

# How People Interact with Technology

**Unit:** Game Design

**Problem Area:** Theory of Game Design

**Lesson:** How People Interact with Technology

- **Student Learning Objectives.** Instruction in this lesson should result in students achieving the following objectives:

- 1 Define how people interact with game technologies.**
- 2 Evaluate future game interaction technologies.**

- **Resources.** The following resources may be useful in teaching this lesson:

E-unit(s) corresponding to this lesson plan. CAERT, Inc. <http://www.mycaert.com>.

Adams, Diana. "The Evolution of Video Game Controllers," *Bit Rebels*. Accessed Jan. 4, 2013. <http://www.bitrebels.com/geek/the-evolution-of-video-game-controllers-infographic/>.

"Future of Video Game Controls Debate," *YouTube*. Accessed Jan. 4, 2013. <http://www.youtube.com/watch?v=Ssqkfm4qzJA>.

"Game Design: Future of Video Game Controls," *YouTube*. Accessed Jan. 4, 2013. <http://www.youtube.com/watch?v=ahWvxk34U>.

Hachman, Mark. "Infographic Visual History of Video Game Controllers," *pcmag.com*. Accessed Jan. 4, 2013. <http://www.pcmag.com/article2/0,2817,2393047,00.asp>.

"A History of the Game Controller Evolution," *YouTube*. Accessed Jan. 4, 2013. <http://www.youtube.com/watch?v=Q-03HmcjOPs/>.



“Sock Master’s Game Console Controller Family Tree,” *Twilight*. Accessed Jan. 4, 2013. <http://www.axess.com/twilight/console/>.

Sung, Kelvin. “Recent Videogame Console Technologies,” *Entertainment Computing*. Accessed Jan. 4, 2013. [http://www.computer.org/cms/Computer.org/ComputingNow/homepage/2011/0311/rW\\_CO\\_RecentVideogameConsoleTechnologies.pdf](http://www.computer.org/cms/Computer.org/ComputingNow/homepage/2011/0311/rW_CO_RecentVideogameConsoleTechnologies.pdf).

“Video Game Controller Evolution,” *YouTube*. Accessed Jan. 4, 2013. <http://www.youtube.com/watch?v=D59-bodcBlc&feature=related>.

## ■ **Equipment, Tools, Supplies, and Facilities**

- ✓ Overhead or PowerPoint projector
- ✓ Visual(s) from accompanying master(s)
- ✓ Copies of sample test, lab sheet(s), and/or other items designed for duplication
- ✓ Materials listed on duplicated items
- ✓ Computers with printers and Internet access
- ✓ Classroom resource and reference materials

## ■ **Key Terms.** The following terms are presented in this lesson (shown in bold italics):

- ▶ cloud computing
- ▶ game controller
- ▶ gamepad
- ▶ joystick
- ▶ light gun
- ▶ motion-sensing controller
- ▶ rhythm game controller
- ▶ touch screen technology

## ■ **Interest Approach.** Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situations. A possible approach is included here.

*In the evolution of video games, one key component is the ability to input or control the actions of the game. From simple switches to more complex D-Pads and wireless controllers, game controllers have evolved to allow greater interaction between the player and the game. Ask your students to list ways in which game controllers allow them to better experience games. Have them share some of their answers with the class.*

# CONTENT SUMMARY AND TEACHING STRATEGIES

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**Objective 1:** Define how people interact with game technologies.

**Anticipated Problem:** How have game controllers evolved to allow for greater human interaction?

I. Types of game interfaces

- A. A **game controller** is a device used with games or entertainment systems to provide input to a video game, typically to control an object or a character.
  - 1. A game controller is an intricate hardware device that allows a game player to send instructions to a computer that ranges in size from a desktop computer to a handheld proprietary game device.
  - 2. A controller connects to a game console or computer by means of a wire or cord, unless it is a wireless controller.
  - 3. Various input devices have been classified as game controllers, such as keyboards, mice, game pads, and joysticks.
- B. Game controllers include game pads, joysticks, paddles, steering wheels, fishing rods, aircraft yokes, light guns, and rifles.
  - 1. The **joystick** is a game control peripheral that consists of a handheld stick that can be tilted around either of two axes and sometimes twisted around a third.
    - a. Players can maneuver the screen cursor by moving the joystick with one hand and pressing the button with the thumb of the other hand.
    - b. The only feedback is an occasional “blip” or “doink” noise from primitive speakers and relatively slow, jerky movements on the screen.
  - 2. A **gamepad** is the most common kind of game controller. It is held in both hands with thumbs and fingers used to provide input. A gamepad can have a number of action buttons combined with one or more omni-directional control sticks or buttons.
    - a. Most modern game controllers are a variation of a standard gamepad originally designed by Nintendo.
    - b. Newer controllers include shoulder buttons placed along the edges of the pad, centrally placed buttons (labeled start, select, and mode), and an internal motor to provide motion feedback.
    - c. Controllers for proprietary games (e.g., Nintendo’s Game Boy, Sega’s Dreamcast, and Sony’s PlayStation) became special two-handed devices, each with two one-inch joysticks and many multifunction action buttons.

