WHAT’S YOUR MAIN ATTRACTION?

AMATYC Annual Conference
November 2018
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Karen Starin and Elizabeth Betzel
The term "21st-century skills" is generally used to refer to certain core competencies such as collaboration, digital literacy, critical thinking, and problem-solving that advocates believe schools need to teach to help students thrive in today's world.

“How Do You Define 21st Century Learning?’

Education Week
October 2010
DIGITAL LITERACY

The American Library Association's digital-literacy task force offers this definition: "Digital literacy is the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills."

1. Finding digital content
2. Creating digital content
3. Communicating or sharing it
The 21st Century Classroom

- Survey of 2,000,000 classrooms (Dr. Robert Marzano)
- “What instructional strategy is being used in U.S. classrooms?”

- 57% Practicing and Deepening New Content
- 37% Interacting with New Content
- 6% Cognitively complex tasks involving generating and testing hypotheses
## The 21\textsuperscript{st} Century Classroom

<table>
<thead>
<tr>
<th>Group Space (In Class)</th>
<th>Individual Space (At Home)</th>
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<tbody>
<tr>
<td><strong>Transmission of information</strong> (Interacting with new material)</td>
<td><strong>Assimilation of information</strong> (Practicing and Deepening)</td>
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<td><strong>Direct instruction</strong> (Interacting with new material)</td>
<td><strong>Practice, Application, Analysis</strong> (Practicing and Deepening Higher Order Skills)</td>
</tr>
<tr>
<td>Teacher lectures and works problems at the board (Interacting with new material)</td>
<td>Students work problems and complete assignments (the <strong>HARD</strong> part) (Practicing and Deepening)</td>
</tr>
<tr>
<td>Students passively take notes (the <strong>EASY</strong> part)</td>
<td>☺ No help from teacher or classmates</td>
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THE 21ST CENTURY CLASSROOM

Blooms Taxonomy

At Home

Problem-Solving & Critical Thinking

In Class
21st Century Learning Requires a Flipped Approach

In Class

- creating
- evaluating
- analyzing
- applying
- understanding
- remembering

Problem-Solving & Critical Thinking

At Home

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21st Century Learning Requires a Flipped Approach

“Flipped Learning occurs when direct instruction is moved from the group teaching space to the individual learning environment. Class time is then used for higher order, active problem solving by students and one-to-one or small group interactions with the teacher.”

(http://flippedlearning.org/Page/1)
### 21st Century Learning Requires a Flipped Approach

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<tr>
<td>Students view video lectures</td>
<td>Students engage in active learning - work problems and complete assignments (the HARD part)</td>
</tr>
<tr>
<td>Students passively take notes (the EASY part)</td>
<td>😊 With support of teacher &amp; classmates</td>
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Adapted from ‘Flipping the College Classroom’ Webinar, Robert Talbert, [http://www.youtube.com/watch?v=8nRCeZh0sMQ](http://www.youtube.com/watch?v=8nRCeZh0sMQ)
Flipped Learning: a digital platform for 21st Century skills
21st Century Technology Delivers the Direct Instruction

- Video lectures
- ‘Borrow’ videos
  - Publisher’s resources
  - Existing YouTube videos
  - Khan Academy
- Make your own
  - Your own YouTube channel
  - Vittle, Screencast-O-Matic
  - your school’s LMS
USE 21ST CENTURY TECHNOLOGY WISELY

- Keep videos short and focused
- Directly align videos with guided notes
- When possible, record your own videos
- Use humor & animate your voice – get excited!
- Work with a partner
- Less text, more pictures
- Ensure A.D.A. accessibility
21st Century Students Don’t Do Optional: Course Design not a Teaching Strategy

- Require students to watch videos
  - Insert videos in online HW system
  - Daily quiz or entrance ticket
  - Embed questions within videos

- Require students to take notes
  - Guided notes
  - Note-taking system
21st Century Group Space: Collaboration, Critical Thinking, & Problem-Solving

- Dynamic, interactive learning environment
- Only one requirement – no lectures!!!
- Some possibilities:
  - Active learning
  - Collaborative activities
  - Projects
  - Peer instruction
  - Inquiry-based learning
  - Retrieval assessments
GROUP ACTIVITY – ASSESSING NORMALITY WITH THE TI CALCULATOR

Outside of class – Watch a short video on how to assess normality of data

- Check for outliers
- Check for skewness
- Check to see if data is multi-modal
- Check normal quantile plot
GROUP ACTIVITY – ASSESSING NORMALITY WITH THE TI CALCULATOR

- In class – Analyze six datasets through the use of summary statistics, graphs (histograms, boxplots), and normal quantile plots to determine if samples are from populations that are normally distributed

- Students create, evaluate, and analyze in the group space...where the collaboration, critical thinking, and problem-solving takes place!
Hopefully, students react like "Success Kid" and not Dwight...
ADDRESSING BLOOM’S TAXONOMY

- Analyze – Draw connections among ideas
  - Differentiate, organize, relate, compare, contrast, distinguish, examine, experiment, question, test

**Compare** and **contrast** the histogram and boxplot...what important feature of the histogram does not appear in the boxplot?
ADDRESSING BLOOM’S TAXONOMY

- Evaluate - Justify a stand or decision
  - Appraise, argue, defend, judge, support, value critique, weigh

**Defend** whether the data came from a Normal population using the appropriate graphs and summary statistics. Give **supporting** evidence.
ADDRESSING BLOOM’S TAXONOMY

