

## Change in Tech

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### Textbook

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## Change in Tech



Our world is getting smarter all the time. This section will look at the new features in cell phones, smart gadgets, and cars, along with the difficulties people have using them. We'll also talk about how devices communicate with each other without us, and explore virtual and augmented reality.

### New Features in Mobile Devices, Smart Gadgets, and Cars

Cell phones are now like powerful mini-computers. They have really good cameras, faster computer chips, screens that can fold, and better ways to keep your information safe, like facial recognition. Smart devices are everyday items that are connected to the internet, such as smart speakers and home systems. These devices use artificial intelligence (AI) to understand your voice and work together smoothly. Cars are also becoming "smart" with features like systems that help drivers and technology that allows cars to drive themselves. These cars are full of sensors and computers.

### Physical and Mental Problems When Using Computers

New technology can also create challenges. Physical problems include things like "text neck" from looking down at your phone too much or pain in your wrist from tapping touchscreens. Sitting incorrectly at computers can also cause back pain. Mental, or thinking, problems can happen when computer programs are designed poorly. If labels are confusing, there are too many choices, or designs are not consistent, users can get frustrated, make mistakes, and feel mentally tired. Computer programs need to be designed in a way that matches how people naturally think and learn to be easy to use.

## How Devices Talk to Each Other

More and more, devices are talking to each other without any help from humans. This is called "Machine-to-Machine (M2M) interaction," and it's a key part of the Internet of Things (IoT). For example, a smart thermostat might turn off the air conditioning if a sensor detects that a window is open. Machines in a factory can automatically order new parts when they run low. Self-driving cars can communicate with each other to avoid accidents. Smart trash cans in a city can send a signal when they are full. These behind-the-scenes interactions make systems work better and respond automatically.

## Understanding Virtual and Augmented Reality

Virtual Reality (VR) and Augmented Reality (AR) change the way we experience digital information. Virtual Reality (VR) completely puts you into a computer-made world using a special headset. It blocks out the real world, letting you explore fake environments, play games, or go on virtual tours. VR tracks your movements to make you feel like you are actually there. Augmented Reality (AR) adds digital information onto your view of the real world, making it better. You see AR through a phone camera or special glasses. It can show things like game characters in your room, navigation directions on your car's windshield, or virtual furniture in your house. Both VR and AR are growing quickly and are changing how we learn, work, and have fun.

## Critical Thinking Questions

1. Imagine you're helping design a new kind of smart device for helping people with their daily routines. What kind of difficulties might older people or those who aren't used to technology have when trying to use it? What features could you add or what ways could you explain how it works to make it easier for everyone?
2. Think about a future where most tasks are handled by devices talking to each other, like ordering groceries or managing your home's energy. How might this change the kinds of jobs people do or the skills they need? Are there any potential downsides to having so many things automated?
3. If you could create a new type of smart device that combines aspects of both virtual and augmented reality, what would it be and how would it work? How could this new device improve how people interact with each other or learn new things?

## Questions (5)

**1. A person consistently experiences neck pain and headaches after prolonged use of their smartphone, often bending their neck to look at the screen. Which type of challenge in using computer interfaces is this an example of?**

MULTIPLE CHOICE

**Choose the correct answer:**

- A. Cognitive challenge
- B. Mental fatigue
- C. Physical challenge
- D. Interface design flaw

**2. A smart thermostat in a home automatically turns off the air conditioning when a window sensor detects that a window has been left open. This interaction occurs without direct human input. What concept does this scenario best illustrate?**

MULTIPLE CHOICE

**Choose the correct answer:**

- A. Virtual Reality (VR)
- B. Augmented Reality (AR)
- C. Machine-to-Machine (M2M) interaction
- D. Advanced Driver-Assistance Systems (ADAS)

**3. A user tries a new app but struggles to understand its icons and menus because they seem inconsistent with other apps they've used. This leads to frustration and mistakes. Which type of challenge in using computer interfaces is highlighted here?**

MULTIPLE CHOICE

**Choose the correct answer:**

- A. Physical strain
- B. Repetitive strain injury
- C. Cognitive challenge
- D. "Text neck"

**4. Which emerging feature of mobile phones with enhanced security measures like scanning a user's face to unlock the device?**

MULTIPLE CHOICE

**Choose the correct answer:**

- A. Folding screens
- B. Advanced cameras
- C. Facial recognition
- D. Faster processors

**5. You are wearing a headset that completely blocks out your view of the real world and transports you into a computer-generated environment where you can interact with virtual objects. What technology are you experiencing?**

MULTIPLE CHOICE

**Choose the correct answer:**

- A. Augmented Reality (AR)
- B. Virtual Reality (VR)
- C. Smart home system
- D. Advanced Driver-Assistance System (ADAS)

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## Answer Keys & Solutions

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### Questions

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1. A person consistently experiences neck pain and headaches after prolonged use of their smartphone, often bending their neck to look at the screen. Which type of challenge in using computer interfaces is this an example of?

MULTIPLE CHOICE

Correct Answer:

- |                          |             |
|--------------------------|-------------|
| A. Cognitive challenge   | ✗ Incorrect |
| B. Mental fatigue        | ✗ Incorrect |
| C. Physical challenge    | ✓ Correct   |
| D. Interface design flaw | ✗ Incorrect |

**Explanation:**

Consider the bodily strain caused by device usage.

2. A smart thermostat in a home automatically turns off the air conditioning when a window sensor detects that a window has been left open. This interaction occurs without direct human input. What concept does this scenario best illustrate?

MULTIPLE CHOICE

Correct Answer:

- |  |             |
|--|-------------|
| A. Virtual Reality (VR)                      | ✗ Incorrect |
| B. Augmented Reality (AR)                    | ✗ Incorrect |
| C. Machine-to-Machine (M2M) interaction      | ✓ Correct   |
| D. Advanced Driver-Assistance Systems (ADAS) | ✗ Incorrect |

**Explanation:**

Think about devices communicating and acting on their own.

**3. A user tries a new app but struggles to understand its icons and menus because they seem inconsistent with other apps they've used. This leads to frustration and mistakes. Which type of challenge in using computer interfaces is highlighted here?**

MULTIPLE CHOICE

**Correct Answer:**

- |                             |             |
|-----------------------------|-------------|
| A. Physical strain          | ✗ Incorrect |
| B. Repetitive strain injury | ✗ Incorrect |
| C. Cognitive challenge      | ✓ Correct   |
| D. "Text neck"              | ✗ Incorrect |

**Explanation:**

Focus on difficulties related to thinking, understanding, and processing information from the interface.

**4. Which emerging feature of mobile phones with enhanced security measures like scanning a user's face to unlock the device?**

MULTIPLE CHOICE

**Correct Answer:**

- |                       |             |
|-----------------------|-------------|
| A. Folding screens    | ✗ Incorrect |
| B. Advanced cameras   | ✗ Incorrect |
| C. Facial recognition | ✓ Correct   |
| D. Faster processors  | ✗ Incorrect |

**Explanation:**

This feature is explicitly linked to improved security for unlocking devices.

**5. You are wearing a headset that completely blocks out your view of the real world and transports you into a computer-generated environment where you can interact with virtual objects. What technology are you experiencing?**

MULTIPLE CHOICE

**Correct Answer:**

A. Augmented Reality (AR)

✗ Incorrect

B. Virtual Reality (VR)

✓ Correct

C. Smart home system

✗ Incorrect

D. Advanced Driver-Assistance System (ADAS)

✗ Incorrect

**Explanation:**

Think about full immersion in a simulated world.