3. The keyboard and mouse are typical input devices for a personal computer and are currently the main game controllers for computer games.
  - a. The computer keyboard is modeled after the typewriter keyboard and was designed for the input of written text.
  - b. A mouse is a handheld pointing device used in addition to the keyboard.
  - c. While originally designed for general computer input, several keyboard and mouse peripherals available were designed specifically for gaming, often with built-in gaming-specific functions.
4. The Racing Wheel controllers for car racing games made the experience more realistic with controls such as a brake and gas pedal. The steering wheel is used in most racing arcade games as well as in more recent racing simulators (e.g., Live for Speed, Grand Prix Legends, and GTR2).
  - a. Shifting is handled in various ways, including paddle shifting systems, simple stick shifters (moved forward or back to change gears), and more complex shifters that mimic those of real vehicles.
  - b. Many steering wheels are force feedback designed to give the same feedback as would be experienced when driving a real car.
5. A **light gun** is a pointing device for computers and a control device for arcade and video games. Gun fighting games spawned the introduction of light guns and rifles that generally resemble firearms or ray guns.
  - a. Light guns were first used in arcade games, but the first home console light gun was released for the Magnavox Odyssey in 1972.
  - b. With force feedback, many light guns can simulate the recoil of a weapon.
6. A **rhythm game controller** is a game input device that resembles a musical instrument (e.g., guitar, keyboard, drums, or maracas).
  - a. A common feature among guitar controllers are a set of five colored “fret” buttons on the neck (green, red, yellow, blue, and orange), a “strum bar” (around where the pickups on an electric guitar would be), and a whammy bar (corresponding to its real-life position) on the guitar body.
  - b. The drum kit controller features four drum pads and a kick pedal to simulate a standard drum kit set-up and is operated by striking the drums with drumsticks.
7. A **motion-sensing controller** is a game controller that contains an infrared camera and accelerometers that can track position and sense movement. A motion-sensing device is available on three game systems using different technologies that allow the user to interact with the game being played.
  - a. The Nintendo Wii remote game control communicates player movement information to the console unit via a simple Bluetooth protocol.
  - b. The PlayStation Move uses a handheld motion controller wand and the PlayStation Eye camera to track the wand’s position and inertial sensors in the wand to detect its motion.
  - c. The Microsoft Kinect hardware features a pair of depth-sensing range cameras, a system of infrared structured light sources, a multi-array microphone, and a regular RGB camera that senses player movements.

**Teaching Strategy:** Use VM–A through VM–H. Use <http://www.axess.com/twilight/> console to view the evolution of game controllers to facilitate a discussion.

**Objective 2:** Evaluate future game interaction technologies.

**Anticipated Problem:** What are the game technologies that will be available in the near future, and how will they allow gamers to interact with the game?

II. Future and evolving game interactive technologies

A. Motion-controlled games

1. Body movement control of video games, pioneered by the Nintendo Wii, will be an integral part of games.
2. Players will be able to spring their on-screen avatar into action by moving their hands, arms, and legs as well as communicate emotions to in-game characters and other players via built-in facial recognition tools.
3. With the Microsoft Kinect, the game recognizes player movements.
4. The software watches gamers' movements and translates them into on-screen video game action. It also uses the spoken word to take direction, recognizing who is playing a game.
5. In the future, with systems such as Kinect, players can have a controller experience augmented with identity of voice and gestures, with a controller that recognizes a player.

B. Cloud gaming

1. **Cloud computing** is the delivery of computing and storage capacity as a service to a community of end-recipients.
2. In the near future, it is believed the set-top box console video game systems will become a thing of the past.
3. Consoles likely will be built into the video display or a home's automation system with game companies distributing, monitoring, and upgrading games on-demand via cloud computing technologies.
4. The cloud will make gaming possible 24/7, with players able to find partners for multiplayer and cooperative games on a variety of networks.
5. Cloud gaming will become the interface that connects everything together and will allow the player to access a game anywhere and anytime.
6. Sony's new Gaikai's cloud technology will allow people to play video games on Internet-connected devices, including mobile gadgets, computers, and TVs.