- Create – Produce new or original work

  Design, assemble, construct, conjecture, formulate, author, investigate

  **Construct** graphs, **investigate** and **conjecture** whether data is from a Normal population

![Graphs showing data analysis examples](image-url)
GROUP PROJECTS

- Choose a data set (instructor may want to provide suggestions of where to find data)
- **Formulate** hypotheses
- **Test** hypotheses
- **Construct** appropriate graphs
- **Produce** summary statistics
- **Support** conclusions
- **Communicate** results
GROUP ACTIVITIES/PROJECTS – THOUGHTFUL PLANNING TO FOSTER ACCOUNTABILITY AND SUCCESSFUL GROUP DYNAMICS

IN SCHOOL YOU HAVE EVER DONE

when I die, I want the people I did group projects with to lower me into my grave so they can let me down one last time
**Some Suggestions**

- Create interdependence
  - Ensure projects are sufficiently complex that students must draw on one another’s knowledge and skills.
  - Create shared goals that can only be met through collaboration.
  - Limit resources to compel students to share critical information and materials.
  - Assign roles within the group that will help facilitate collaboration.
Some Suggestions

- Devote time specifically to teamwork skills
  - Emphasize the practical importance of strong teamwork skills.
  - Establish ground rules.
  - Incorporate process assessments.
  - Alert students to common pitfalls.
  - Set interim deadlines.
  - Provide structure and guidance to help students plan.
  - Address negative or inaccurate preconceptions about group work.

- Build in individual accountability
  - Individual quiz
  - Individual submission to complement group submission
COLLABORATIVE ACTIVITY: TEST REVIEW

In Class Jigsaw Test Review (20 students)
Mix Up usual groups:

1. Have students count off by 4s (this gives 4 groups with 5 per group)
2. Have each group count themselves off 1 through 5
3. Randomly select a number from 1-5 to create a fifth group then all 5 groups have 4 students.
4. Hopefully, talent and students mixed up well.
COLLABORATIVE ACTIVITY: TEST REVIEW

Group Instructions:

1. All have to work on the five problems assigned to their group.
2. Each group member has to present one problem to the class.
3. The group can opt to give me one problem to present or someone in the group can present two.
4. I check all solutions before start of presentations.
1. Given \( f(x) = 8x \) and \( g(x) = 7x^2 + 3 \), find the following:

   a) \( (f \circ g)(4) \)
   \[
   7(4)^2 + 3 = 115 \\
   8(115) = 920
   \]

   b) \( (g \circ f)(2) \)
   \[
   8(2) = 16 \\
   7(16)^2 + 3 = 1795
   \]

   c) \( (f \circ f)(1) \)
   \[
   8(1) = 8 \\
   8(8) = 64
   \]

   d) \( (g \circ g)(0) \)
   \[
   7(0)^2 + 3 = 3 \\
   7(3)^2 + 3 = 66
   \]
11. Solve algebraically WITHOUT USING LOGARITHMS.

a) \[ 7^{-x} = 343 \]
\[ 7^x = 7^3 \]
\[ 7 = 7 \]
\[ x = \frac{3}{x} \]
\[ x = -3 \]

b) \[ \left( \frac{4}{3} \right)^x = \left( \frac{64}{27} \right) \]
\[ \left( \frac{4}{3} \right)^x = \left( \frac{4^3}{3^3} \right) \]
\[ \left( \frac{4}{3} \right)^x = \left( \frac{4}{3} \right)^3 \]
\[ x = 3 \]

c) \[ 27^{3x} = 9^{x+3} \]
\[ 3^{3(3x)} = 3^{2(x+3)} \]
\[ 3^9 = 3^{2x+6} \]
\[ 9x = 2x + 6 \]
\[ -2x = -2x \]
\[ 7x = \frac{6}{7} \]
\[ x = \frac{6}{7} \]
7. The function \( f(x) = \frac{4}{5-x} \) is one-to-one.

a) Find the inverse of \( f \).

\[
5 - y \cdot x = \frac{4}{5 - y} \cdot (5 - y) \\
5x - yx = 4 \\
-5x + yx = 4 \\
-x = 4 - 5x \\
f^{-1} = \frac{4 - 5x}{-x} \quad x \neq 0
\]

b) Find the domain and range of \( f \) and \( f^{-1} \).

Domain \( F \): \((-\infty, 5) \cup (5, \infty)\)
Range \( F \): \((-\infty, 0) \cup (0, \infty)\)

Domain \( F^{-1} \): \((-\infty, 0) \cup (0, \infty)\)
Range \( F^{-1} \): \((-\infty, 5) \cup (5, \infty)\)
21st Century Students Must Buy-In to The Process

- Sell it on the first day of class
- Sell it throughout the semester
- Explain how the brain learns – how does durable learning take place?
- Teach the importance of 21st century skills
- Consider using student contracts
This Is Where Our Future Lies...

We are doing something in the classroom that cannot be duplicated via technology.
Flipped Learning Network

- Flippedlearning.org
- Tens of thousands of “flipped” educators across the country
- Professional learning opportunities – webinars, conferences, etc.
- Research and clearinghouse for distributing promising practices for “flipped” educators
FLIPPED LEARNING CERTIFICATION

Certification for...

Beginning Educators

Educators who are new to flipped learning and want a step-by-step roadmap to start flipping their classrooms.

Quickly learn the fundamentals, best practices, and right technologies to avoid the novice mistakes.

http://flglobal.org/getcertified/

Experienced Educators

Educators who are experienced with flipped learning and want to update their knowledge with the latest global research and best practices.

Confirm and validate your skills to administrators and peers. Distinguish yourself as a Flipped Learning Certified Educator.

Transitioning Administrators

Administrators who are considering implementing flipped learning and need to master the basics.

Quickly learn the fundamentals every administrator needs to know to select the right teachers, trainers, and technology to ensure a successful implementation in your school or district. Avoid costly and embarrassing technology purchasing mistakes.

http://flglobal.org/getcertified/
Questions?

Thanks for coming!

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