Running Head: CONSTRUCTIVIST LESSON

Digital Constructivist Lesson: Becoming an Expert

Stephen Hawkins-Bogle

Student, MET Program

University of British Columbia

Submitted to:

Diane Janes

Faculty, MET Program

University of British Columbia

April 3rd, 2011

Digital Constructivist Lesson: Becoming an Expert

Preamble

The following lesson entitled “Becoming an Expert” is a computer based, online learning project for students to research their own unique questions regarding scientific phenomena. The lesson occurs over several days whereby students are responsible for deciding upon a conceptual question to investigate, researching digital and print materials, taking and organizing notes into categories, organizing a reference list, and finally, presenting their answer to the original question using the digital poster technology of Glogster EDU. Glogster EDU provides students with the ability to create multi-media products of their learning, making the use of multi-media an implicit, or hidden curricular objective of this lesson.

This lesson is built upon the constructivist instructional model of Assessment for Learning (AFL) that is based on the Conceptual Change Model (CCM) of Posner et al (1982). The six big strategies of AFL (Koehn, 2008) and the principles of CCM will be used to create a rubric to measure the constructivist merits of the lesson. As this lesson occurs over several days, the following detailed plan occurs after students have composed their questions, researched their ideas, categorized their notes and are ready to present their findings in a multi-media digital poster (Glog). The lesson that follows includes a student/teacher co-created rubric to assess student learning. This will follow with a personal reflection of my lesson, including criteria (rubric) that can be used to evaluate this lesson.

Becoming an Expert

Lesson: Digital Poster Creation

Grade/Age: Grade 5/6, or age 10-14
Adaptable for other ages

Unit: Becoming an Expert

Duration: 1 hour, ongoing

1. Learning/Performance Objectives

(Lesson objectives in bold/italics)

Learning Objectives:

1. To inquire and analyze information to answer questions pertaining to scientific phenomena.
2. To judge and evaluate scientific information culminating in a conclusion.
3. ***To use digital technologies and multi-media as artifacts demonstrating knowledge and understanding.***
4. ***To use ongoing, descriptive feedback regarding learning to feed learning forward.***

Performance Objectives:

1. For students to gather and categorize information from multiples sources including print and digital.
2. For students to analyze and evaluate the gathered materials to form an answer to the prescribed question.
3. ***For students to create a digital poster (glog) as artefacts of learning.***
4. ***For students to provide and accept self, peer, and teacher feedback regarding learning based on* established and co-created criteria.**

2. Resources:

- Computer/internet workstations
- Student journal/notebook
- Access to student glog accounts: http://edu.glogster.com/login/
- Access to online media: Google images, Google video, flickr, YouTube
- Student scanned documents, images, video, and audio files
- Project checklist and rubric

3. Prior Knowledge

- Students are answering a question pertaining to scientific phenomena that they wish to uncover. As this is a choice project, students' interest in topics provides relevance and some prior understanding.
- Students have investigated their concepts (questions) and have gathered and categorized information to inform the answer to their question.
- Along with their teacher, students have co-created a checklist regarding what an accomplished project will include. A rubric based on the same content has been created for project assessment, and the students have access to both the checklist and rubric online.
- Students have created glog accounts, and have learned how to add text, images, video, audio, and animations to their glogs.
- Students know how to use Glogster's portal to view their classmates' glogs, and to access the checklist and rubric.

4. Lesson Activities

Student Activities

- Students are entering their research (information) into their glogs to answer their unique conceptual questions.
- Students' information includes text, audio, video, graphics, and animations.
- Students are using the project checklist to self-assess the creation of their glog.
- Students are using the project checklist to provide each other with feedback regarding their glogs.
- Students are using this checklist feedback from self, peer, and teacher, to improve their glog design.

Teacher Activities

- Teacher is circulating and assisting students' entry of multi-media information into their glogs.
- Teacher is answering questions regarding the checklist and rubric.
- Teacher is providing students with descriptive feedback regarding their project design.
- Teacher is monitoring students' ongoing design of their project using feedback from others.

5. Questions to Support Learning

- Class Discussion:
  - Have you discovered new ideas and information as you sought the answer to your questions?
  - Do you feel that you have answered your question thoroughly?
  - Would you call yourself an expert on this topic?
  - Do you think your question could have been written differently?
  - Did this research uncover any other mysteries that you would like to solve?