C. Touch screen displays

1. **Touch screen technology** is a concept that utilizes the ability to sense when a human finger, which conducts electricity, touches it by monitoring a single frequency.

2. The Wii “U” is a touch screen controller that can display anything exactly as it is on the TV screen, including the same action but with a different camera view.
  - a. The controller employs motion sensors to change the viewing angle or the aim on the touch screen by a player moving his or her hands or body.
  - b. The player can use the touch screen as a controller since the device has the same full range of buttons and joysticks as a standard gamepad.
3. The PlayStation “Vita” is a handheld device that includes two analog sticks and a 5-inch LED screen with multi-touch capacitive touch screen. It supports Bluetooth, Wi-Fi, and optional 3G networks.
  - a. The device features a rear touch pad, two cameras (a front and a rear), stereo speakers, and a microphone.
  - b. The two cameras feature the abilities of face detection, head detection, and head tracking. In addition, they allow for customization and personalization.
4. The Xbox 720, when released, will use a touch screen controller similar to the Nintendo Wii.

**Teaching Strategy:** Use VM–I through VM–K to begin a discussion. You may want to share one of the videos in the Resources section. Have students do an Internet search on future technologies. Assign LS–A.

■ **Review/Summary.** Use the student learning objectives to summarize the lesson. Have students explain the content associated with each objective. Student responses can be used in determining which objectives need to be reviewed or taught from a different angle. Questions at the end of chapters in the textbook may be used in the Review/Summary.

■ **Application.** Use the included visual master(s) and lab sheet(s) to apply the information presented in the lesson.

■ **Evaluation.** Evaluation should focus on student achievement of the objectives for the lesson. Various techniques can be used, such as student performance on the application activities. A sample written test is provided.

## ■ **Answers to Sample Test:**

### **Part One: Matching**

1. d
2. h
3. g
4. e
5. a

6. c
7. b
8. f

### **Part Two: Short Answer**

1. A gamepad is the most common kind of game controller. It is held in both hands with thumbs and fingers used to provide input. A gamepad can have a number of action buttons combined with one or more omni-directional control sticks or buttons.
2. A motion-sensing controller is a game controller that contains an infrared camera and accelerometers that can track position and sense movement. A motion-sensing device is available on three game systems using different technologies that allow the user to interact with the game being played.

### **Part Three: True/False**

1. T
2. T
3. F
4. F
5. F
6. T

# How People Interact with Technology

## ► Part One: Matching

**Instructions:** Match the term with the correct definition

- |                    |                              |
|--------------------|------------------------------|
| a. cloud computing | e. motion-sensing controller |
| b. game controller | f. light gun                 |
| c. gamepad         | g. rhythm game controller    |
| d. joystick        | h. touch screen technology   |

- \_\_\_\_\_ 1. A game control peripheral that consists of a handheld stick that can be tilted around either of two axes and sometimes twisted around a third
- \_\_\_\_\_ 2. A concept that utilizes the ability to sense when a human finger, which conducts electricity, touches it by monitoring a single frequency
- \_\_\_\_\_ 3. A game input device that resembles a musical instrument (e.g., guitar, keyboard, drums, or maracas)
- \_\_\_\_\_ 4. A game controller that contains an infrared camera and accelerometers that can track position and sense movement
- \_\_\_\_\_ 5. The delivery of computing and storage capacity as a service to a community of end-recipients
- \_\_\_\_\_ 6. The most common kind of game controller
- \_\_\_\_\_ 7. A device used with games or entertainment systems to provide input to a video game, typically to control an object or a character
- \_\_\_\_\_ 8. A pointing device for computers and a control device for arcade and video games



## ► Part Two: Short Answer

**Instructions:** Answer the following.

1. Describe the most common interface device for video games.
  
  
  
  
  
  
  
  
  
  
2. Describe the game controller that can track position and sense movement.

## ► Part Three: True/False

**Instructions:** Write *T* for true or *F* for false.

- \_\_\_\_\_ 1. The gamepad was originally developed by Nintendo.
- \_\_\_\_\_ 2. Motion sensing uses infra red cameras and accelerometers to detect movement.
- \_\_\_\_\_ 3. The first use of a light gun was with the Nintendo SNES.
- \_\_\_\_\_ 4. A joystick is the most common type of controller.
- \_\_\_\_\_ 5. The Nintendo Wii U uses a game pad design.
- \_\_\_\_\_ 6. Kinect has voice recognition capabilities.

