QUESTION & REVIEW:
HIGHER ORDER QUESTIONS
GAMES

Declarative Knowledge Level

EAST CAROLINA UNIVERSITY
First Impressions

- How do I gauge student content knowledge?
- How do I encouraging students to make deep connections?
- What activities engage students in the learning process?
Higher order thinking ["H.O.T."] involves processing information derived from research or text, articulating it to others, and synthesizing it in a format that shows an understanding beyond rote memorization. Promoting higher order thinking in the classroom requires students to seek answers and arrive at their own conclusions. Over time, the consistent use of higher level questioning helps students with explaining, defending, analyzing, and evaluating their own perspectives.

Higher order thinking skills encourage the brain to produce responses that illustrate an individual’s internal understanding of a concept beyond a basic level.
A traditional pitfall that instructors frequently fall into is using basic questioning strategies that only required students to recall what they were directly taught. This type of questioning does not take into account the brain’s ability to analyze, evaluate and create responses.

By answering higher levels questions, a student can prove that he/she understands and has internalized the concept being taught.

Higher order questions are also called open-ended, interpretive, evaluative, inquiry, inferential, and synthesis questions (Cotton, 2001).
1. **Examples of Activities that Promote Higher Order Thinking** - This reference contains activities that can be modified for various grade levels to accommodate multiple intelligences.

2. **Stemming** - This process uses sentence stems to promote higher order thinking among students. It can be used in large groups or small.

3. **Bloom’s Ball** - This strategy uses a teacher-made ball with revised Bloom's Taxonomy
questions on it. The instructor should allow students to pass the ball around the room. When a student catches it, he/she has to delve deeper into the topic by using the higher order question that is located on the top of the ball. This is a quick way to ensure deeper responses and check students for their use of higher order thinking.

4. **Comparing, Classifying, Structural Analysis, Supported Induction/Deduction, Error Analysis, Construct Support, Extending, Decision Making, Investigation, Systems Analysis, Problem Solving, Experimental Inquiry, and Invention**  
   *pp. 88-90*

5. **Instructional Resources for Higher Order Skills:**
   
   - What are they?
   
   - What do they look like?

6. **Debates**- Debates are centered around central questions or issues and require students to use higher order thinking skills in order to create successful cases. These activities can take place across various curricula and provide students the opportunity to display their thought processes and reasoning skills.

7. **Whole Class Discussions / Socratic Seminars**- This website features information, commentary, and research regarding the quality of student responses, the mechanics of in-class discussions, and misuses of New Bloom’s Taxonomy within the scope of higher order thinking questions in classroom discussions.

8. **Digital Is: National Writing Project**- This site contains examples of higher order thinking projects for writing.

9. **Book Sales: Project**- This activity hones students’ abilities to produce meaningful arguments using compare/contrast argumentative skills...cross-curricular studies.

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**Read and Respond**

Click on the notepad and respond to the following questions. Share your responses.
“Complex, real-life problems often demand complex solutions, which are obtained through higher level thinking processes. Teaching higher order thinking, then, provides students with relevant life skills and offers them an added benefit of helping them improve content knowledge, lower order thinking, and self-esteem” (DeVries & Kohlberg, 1987; McDavitt, 1994; Son & VanSickle, 1993).

Engaging students in the learning process should be the focus of each lesson a teacher designs. Being part of the learning process not only enhances discussions and responses; it also creates a classroom culture where students hold...
themselves accountable as partners in learning and establish high expectations for themselves and their classmates.

Teaching and promoting higher order questions in the classroom transforms the learning process by encouraging students to formulate deep connections to the information with which they are presented, creating learners who can analyze, evaluate, create, and question sources. This process teaches students how to think, rather than what to think: the ultimate goal of education.

Students who are taught via higher order questions are able to make connections within and outside presented information, which helps them understand content on a deeper level and retain that information. Using higher order thinking questions in lesson planning provides models for students that create blueprints for how they should go about connecting with material.

