5.24/7 Operation

Explanation: Automated systems can operate continuously without breaks, leading to increased output.

Example: Automated customer service chatbots can assist users at any time of day or night.

6. Data Collection and Analysis

Explanation: Automation systems can collect and analyze data in real-time, providing valuable insights.

Example: Smart thermostats analyze temperature patterns to optimize energy usage.

Disadvantages of automation:

1. Job Losses

Explanation: Automation can lead to the displacement of workers as machines and software take over tasks previously performed by humans.

Example: Assembly line jobs might be reduced as robots handle repetitive tasks.

2. High Initial Costs

Explanation: Implementing automated systems can require significant upfront investment in technology and infrastructure.

Example: Purchasing and installing industrial robots can be expensive for small businesses.

3. Technical Issues and Maintenance

Explanation: Automated systems can experience technical problems and require regular maintenance and repairs.

Example: A malfunctioning robot on a production line can halt operations until it is fixed.

4. Reduced Human Interaction

Explanation: Automation can reduce opportunities for human contact and collaboration, which might impact team dynamics and customer service.

Example: Automated phone systems may frustrate customers who prefer speaking directly with a person.

5. Dependence on Technology

Explanation: Heavy reliance on automation can make organizations vulnerable to technology failures or cyber-attacks.

Example: A company heavily dependent on automated data entry systems may struggle if those systems are hacked or break down.

6. Skill Gaps

Explanation: The rise of automation can create skill gaps as workers may need to be retrained or reskilled to adapt to new technologies.

Example: Workers in traditional manufacturing roles may need new skills to operate advanced automated machinery.

Home assignment

Ask students to write a report on the advantages and disadvantages of automation. (100-150 words)