# TYPES OF INTERFACE DEVICES

- ◆ A game controller is a device used with games or entertainment systems to provide input to a video game, typically to control an object or character.
- ◆ A game controller is an intricate hardware device that allows game players to send instructions to a computer that can range in size from a desktop computer to a handheld proprietary game device.
- ◆ A controller connects to a game console or computer by means of a wire or cord, unless it is a wireless controller.
- ◆ Input devices that have been classified as game controllers include keyboards, mice, game pads, and joysticks.



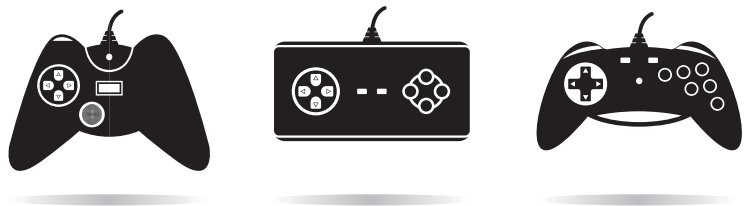
# JOYSTICK

- ◆ This joystick is a game control peripheral that consists of a handheld stick that can be tilted around either of two axes and sometimes twisted around a third.
- ◆ Players can maneuver the screen cursor by moving the joystick with one hand and pressing the button with the thumb of the other hand.
- ◆ The only feedback is an occasional “blip” or “doink” noise from primitive speakers and relatively slow, jerky movements on the screen.



# GAMEPAD

- ◆ A gamepad is the most common kind of game controller. It is held in both hands. Thumbs and fingers are used to provide input. Gamepads can have a number of action buttons combined with one or more omni-directional control sticks or buttons.



- ◆ Most modern game controllers are a variation of a standard gamepad originally designed by Nintendo.
- ◆ Newer controllers include shoulder buttons placed along the edges of the pad, centrally placed buttons (labeled start, select, and mode), and an internal motor to provide motion feedback.
- ◆ Controllers for proprietary games (e.g., Nintendo's Game Boy, Sega's Dreamcast, and Sony's PlayStation) became special two-handed devices, each with two one-inch joysticks and many multifunction action buttons.

# MOUSE

- ◆ The keyboard and mouse are typical input devices for a personal computer and are currently the main game controllers for computer games.
- ◆ The computer keyboard is modeled after the typewriter keyboard and was designed for the input of written text.
- ◆ A mouse is a handheld pointing device used in addition to the keyboard.
- ◆ While originally designed for general computer input, several keyboard and mouse peripherals available are designed specifically for gaming, often with built-in gaming-specific functions.



# RACING WHEEL

- ◆ The Racing Wheel controllers for car racing games made the experience more realistic. Some of the wheel controls include brake and gas pedals.
- ◆ The steering wheel is used in most racing arcade games as well as in more recent racing simulators (e.g., Live for Speed, Grand Prix Legends, and GTR2).
- ◆ Shifting is taken care of in various ways, including paddle shifting systems, simple stick shifters (moved forward or back to change gears), or more complex shifters (which mimic those of real vehicles).
- ◆ Many steering wheels are force feedback designed to give the same feedback as would be experienced when driving a real car.



# LIGHT GUN

- ◆ A light gun is a pointing device for computers and a control device for arcade and video games.
- ◆ Gun fighting games spawned the introduction of light guns and rifles that usually resemble firearms or ray guns.
- ◆ Light guns were first used in arcade games, but the first home console light gun was released for the Magnavox Odyssey in 1972.
- ◆ With force feedback, many light guns can simulate the recoil of a weapon.



# RHYTHM GAME CONTROLLER

- ◆ Rhythm game controllers are game input devices that resemble musical instruments, such as guitars, keyboards, drums, or maracas.
- ◆ A common feature among the different guitar controllers is a set of five colored “fret” buttons on the neck (green, red, yellow, blue, and orange), a “strum bar” (around where the pickups on an electric guitar would be), and a whammy bar (corresponding to its real-life position) on the guitar body.
- ◆ The drum kit controller features four drum pads and a kick pedal to simulate a standard drum kit set-up and is operated by striking the drums with “drumsticks.”



# MOTION-SENSING GAME CONTROLLERS

- ◆ Motion-sensing game controllers contain an infrared camera and accelerometers that can track position and sense movement.
- ◆ Motion-sensing devices are available on three game systems using different technologies that allow the user to interact with the game being played.
  - The Nintendo Wii remote game control communicates player movement information to the console unit via a simple Bluetooth protocol.
  - The PlayStation Move uses a handheld motion controller wand and the PlayStation Eye camera to track the wand's position and inertial sensors in the wand to detect its motion.
  - The Microsoft Kinect hardware features a pair of depth-sensing range cameras, a system of infrared structured light sources, a multi-array microphone, and a regular RGB camera that senses player movements.