Teaching students how to use higher order questions for themselves ensures that they are equipped with the tools needed to be successful learners across multiple disciplines, thereby increasing achievement, proficiency, and growth.

Finally, students that have been taught higher order questioning are able to synthesize information and situations that they encounter in their academic and professional life, making them more successful and marketable as 21st century citizens.

General Benefits

- Benefits of Higher Order Thinking: All Students

Benefits for ELL Students

- Benefits of Higher Order Thinking on ELL Students

Benefits for At-Risk Students

- Benefits of Higher Order Thinking on At-Risk Students
  [http://www.ncrel.org/sdrs/areas/issues/students/atrisk/at600.htm](http://www.ncrel.org/sdrs/areas/issues/students/atrisk/at600.htm)
Question 1 of 2
Which of the following does NOT require students to use a higher order thinking skill?

A. Recall the primary author of the Declaration of Independence.

B. Compose a response to the Declaration of Independence from the perspective of the British.

C. Compare the Articles of Confederation to the United States Constitution

D. Examine the United States Constitution to determine which of its features have allowed it to be a “living document” that has lasted for over 200 years.
CHAPTER 2

GAMES: PBL & SIMULATIONS

First Impressions

How has the “gamification of learning” helped us understand the effectiveness of problem-based learning (PBL) and simulations?

How are teachers able to capitalize on students’ identities to create motivating lessons?
Increasing student engagement is a nation-wide imperative supported by the Common Core State Standards and other research linking engagement to higher academic and literacy achievement. James Gee’s recent research on how learning should be more like video games (2005b, p. 37) manifests the literacy practices approach, primarily because both models view literacies as an amplification of social practices and are supported by new research on cognition and motivation (2005c). Games, Gee explains, are learning simulations: “[...] a game such as Full Spectrum Warrior is a game when I buy it off the rack, but it is a serious learning tool when a soldier ‘plays’ the professional-training version” (Gee, 2005a, p. 2).

Objectives:
Students will be able to . . .

1. Identify two general strategies supported research on gaming.

2. Define and give examples of PBL and simulations.

3. Describe the benefits of teaching with PBL & simulations.

4. Distinguish between examples and non-examples of PBL & Simulations

5. Articulate the purposes for incorporating simulations and PBL activities into classroom instruction.

Definition & Purpose
in an addictive learning context like *Skyrim*, adolescents assume multiple roles, each one being developed in accordance with a complex and prescribed environment and various narratives. Surviving means relying on a distributed information system: multiple imbedded and online texts, a complicated resource and navigation system, and multimodal conversations with peers who are also playing the game or observing.

In this respect, games may be better sites for preparing workers for modern workplaces than traditional schools. However, in the end, the real importance of good computer and video games is that they allow people to re-create themselves in new worlds and achieve recreation and deep learning at one and the same time (Gee, 2003 p. 3).

**Gaming as a heuristic for classroom learning**

Many interactive and immersive classroom experiences it turns out, look a lot like a game. Thus, in constructing engaging curriculum, educators can think through the principles that make a game successful. In Gee’s book, *What Video Games Have to Teach Us About Learning and Literacy* (2003), the author explains 36 learning principles that games concretize. A few that most closely align with the literacy practices approach include:

**Identity:** “[P]layers become committed to the new virtual world in which they will live, learn, and act through their commitment to their new identity.”

**Interaction:** “Nothing happens until a player acts and makes decisions.”

**Agency:** Players “feel a real sense of agency and control.”

**System Thinking:** “Games encourage players to think about relationships, not isolated events, facts, and skills (2005b, p. 36-37).

Read Andrew James’ article in *Edutopia*, “Get Your Game On: How to Build Curriculum Units Using the Video Game Model.”

**Two Types of Learning Strategies that Align with Gaming Principles**

Two types of learning strategies align with gaming principles:

1. simulations
2. problem-based learning (PBL)

In each of these learning scenarios, adolescents assume multiple roles, each one being developed in accordance with a
complex and prescribed environment and various narratives. Additionally, students have to rely on a distributed information system: multiple imbedded and online texts, a complicated resource and navigation system, and multimodal conversations with peers who are also playing the game or observing.

