KD Module 3: Pedagogy

Unit 1: Introduction to Project-Based Learning

Objectives:
Describe how collaborative, project-based learning and ICT can support student thinking and social interaction, as students come to understand key concepts, processes and skills in the subject matter and use them to solve real-world problems (UNESCO ICT-CFT, KD.3.a).

Duration:
Total of 4 notional hours – 1 hour lecture, 3 hour computer practical session.

A] Lecture Content (1 hour)

Notes to Facilitator
The purpose of this lecture is to introduce participants to Constructivist teaching methods and it builds directly on from the lecture given in TL M03U01 which focused on didactic methodologies. In an attempt to provide the theory with a practical dimension focus, this lecture and the entire module will look at a particular manifestation of the theory, Constructionism, or more specifically, *Project-based Learning.* Use your own resources to lecture on Constructivism, Constructionism, PBL and the role of technology, or you can use the lecture content below.

Introduction
During the Technology Literacy Pedagogy course (TL M03U01), we introduced you to didactic methods of teaching. We briefly contrasted it to Constructivism and then spent considerable time looking at different ways ICT can support didactic teaching and learning methods. There the emphasis was on using ICT to enhance teacher exposition and supporting learners to demonstrate understanding or proficiency in a skill or behaviour. The focus of this lecture and the units to follow is instead on deploying different methods that allow students a lot more control over how and what they learn, or Constructivism.

Constructivism
Let us first review a definition of the Constructivist approach.

"**Constructivist teaching** is based on [constructivist learning theory](). This theoretical framework holds that learning always builds upon knowledge that a student already knows. Because all learning is filtered through pre-existing knowledge, constructivists suggest that learning is more effective when a student is actively engaged in the learning process rather than attempting to receive knowledge passively. A wide

variety of methods claim to be based on constructivist learning theory. Most of these methods rely on some form of guided discovery where the teacher avoids most direct instruction and attempts to lead the student through questions and activities to discover, discuss, appreciate and verbalize the new knowledge." [Read more… Constructivist Teaching Methods (Wikipedia CC: BY SA).]

Jean Piaget is considered the founder of Constructivism. He claimed that humans generate knowledge and meaning from an interaction between their experiences and their ideas. Through a process of *accommodation* and *assimilation*, individuals construct new knowledge from their experiences. When individuals assimilate, they incorporate the new experience into an already existing framework without changing that framework. Accommodation is the process of reframing one's mental representation of the external world to fit new experiences. While constructivism is a theory about how we learn, Piaget's views cannot be considered a pedagogy. However, constructivism is often associated with pedagogic approaches that promote *active* learning, or learning by *doing*.

Constructionism

One such approach, Seymour Papert's *Constructionism* (note the different spelling), has taken Piaget's ideas and extrapolated them into the teaching and learning setting. He claims that accommodation and assimilation can be invoked in a learner when educators create learning environments that encourage learners to make tangible objects in the real world, hence the term *construct*ionism. Papert believes that learning by doing is nothing new and has been advocated by educators for centuries, but what is different now is that advances in technology have placed powerful building tools in the hands of the learner like never before.

Project-Based Learning

Project-based Learning (PBL) is a popular manifestation of Piaget and Papert's ideas. It is a structured method containing a number of design steps, designed to allow educators to create the learning pathway described above. PBL can be defined as:

"**Project-based learning**, or PBL, is the use of in-depth and rigorous classroom projects to facilitate learning and assess student competence. Students use technology and inquiry to respond to a complex issue, problem or challenge. PBL focuses on student-centered inquiry and group learning with the teacher acting as a facilitator." [Read more… Project Based Learning (Wikipedia CC: BY SA).]

Practically, for a teacher it means designing a number of activities for the students to pursue in order to solve or answer a question. The project activities culminate in a 'product', usually a public presentation of some type: a poster, a PowerPoint presentation, a model or artifact, etc. In order to do this a number of design issues need to be considered. The diagram here illustrates this.

1. Identify the objectives/standards for the section of work that needs to be met by your project design and by the 'product' the students will make.
2. Create, or use the students to create, a complex open-ended question that engages the students' interest and the answer of which is the 'drive' for student activity.
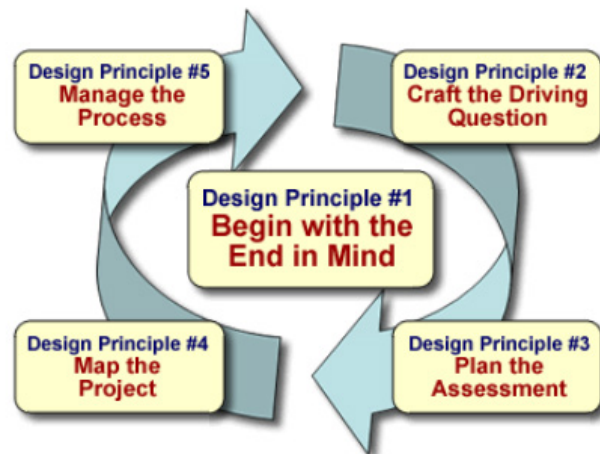
3. Plan, and alert the students to, how their investigations will be assessed. If the product is to be marked, for example, allow the students to know the marking criteria before they start.
4. Provide a scaffold of what activities are required in order to answer the 'driving' question and create the 'product'.
5. Be a facilitator, rather than a traditional teacher. Resist the temptation to answer the students' questions! Rather point them in the direction where an answer can be found. Manage the process to ensure the project stays on track and to purpose.

