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Computing for the Next Generation

Unit 0. Introduction

Revision Date: Jul 22, 2019
Duration: 1 50-minute session

Lesson Summary

Summary

Through presentations, videos, and discussion, students discover how technology has been changing and brainstorm ideas for how the next generation will have a different relationship with technology than the current generation. Students will also learn the relative measures of computer storage (KB, MB, etc.)

This is a prelude to the idea of big data and the impact of technology as well as an introductory opportunity to start to develop team norms, effective group participation and a respectful environment where every student is encouraged to contribute and share their perspective.

Outcomes

- Students describe some of the ways that technology has been changing and has generated and increased creativity in other fields
- Students brainstorm ideas for how the next generation will have a different relationship with technology than the current generation
- Students explore the improvements in picture quality as a measure of improvements in the internet overall.
- Students explain connections between computing concepts
- Students compare the relative measures of computer storage
- Students participate in groups; valuing diverse perspectives and skills.

Overview

1. Introduction (5 min) - Students journal about the different relationships each generation has with technology.

2. Activities (40 min) - Students practice organizing by relative size and create posters to demonstrate learning.

3. Wrap-up (5 min) - Posters are shared with the class.

Learning Objectives

CSP Objectives

- *EU CRD-1 - Incorporating multiple perspectives through collaboration improves computing innovations as they are developed.*
  - LO CRD-1.A - Explain how computing innovations are improved through collaboration.
  - LO CRD-1.C - Demonstrate effective interpersonal skills during collaboration.

- *EU DAT-1 - The way a computer represents data internally is different from the way the data is interpreted and displayed for the user. Programs are used to translate data into a representation more easily understood by people.*
  - LO DAT-1.A - Explain how data can be represented using bits.

- *EU DAT-2 - Programs can be used to process data, which allows users to discover information and create new knowledge.*
  - LO DAT-2.C: - Identify the challenges associated with processing data.

- *EU IOC-1 - While computing innovations are typically designed to achieve a specific purpose, they may have unintended consequences.*
  - LO IOC-1.A - Explain how an effect of a computing innovation can be both beneficial and harmful.
  - LO IOC-1.B - Explain how a computing innovation can have an impact beyond its intended purpose.
  - LO IOC-1.C - Describe issues that contribute to the digital divide.
  - LO IOC-1.E - Explain how people participate in problem-solving processes at scale.
  - LO IOC-1.F - Explain how the use of computing can raise legal and ethical concerns.

- *EU IOC-2 - The use of computing innovations may involve risks to your personal safety and identity.*
  - LO IOC-2.A - Describe the risks to privacy from collecting and storing personal data on a computer system.

Essential Questions

- How can computing and the use of computational tools foster creative expression?
- How can computing extend traditional forms of human expression and experience?
- How does computing enhance human communication, interaction, and cognition?
- How does computing enable innovation?

Teacher Resources

Student computer usage for this lesson is: **none**

Videos:

- Oracle The Information Age https://www.youtube.com/watch?v=WFgT9KCxQ0k (https://www.youtube.com/watch?v=WFgT9KCxQ0k) (3:51)
- https://www.youtube.com/watch?v=qGYmML0e0X4 (https://www.youtube.com/watch?v=qGYmML0e0X4) (2:31 - stop at 1:14)
- https://www.youtube.com/watch?v=6yWzKvQXsYM (https://www.youtube.com/watch?v=6yWzKvQXsYM) Technology In 2019 - What The Future Of Tech Looks Like! (5:51) Published on Mar 11, 2013

PowerPoints (in the Lesson Resources folder):

1. Unit0_Lesson2_The Information Age How Big.pptx
2. Unit0_lesson2_TheFuture.ppt

Students should have paper for taking notes. (If desired, use preprinted Information Age Notes, in the Lesson Resources folder)

Print out "Relative Measure Word Strips to cut" papers and "Measure Quantity Word Strips to cut" papers (in the Lesson Resources folder) and cut them into strips to give to students for the activity.

8 big sheets of big poster paper to place at the front of the room labeled:

1. communication
2. education
3. automation (robotics)
4. privacy
5. entertainment
6. transportation
7. medicine & health
8. the Internet

Post-it notes for students

Lesson Plan

Introduction - Journal and Discussion (5 min)

1. Journal: How were computers and technology different one generation ago?

2. Pair and share journal ideas, compile a class list. *(Ideas you might suggest if they're stuck: bigger, slower, less storage, less portable, not inside of so many other things, not as pervasive, less voice ability, less connection to the Internet, phones weren't very smart, more expensive, Previous generation: land lines, stand in one place when talking on the phone, separate cameras, internet via phone modem, no GPS, etc.)*

3. Prompt students to come up with their own definition of what "1 generation ago" means. (Now a generation is considered to be about 25 years. A century ago it was about 20 years - from Ancestry.com)
{optional question for thought/discussion: Why were generations shorter a hundred years ago? (don't tell them the answer, try to lead them to ask each other good questions to guide them to an

answer: shorter lifespans, more death from disease, younger marriage age
http://www.ancestry.com.au/learn/learningcenters/default.aspx?section=lib_Generation
(http://www.ancestry.com.au/learn/learningcenters/default.aspx?section=lib_Generation))}

4. Discuss the connections between what computing concepts are available and the communication, jobs and services that are available from one generation to the next.