6. Rubric Evaluation and Assessment Checklist (see attached)

7. Methods of Inclusion and Differentiation

- Students research conceptual questions of their choosing, thus, this project allows for personal interest.
- This project can be modified from a conceptual question to answer to a presentation about a specific thing or phenomena. A student with a learning or intellectual difficulty, for example, might chose to do a project regarding polar bear habitat, rather than figuring out why the bears population is declining.
- The technology (Glog) and tools used to gain information (e.g., Google) are user friendly, but alternatives including Power Point and print materials can be used.

8. Post-Lesson Activities

- Following feedback from self, peers, and teachers, students will have prepared their final product that answers their conceptual scientific question.

- Students will be led through a lesson on presentation skills and will be using the SmartBoard to present their learning.
- The technology of glogs may be used for future work with these students, including the development of electronic portfolios.

Attachment: Evaluation and Checklist

Becoming an Expert: Evaluation

Question

- ☐ Question being addressed is clearly stated in project
- ☐ Question is clearly answered in project
- ☐ Question is not easily answered without research
- ☐ Question is based on a branch of science

Accomplished: All Criteria Met Fully
Fully Meeting: Three Criteria Met Fully
Meeting: Two Criteria Met Fully
Not Yet Meeting: One or Less Criteria

Information

- ☐ Information from multiple sources are used to answer question
- ☐ Information is confirmed with peer reviewed resources
- ☐ Information is in multiple forms including text, audio, video, and graphics
- ☐ Information is accurate, neat, and grammatically correct.

Accomplished: All Criteria Met Fully
Fully Meeting: Three Criteria Met Fully
Meeting: Two Criteria Met Fully
Not Yet Meeting: One or Less Criteria

Design

- ☐ The digital design includes at least three sources of media to answer question
- ☐ The design is appealing, organized, and makes good use of space
- ☐ The design only contains information that pertains to the question
- ☐ Design choices including background, colour, and images, are suitable

Accomplished: All Criteria Met Fully
Fully Meeting: Three Criteria Met Fully
Meeting: Two Criteria Met Fully
Not Yet Meeting: One or Less Criteria

Resources

- ☐ At least five resources are used to answer question
- ☐ At least three peer reviewed, or trusted resources are used
- ☐ The resources are clearly indicated in a reference list
- ☐ Quotations and paraphrases are used correctly

Accomplished: All Criteria Met Fully
Fully Meeting: Three Criteria Met Fully
Meeting: Two Criteria Met Fully
Not Yet Meeting: One or Less Criteria

Student: _____ **Question:** _____

Teacher Comments:

_____

_____

Becoming an Expert: Checklist ✔

Question

- ☐ Question being addressed is clearly stated in project
- ☐ Question is clearly answered in project
- ☐ Question is not easily answered without research
- ☐ Question is based on a branch of science

Information

- ☐ Information from multiple sources are used to answer question
- ☐ Information is confirmed with peer reviewed resources
- ☐ Information is in multiple forms including text, audio, video, and graphics
- ☐ Information is accurate, neat, and grammatically correct.

Design

- ☐ The digital design includes at least three sources of media to answer question
- ☐ The design is appealing, organized, and makes good use of space
- ☐ The design only contains information that pertains to the question
- ☐ Design choices including background, colour, and images, are suitable

Resources

- ☐ At least five resources are used to answer question
- ☐ At least three peer reviewed, or trusted resources are used
- ☐ The resources are clearly indicated in a reference list
- ☐ Quotations and paraphrases are used correctly

Additional Comments:

_____

_____

Reflection

Constructivism, as a broad foundation of pedagogy, might arguably be the most important philosophy shaping current educational systems. Constructivist learning environments embrace a learner's prior knowledge and support her active pursuit of further conceptual understanding (Mathews, 1994). The intent of this lesson is to support a learner's pursuit of scientific understanding that is of interest to the learner. Constructivist philosophical and instructional models can be used to develop and measure the effectiveness of a learning environment. This lesson is built upon the constructivist Conceptual Change Model (CCM) (Posner et al., 1982), and is designed for constructivist instructional teaching following the six big strategies in Assessment for Learning (AFL) (Koehn, 2008).

The ideas of John Dewey (1859 – 1952), John Piaget (1896 – 1980), Lev Vygotsky (1896 – 1934), Jerome Bruner (1915 – present) and many other constructivist thinkers have supported change in teaching. We have shifted from a transmission model of knowledge delivery to that of facilitators of learning. Learners are no longer seen as empty vessels needing to be filled, but rather, candles needing fuel. Conceptual change is paramount to active learning, and Posner et al. (1982), articulate four criteria for this to occur:

1. There must be dissatisfaction with existing conceptions.
2. A new conception must be intelligible.
3. A new conception must appear initially plausible.
4. A new concept should suggest the possibility of a fruitful research program (p. 214).