Information & Communication Technology (ICT) can support PBL. How it does this is up to the teacher and the students to determine. Learners will gravitate to using tools that satisfy their learning preferences. (Remember Gardiner and his Multiple Intelligences theory?) Obvious tools include the Internet and the vast amount of information contained there. It can be easily searched for information, so ensure your driving question is broad enough that it can't be answered by a simple Google search! Electronic presentation tools will also be useful for report backs. Electronic probes could be used to collect data. Cell phones and cameras can be used to collect still and video footage. The list is endless. It is important, however, that the technology supports and does not dominate the project. The quest by the students to answer the question and demonstrate real understanding must be the paramount sentiment.

In the rest of this module we will investigate a number of ways to develop effective PBL projects. There are a number of online tutorials to take us through the design steps as well as some practical sessions to help us develop effective projects of our own.

Enjoy.

B] Computer Practical (Total 3 hours)

Task 1: Commonwealth Certificate for Teacher ICT Integration Tutorial (2 hours)
Complete the following CCTI tutorial.

Elective Module 9 – Learning With Projects
Activity 1: Overview of project-based learning

"The purpose of this module is to help you plan and experience the practicalities of project-based learning. Project-based learning (PBL) includes a range of typical activities and approaches to teaching and learning. In addition to this there are implications for classroom management. During this module

you will experience many of these aspects as you work within your own class and in collaboration with other classes.

During this activity we will focus on the following questions:
- What is Project-based Learning (PBL)?
- What are the key aspects of PBL?
- What do these mean?
- What are some examples of PBL?

Activity 1
1. Read the mini-articles on Project-based Learning by exploring this mindmap.
2. Open the PowerPoint document Key Aspects.ppt. Save it (using Save As...) in your home folder and close the file. Start PowerPoint and open the file called Key Aspects.ppt from your home folder.
3. Open the Word document called Key Aspects.doc. You will be copying sentences from this file to the PowerPoint file.
4. For each slide in the presentation, find one suitable **description** in the Word doc. Copy and paste the description sentence from the Word document to the PowerPoint slide.
5. For each slide in the presentation, find one suitable **example** in the Word doc. Copy and paste the example sentence from the Word document to the PowerPoint slide.
6. Illustrate your presentation using pictures and photos from http://images.google.com.

Tip: Restrict each point to no more than 6 words. Restrict each page to no more than 6 points.

Task 2: Designing Your PBL Tutorial (1 hour)
Complete the following Buck Institute tutorial online.

Designing Your Project

"Project planning is organised according to five design principles displayed to the right. Scroll over the image at right for an introduction to each principle, or click to learn in depth about each principle. In addition, each design principle is supported by a set of resources and advice from expert PBL teachers. You can find these links on the left of each page."

Available at http://pbl-online.org/pathway2.html
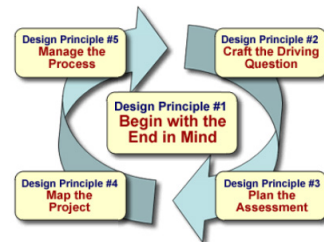
Resources Used in this Lesson Unit

Buck Institute for Education, et al. (2005). *Project Based Learning: The Online Resource for PBL*. Available online at http://pbl-online.org/default.htm. Accessed 12/08/2011 (CC: BY NC SA).

SchoolNet SA/SCOPE. (2011). *Commonwealth Certificate for Teacher ICT Integration: Learning with Projects Module*. Available online at http://www.schoolnet.org.za/CoL/ACE/projectbased/activities/pbl.index.htm. Accessed 16/08/2011 (© All Rights Reserved. Free to use online.).

Wikipedia. (2011). *Constructivism (Learning Theory)*. Available online at http://en.wikipedia.org/wiki/Constructivism_(learning_theory). Accessed 12/08/2011 (CC: BY SA).

Wikipedia. (2011). *Constructivist Teaching Methods*. Available online at http://en.wikipedia.org/wiki/Constructivist_teaching_methods. Accessed 08/07/2011 (CC: BY SA).

Wikipedia. (2011). *Constructionism*. Available online at http://en.wikipedia.org/wiki/Constructionism_(learning_theory). Accessed 12/08/2011 (CC: BY SA).

Wikipedia. (2011). *Project Based Approaches*. Available online at http://en.wikipedia.org/wiki/Project-based_learning. Accessed 12/08/2011 (CC: BY SA).