



Into the Darkness: A World Without Digital Communication

Unit 1. Your Virtual World

Revision Date: Jan 04, 2020

Duration: 3 50-minute sessions

Lesson Summary

Pre-lesson preparation

Students must complete a pre-reading assignment (the first chapter of *Blown To Bits*, which is available online (<http://www.bitsbook.com/wp-content/uploads/2008/12/chapter1.pdf>) or in the Resources folder). This pre-reading can be assigned at the end of Unit 0.

Summary

Students will read about the "Digital Explosion" and discuss exponential growth. They will discuss and share insights on what a world without digital communication would be like and investigate some of the things that are possible because of digital communication. They will then share their findings with the class.

Learning Objectives

CSP Objectives

- *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.

- *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.

NGSS Practices:

- 5. Using mathematics and computational thinking
- 7. Engaging in argument from evidence
- 8. Obtaining, evaluation, and communicating information

NGSS Content:

- HS-ETS1-1. Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

Key Concepts

Chapter 1 of "Blown to Bits" and the lesson motivate students to begin thinking about the advancement of technology and its impact on many aspects of their lives (both positively and negatively). Subsequent lessons will research particular impacts on society in more depth.

Students will consider a world without digital communication to emphasize the impact that computers have on their everyday lives and how integral computers and digital communication have become to our ordinary existence.

Outcomes

- Students will explain how innovation affects communication, interaction, and cognition.
- Students will explain how computing has impacted innovation in other fields defining a computing device as a physical device that can run a program. Some examples include computers, tablets, servers, routers, and smart sensors.
- Students will analyze the effects of computing including increased ability to collaborate.
- Students will explain connections between technology, and economic and social differences.
- Students will describe how widespread access to information facilitates the identification of problems, development of solutions, and dissemination of results and the lack of that access limits all of these functions.

Teacher Resources

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

TEACHER RESOURCES

In the Lesson Resources Folder:

- *Blown to Bits* – Chapter 1 reading assignment

- from: <http://www.bitsbook.com/wp-content/uploads/2008/12/chapter1.pdf>
(<http://www.bitsbook.com/wp-content/uploads/2008/12/chapter1.pdf>)
- PowerPoints: What If Part 1, What If, Part 2, What If Part 3

Prior to the Lesson:

- Provide students a copy of the “Questions to Consider” (in the resources folder) and assign the *Blown to Bits* reading assignment (above)

During the lesson, students will need:

- Student Journal

Lesson Plan

Session 1

This lesson assumes that students have either taken a previous CS course or that you have done Unit 0, so that students know what a computer is, how to write a basic algorithm, and the basic history of technology. It also assumes that students have read *Blown to Bits*, Chapter 1.

Getting Started (5 min)

Set a timer. In your journal list all the ways you communicated in the past 24 hours both in person and using technology. Give students 1 minute to list all of the ways they have engaged in communication today (verbal/non-verbal). Compile a class list of communications used.

Activity (30 min) – Form Teams and Investigate Communication and Digital Communication

Use a creative method for dividing students up into teams of 3-4 (line up by birthday, etc.)

You can use the presentation "What If Part 1" as a guide through this lesson.

- Have each team underline any communication methods that ALL team members wrote down.
- Using the Social Media Post Template handout, have students create a social media post that reflects their current status. Display these posts around the room.
- Present the scenario: what if all digital communication suddenly stopped working?
 - Encourage discussion. Have teams brainstorm a list of possible answers to the following question: "What will be impacted if digital communication is no longer an option?"
 - Define what a computing device is. (a physical artifact that can run a program. Some examples include computers, tablets, servers, routers, and smart sensors.)
- How could you check the news to find out what caused the communication issue?
 - Point out that all digital devices would no longer work because they use digital communication internally between the processor and memory.

- In your teams, create a definition of digital. (Remember, you don't have any digital devices to look it up!)
- What kinds of communication will still work? (Hint: Not the TV: all of the signals are digital.)
- Have teams try to build up a comprehensive list of the things we use that are digital.
- Have teams complete the graphic organizer of what would be different in each of these places without digital communication:

| At School | At Home | Other Places |
|-----------|---------|--------------|
| | | |

Activity (10 min) - Think-Pair-Share

Have students discuss with their partner the answers to the pre-reading questions from Blown To Bits Chapter 1 (see Questions to Consider in Teacher Resources).

Choose an open-ended question from the pre-reading questions. Either:

- give examples of things today that are stored in bits
- describe examples of innovations that are neither good nor bad
- list ways that life is more complicated because of the explosion of bits

Have partners pick their most interesting answers and post them or write them on something in the front of the room to share with the class.