This lesson, "Becoming an Expert", meets the requirements within this CCM. Students are required to articulate their own scientific question to answer, and as such, are seeking resolutions to conceptual dissatisfaction. Students are searching for greater understanding of phenomena that they have some prior knowledge of, so the conception is initially intelligible and plausible. Becoming an Expert requires students to seek truths that they do not fully hold,

and this supports further research of the concept. Students may conclude that they have answered the question upon completion of their investigation, or they may uncover additional questions requiring research.

Constructivist teaching is an active process of engaging students in their own learning. AFL is an instructional practice that is based on the exhaustive research of Paul Black and Dylan Wiliam. Black and Wiliam (1998) show that students who receive more descriptive feedback about how they learn, and less norm-referenced summative evaluations, will learn at a significantly faster rate. This strategy is especially useful for students who are vulnerable and of low socio-economic status. Becoming an Expert is designed to be used with the following six big ideas of AFL (Koehn, 2008):

1. Students receive and understand the learning intention of the lesson.
2. Criteria describing success is provided to, and co-developed with students.
3. Students are provided with ongoing, descriptive feedback of their learning progression.
4. Thoughtful questions are used to provoke discussion and elicit evidence of student learning.
5. Students engage in self and peer assessment.
6. Decisions regarding instruction are designed to support student ownership of learning.

This lesson is designed with AFL strategies, but how it is facilitated in the classroom is left to the teacher. Learning intentions can be provided to students in many forms. The checklist and evaluative rubric provided in this lesson were developed and co-created with my students, and the questions are suggestions specific to this phase of the project. The students use the checklist for self and peer evaluation, and all decisions regarding the design of Becoming an Expert are aimed at student ownership of learning.

I believe that a meaningful constructivist learning environment supports a learner's active pursuit of knowledge. This lesson is based on conceptual change, and with purposeful use of AFL, students will actively pursue answers to their questions.

Lesson Evaluation Criteria

This rubric effectively measures a constructivist lesson design. It is based on Posner et al's Conceptual Change Model and the principles of Assessment for Learning. The lesson uses the terms of Accomplished through to Not Yet Meeting Expectations, and these terms can be translated to a grade point system.

Constructivism Lesson Evaluation

Conceptual Change Model (CCM):

- ☐ 1. Lesson aims to address dissatisfaction with current conceptual understanding
- ☐ 2. Learning intentions are relevant and within a learner's zone of proximal development
- ☐ 3. New concepts are authentic and realistic
- ☐ 4. The learning intentions will resolve conceptual dissatisfaction and/or will suggest further inquiry

Accomplished: All Criteria Met Fully
Fully Meeting: Three Criteria Met Fully
Meeting: Two Criteria Met Fully
Not Yet Meeting: One or Less Criteria

Assessment for Learning (AFL):

- ☐ 1. Lesson includes suggestions for implementation using AFL (e.g., peer feedback, co-development of criteria)
- ☐ 2. Lesson includes tools for providing specific and ongoing descriptive feedback to the student
- ☐ 3. Lesson includes questions for discussion and eliciting evidence of learning
- ☐ 4. Lesson provides criteria for success, rubrics, and other assessment/evaluation tools

Accomplished: All Criteria Met Fully
Fully Meeting: Three Criteria Met Fully
Meeting: Two Criteria Met Fully
Not Yet Meeting: One or Less Criteria

Lesson Presentation:

- ☐ 1. Lesson is supported with reference to literature
- ☐ 2. Lesson is written with academic language suitable for the discipline
- ☐ 3. Lesson is related to current pedagogy
- ☐ 4. Lesson is relevant and can be adapted for differentiation

Accomplished: All Criteria Met Fully
Fully Meeting: Three Criteria Met Fully
Meeting: Two Criteria Met Fully
Not Yet Meeting: One or Less Criteria

Comments:

_____

_____

_____

References

Black, P., & Wiliam, D. (1998). Inside the black box: Raising standards through classroom assessment [Electronic version]. *Phi Delta Kappan, 80*(2). 139-44.

Koehn. (2008). Together is better (BCTF Teacher Inquirer). Retrieved February 18, 2009 from Website: http://bctf.ca/publications/TeacherInquirer.aspx

Matthews, M. R. (1994). *Science Teaching*. New York: Routledge, chapter 7 [pdf].

Posner, G.J, Strike, K.A, Hewson, P. W & Gertzog, W.A (1982). Accommodation of a scientific conception: Toward a theory of conceptual change. *Science Education. 66*(2), 211-227.