# FUTURE AND EVOLVING GAME INTERACTIVE TECHNOLOGIES

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## Motion-Controlled Games

- ◆ Body movement controlling of video games, pioneered by the Nintendo Wii, will be an integral part of games in the future.
- ◆ Players will be able to spring their on-screen avatar into action by moving their hands, arms, and legs. In addition, they will be able to communicate emotions to in-game characters and other players via built-in facial recognition tools.
- ◆ With the Microsoft Kinect, the game recognizes your movements.
- ◆ The software is watching gamers' movements and translating it into on-screen video game action as well as using the spoken word to take direction, recognizing who is playing a game.
- ◆ In the future, with Kinect, you can have a controller experience augmented with identity of voice and gestures, with a controller who knows the player.

# CLOUD COMPUTING

- ◆ Cloud computing is the delivery of computing and storage capacity as a service to a community of end-recipients.
- ◆ In the near future, it is believed the set-top box console video game systems will become a thing of the past.
- ◆ Consoles will be built into the video display or a home's automation system, with game companies distributing, monitoring, and upgrading games on-demand via cloud computing technologies.
- ◆ Sony's new Gaikai's cloud technology will allow people to play video games on Internet-connected devices, including mobile gadgets, computers, and TVs.
- ◆ The cloud will make gaming possible 24/7, with players able to find partners for multiplayer and cooperative player games on a variety of networks.
- ◆ Cloud gaming will become the interface that connects everything together and will allow players to access their game or a specific slice of that game anywhere and at any time.



# TOUCH SCREEN DISPLAYS

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- ◆ Touch screen technology is a concept that utilizes the ability to sense when a human finger, which conducts electricity, touches it by monitoring a single frequency.
- ◆ The Wii “U” is a touch screen controller that can display anything exactly as it is on the TV screen, including the same action but with a different camera view.
- ◆ The controller employs motion sensors so you can change the viewing angle or your aim on the touch screen by moving your hands or your whole body.
- ◆ The player can use the touch screen as a controller since the device has the same full range of buttons and joysticks as a standard gamepad.
- ◆ The PlayStation “Vita” is a handheld device that includes two analog sticks, a 5-inch LED screen with multi-touch capacitive touch screen. It supports Bluetooth, Wi-Fi, and optional 3G networks.
- ◆ The device features a rear touch pad, two cameras (a front and a rear), stereo speakers, and a microphone.
- ◆ The two cameras feature the abilities of face detection, head detection, and head tracking. Also, they allow for customization and personalization.
- ◆ The Xbox 720, when released, will use a touch screen controller similar to the Nintendo Wii.

# Compare and Contrast Future Game Technologies

## Purpose

The purpose of this activity is to evaluate the different game technologies starting to become available to the masses.

## Objective

Evaluate new technologies as to game play experience.

## Materials Needed

- ◆ three copies of this lab sheet
- ◆ copy of the Resources from the teacher
- ◆ writing utensil
- ◆ access to an interactive game console (Wii, PS Move, or Kinect)
- ◆ access to a touch screen device for gaming (e.g., cell phone, iPad, or Kindle)
- ◆ computer access to an online gaming source (e.g., Microsoft Live)

## Procedure

1. Use the Resources list to locate devices/websites in the Resource section to play games on the different technology platforms (e.g., Motion Detection, Cloud, and Touch Screen).
2. Play a game or games on the system for at least 30 minutes.
3. Fill out the attached sheet with the information you find on the platform technologies and their attributes.
4. Use additional space if needed.



Game Technology:

Name of Game Played:

| Attributes                                                                                                                             | Unsatisfactory<br>(1) | Needs<br>Improvement<br>(2) | Satisfactory<br>(3) |
|----------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------|---------------------|
| Game play (Was the game enjoyable to play?)                                                                                            |                       |                             |                     |
| Interface (Was the game easy to control?)                                                                                              |                       |                             |                     |
| Visuals (Were the graphics and backgrounds well designed?)                                                                             |                       |                             |                     |
| Playability (Did the game operate as intended? Did all controls work? Did you move to new levels when you achieved the desired score?) |                       |                             |                     |
| Interactions (Did you find the technology easy to learn and to use?)                                                                   |                       |                             |                     |