Activities: (40 min)

Part 1 (3-4 min)

Hand out mixed up **relative measure papers** (a document with strips to cut is in the Lesson Resources folder) to 8 students.

- In order: kilobyte, megabyte, gigabyte, terabyte, petabyte, exabyte, zettabyte, and yottabyte.

Ask them to try to line up by relative size at the front of the room to display the terms from smallest to largest. Ask if the class agrees, make changes by group vote. Don't tell them if they're right yet. Tape or post the strips to the front wall.

Teacher Note: Be sure to get students' names and introduce them as part of the goal of developing a classroom community of learners. Continuously encourage positive social interactions.

Part 2 (3-4 min)

Hand out the 8 papers with **measured quantities** (a document with strips to cut is in the Lesson Resources folder).

- In order: a picture the size of your fingernail, a small novel, a symphony recorded in high fidelity sound, the whole library of congress, 5 years' worth of the data recorded by NASA earth orbit satellite, all the words ever spoken by humankind written down, all recorded TV broadcasts and movies stored as video, and amount of data the National Security Administration can store.

Ask those students to try to match themselves up with the relative measure papers. Give the class a chance to rearrange by group vote. Tape or post the strips to their relative measure paper.

Part 3 (10 min)

1. Present the PowerPoint: **Unit0_Lesson2 The Information Age. How Big.**
   - Have students take notes on the correct sequence of relative measures. (Use blank paper or Student notes for The Information Age How Big) Rearrange paper strips at the front of the room as needed to match the true order. (5 min)
2. Show the video: **The information age. Big Data is Changing the World** (3:51)
   - https://www.youtube.com/watch?v=WFgT9KCxQ0k (https://www.youtube.com/watch?v=WFgT9KCxQ0k)
3. Have groups try to guess how many people used the Internet each day in 2000 and now, how many searches were done each day on Google in 1998 and now. (3 min)
4. Show the video: 2:31 https://www.youtube.com/watch?v=qGYmML0e0X4 (https://www.youtube.com/watch?v=qGYmML0e0X4) Exalogic: Ready for the Future by

Oracle (only show the first 1:14)

Part 4 (20 min)

1. Present the PowerPoint **Unit0_Lesson2 The Future.**
2. Group students in 3's or 4's. (max of 8 groups)
   - Groups **brainstorm**: What new technology might the next generation have?
     - Ask them to think of how technology will be different for the next generation in each of these categories: communication, education, automation (robotics), transportation, medicine and health, the Internet, privacy, and entertainment. Write at least 10 ideas for each group on post it notes, 1 idea per post it. (5 min)
     - **Note:** 1 generation is about 25 years, so the previous generation was born around 1975 and went to high school around 1990. You were born around 2000, and are in high school now. The next generation will be born around 2025, and be in high school around 2040.
3. Place large **posters** at the front of the room. Take turns having groups contribute 1 post it note at a time and explain their ideas. (5 min)
   - Groups get 1 point for each unique idea that gets posted.
   - The group with the most points, when all notes have been posted, chooses the poster they want to work on. The group with the 2nd highest score chooses next, etc.
4. Point out that visual data is the most popular and largest growing area of Internet data for people. (pictures, videos) Students are going to create a visual artifact: a way to communicate an idea visually. They are welcome to use online sources for pictures or create their own.
5. Digital images can be created by generating pixel patterns, manipulating existing digital images, or combining images.
   Digital effects and animations can be created by using existing software or modified software that includes functionality to implement the effects and animations.
   Have each student create an 8 bit pixel art image that http://www.piskelapp.com (http://www.piskelapp.com) to represent one of their ideas to combine in their group project. Point out the simplicity and limitations of 8 bit art and the use of icons to represent concepts.
6. Groups design a visual artifact on their poster: a labeled drawing, concept map, cartoon (stick figures are fine), or some other visual to describe life for the next generation. Encourage students to do something visually appealing, creative, interesting, or informative. Prepare to explain how the availability of new technology connects to concepts in computing. How do computers make each area different than it was before? How do computers allow us to be more creative visually to entertain, inform and do business? (how-to videos, animated advertisements, posting pictures and videos, etc.) (10 min)

Wrap-Up (5 min)

Display the posters created by the class, share details and ideas from the posters. Have students journal or write a reflection on these key questions:

1. The team development process. How do you facilitate a positive collaborative environment where all students contribute and bring their unique perspectives to create a more meaningful product than one person alone could?
2. Impacts of technology: How have computing advances generated creativity in other fields?

Additional Activities if Time Permits:

1. Show a video on a possible work world of the future: https://www.youtube.com/watch?v=t5X2PxtvMsU (https://www.youtube.com/watch?v=t5X2PxtvMsU) (5:51)
2. Discuss what ideas are the same/different from the ideas that students shared.
3. Have a vote on the posters for most creative, most unique, best detail, etc.

Options for Differentiated Instruction

Instead of having students move to the front of the room to sort the paper strips into order, you could print a set for each group of 3-4 students and have them match and arrange them at their desks.

If students have a strong interest, or if you have extra time, use the ideas in "Extensions to the lesson on the Future of Technology" document located in the resources folder.

Evidence of Learning

Formative Assessment

Self-checking exercise on identifying storage terms (KB, MB, etc.)

Summative Assessment

Assess group dynamics. Did everybody participate? Was communication positive within groups and respectful of the different needs and perspectives of group members?

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