**Simulations Definition**

An educational simulation conveys an experience in which a learner goes through a sequential or non-sequential series of events that models or emulates a real-world scenario. The experience does not represent the entire complexity of a learning experience; it highlights the salient parts, however.

Educational simulations are used for a variety of purposes: they engage students, are memorable, and package complex learning.

*Components of a successful role-playing simulation game* include an Issue, Players/Roles, Context, Rules, Enactments, and Outcomes.

1. **Issue**: A controversy, problem or conflict that must be resolved, a decision that must be made, or a course of action that must be determined.

2. **Players/Roles**: A variety of roles that are representative of stakeholders in the issue. These need to be individual roles, but they can be played by a small group, for example. In model U. N. simulations, a single individual represents a whole nation. However, the nation is treated as a single individual for the purpose of the simulation.

3. **Context**: Context includes the information provided for the participants, which might include background on the issue or documents pertaining to its impact and scope. It also includes the situation of the issue within a larger social, cultural, or historical framework.

4. **Rules**: The rules might also be thought of as guidelines. They constrain the activity to keep the game meaningful for participants. You might insist that over the course of the role-playing simulation all participants act with the role during class time, for example.

5. **Enactment**: The enactment of the game includes all activities and products in which participants engage over the course of the simulation. These might include research on their roles, the issue, or the context; the creation of written papers, Web sites, MOO environments, or other compositions; and, of course, real-
time discussion. It is important to get a sense of an individual participant's take on the issue before assuming a role in the simulation.

6. Outcome: How will the simulation end? What does the action build toward, and how does it conclude? How can participants evaluate the effectiveness of the simulation in developing their own thinking and practice? How can we represent the learning that has occurred?
Examples of Simulations

1. Civilization III:

Students are required in this game to plan, manage, and compete with other civilizations. Students will learn about system of governments, geography, and about different civilizations historical leaders. This game requires students to use their problem solving skills to build their civilization while learning what cause the rise and fall of empires.

2. Who Killed William Robinson:

A great murder mystery surrounding the beginnings of BC settlement. This online site provides information about the real murder or William Robinson. Students must examine the evidence and decide who is the potential murderer. A great resource for both Law courses and Social Studies 10.

3. Cariboo Gold Rush Game:

Students are required to stake a claim and successfully mine for gold during the period of the Cariboo Gold Rush. This simulation is online and provides fact regarding costs of equipment, the different stop towns, the Cariboo road and helpful guides.

4. Age of Empires III:

This game also allows students to learn about the causes of the rise and fall of empires from all over the world. Students are able to strategize based on military, resource development, and expansion.

5. Oregon Trail:

Students will learn what it is like to travel as a western settler. They will understand more about the geography of the Americas while learning about the impact humans have on the environment. This would be great for students studying early American settlement.

6. Where In Time is Carmen Sandiego?:

Just like the old TV show, this classic game showcases many historical events, people, and places. Students will attempt to thwart Carmen Sandiego as she steals relics from history. This will
showcase problem solving skills and will help them learn historical facts.

7. **Pharaoh:**

Pharaoh is a strategy game where students are building Egyptian civilizations. The game involves Egyptian mythology, conflicts, leaders, and vocabulary. This would be a great addition to a unit on Egypt.

8. **Making History:**

Making History is also a strategy game that allows students to work through the time period just before World War Two. Students will make alliances, build weapons, command troops, and manage international relations. Students will understand the impact of their political decisions on diplomacy, aggression, and international relationships. Great simulation for Social Studies 11 or History 12.

7. **Railroad Tycoon II:**

This game allows students to learn about the railroads and the basics and running a business. Students could build track, manage resources, and buy and sell companies within a virtual stock market. This game would be perfect for an Entrepreneurial class or Social Studies 10 during the study of the railroad.