Activity: (5 min)

Have students work in pairs to discuss and answer the following questions. (If possible, provide students with calculators. An exact value is not required to formulate an answer. The choices reflect three different types of growth.)

Someone offers you a summer job with a choice of three pay rates:

1. \$10 per hour for eight hours of work for day for 30 days.
2. One dollar the first day, two dollars the second day, three dollars the third day, and so on (increasing by one dollar each day).
3. One cent on day one, two cents on day two, four cents on day three, and so on (doubling each day for 30 days).

Which pay rate would you choose? Why? What does this illustrate?

Solution: After 30 days,

- The first choice nets $10 \times 8 \times 30 = \$2,400$.
- The second offer will pay \$465.
- The third offer will pay 2 to the 30th power (minus 1) cents, which is over \$10 million.

Clearly, the last choice is the best, even though it starts with the lowest value (although you are unlikely to receive such an offer!)

This activity illustrates *exponential growth* (which was discussed in the chapter in the context of data growth).

Homework:

Students may not use any digital devices to complete this activity. This assignment must be handwritten. If students need a copy of their assignment for the class discussion, they must write another copy. Have students submit their assignment at the start of the next class.

1. Have the students interview three different people, outside of the class, using the following question:
 - How would life be different if we didn't have any means of digital communication?
2. Have the students write a summary of the interview that includes the following information:
 - Summary of the responses
 - Your opinion about the responses
 - What you learned by talking to others about the impact of losing digital communication

Session 2

Getting Started (5 min)

Have students write in their journals: What is the most important digital device in your life? Why is it the most important?

Activity (15 min) - Develop a Communication Plan

Use the presentation "What If Part 2" to remind the students about the scenario from the previous class. Working in the same teams from the previous class, have the students develop a step-by-step plan for getting a message to their parents without using any form of digital communication. This activity must be completed without using any digital tool.

Activity (30 min) - Discussing The Impact of Digital Communication

Teams brainstorm and organize ideas about the impact of digital communication. This activity uses the results from the Day 1 homework.

Discussion: Students work in their teams to answer the following questions:

1. How have the Web and the Internet changed the way people communicate and collaborate? (be sure to include email, SMS, online problem solving, data gathering and analysis & chat)
2. How does the impact of computing innovations differ between national and socioeconomic groups?
3. Describe a way in which social media has changed the way people communicate in the U.S.
4. In what ways have the Internet and the Web changed health care, access to information, entertainment, and online learning? How do these changes vary in different parts of the world?
5. Describe how two groups (e.g., in different geographic regions, from different cultural backgrounds, in different socioeconomic classes or different work industries) are impacted differently by social media and online access.
6. Describe how the impact of social media and online access differs in two different countries.
7. How does digitally enabled collaboration enhance human capabilities?

Homework

Each member of your team should choose one of the following topics:

- Science
- Art
- News
- Music
- Government
- Business

*Note – these topics are just suggestions

In the following question, fill in the blank with your chosen topic. Write a paragraph responding to the question. Be sure to include examples and evidence to support your ideas and answer.

- How does _____ depend on computers?

Session 3

Warm up / Activity 1 (35 min) - A Short Story

Imagine that the digital world that we know now never existed. There are no computers or cell phones -- no digital communication at all. Write a short story that takes place in this non-digital world. Include how your characters would communicate in different situations and how daily life would be. Be as creative as you can.

If time permits, have a few students share their stories.

Activity 2 (15 min) - Reflections

For this activity, students need to use their last social media post the created on Day 1.

Journal - Hooray! Digital communication has been restored after three years. Look at your last social media post, and think about the following questions.

1. How could a stranger interpret your last digital footprint? Was it positive, negative, or neutral?
2. How could you change your post to leave a more positive digital footprint?
3. What would be your first social media post now that digital communication has been restored?

Have students discuss their reflections with an elbow partner.

Options for Differentiated Instruction

Consider different ways to choose teams and assign team roles

Interview with a User of an Enhancing Technology

If you are familiar with an individual who benefits from an abilities-enhancing innovation or a technology that helps the individual overcome a disability, interview the person about the impact the technology has had on his or her life. Ask them questions about how the innovation works, how

it has affected the way they live (the ways in which they play or work). Ask about how it has affected their family and friends. If possible, record the interview. Ask for permission to share with your classmates or to post online.

Speculate about Today's Innovations

Select a recent innovation - something recently in the news. Predict the impact that this innovation will have on individuals. Predict any societal impacts you can foresee. Label the impacts as positive or negative. Explain your reasons for the label.



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