8. **Law & Order:**

This is a great simulation game that is based on the TV show. In this simulation game students are searching for clues and building a case that will be taken to court. This game allows students to learn about the legal process as well as the ins and outs of the legal system. This game is perfect for Law 12 or Social Studies 11 unit on government and the legal system.

9. **Sim City 4:**

This was one of the first simulation games that had widespread success. Sim City allows for students to manage finances, growth, resources in a city. Students can build cities in all types of environments. This game allows students to gain an understanding on human impact on the environment and also how citizen are effected with the growth of a city. This game would be best suited for geography or a sociology course.

**Problem-Based Learning (PBL)**

Problem-based learning is a student-centered pedagogy in which students learn about a subject and develop critical thinking by helping to improve a situation that presents perplexity or difficulty.

PBL is based on the principle that students learn best by experiencing and solving real-world problems. With project-based learning, students adopt a role in which they solve realistic problems as they would in the real world, teachers serve as facilitators of inquiry and reflection and students work
individually, in pairs, or in larger groups (Barron & Darling-Hammond, 2008; Thomas, 2000),

After a realistic problem is identified, a system of accountability is set up for the students. The outcomes—portfolios, white papers, presentations, etc.—should be identified before students problem solve.

A procedure for setting up the problem for students (adapted from Hung, 2008) is as follows:

1. Define the Content. What do you want students to learn by the end of the assignment? At the start of a PBL assignment, teachers should provide students with clear and challenging criteria or guidelines for success, using rubrics and examples that demonstrate intended learning outcomes from local professionals or former students (Ertmer & Simons, 2005; Barron & Darling-Hammond, 2008).

2. List Possible Problems. Select the problem or project that best presents the content objectives and that will be appealing and relevant to learners.

3. Calibrate Your Project. To make the problem more realistic, add time, budget, or location constraints that might occur in an authentic professional situation.

4. Describe the Task. To create a description of the task, remove information from the most viable problem solution from Step Four. If researching or reasoning a critical piece of information is beyond students’ problem-solving skills, this information should be presented to the learners rather than have them struggle to learn it.

5. Reflect on the Learning. Reflect students’ learning by including multiple opportunities to check their progress in the initial assignment and adjust instruction accordingly (for example, let them know they need to keep a journal and report to their supervisor on a weekly basis). The final assessment should also be clearly described in the assignment (for example, a final report, presentation, or follow-up question or problem) and should allow learners to reflect upon their overall learning and problem-solving process.

Interactive 2.1
Examples of PBL learning activities

Cynthia J. O’Hora’s web site
Simulation software

- Physics Abstraction Layer
- SimPy
- CircuitLogix
- Sim City
- SIMUL8
- The Stock Market Game
- Constitutional Convention Simulation

Real Life Examples

Jeopardy Review Game for A.P. Language Arts
Game On: Increasing Learning Through Online Games

Free PowerPoint Games by Complabteacher at Dallas ISD
http://www.schooltube.com/video/8645e01e181e609979fc/
**Benefits of Simulations**

Simulations have been shown to do the following:

- positively impact learning
- positively impact learner motivation (Duffy & Cunningham, 1996)
- produce “high-quality learning,” (Forinash, & Wisman, 2001.)

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**Benefits of games, PBLs and simulations**

1. Positively impact learning.
2. Positively impact learner motivation.
3. Vocabulary development.
4. Produces high quality learning.
5. Aids in long term retention.
6. Improves problem solving skills.
7. Improves students’ attitudes toward learning.

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Balloons and Static Electricity from [http://phet.colorado.edu/en/simulation/balloons](http://phet.colorado.edu/en/simulation/balloons)
PBL offers the following benefits:

- Aids long-term retention of content
- Helps students perform as well as or better than traditional learners in high-stakes tests
- Enhances problem-solving and collaboration skills
- Improves students’ attitudes towards learning (Strobel & van Barneveld, 2009; Walker & Leary, 2009.)

http://21centuryedtech.files.wordpress.com/2012/01/pbl9.jpg
• Section 4 •

Resources


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