



# **EDID 6501 - Instructional Design & Technology**

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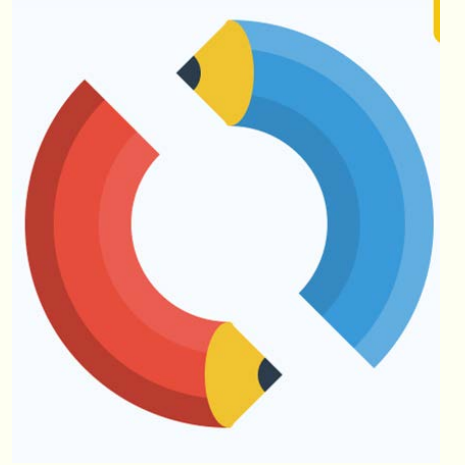


# Problem-Based Learning



PBL is a method of instruction aligned with the constructivist ideology. This method of learning relies on group collaboration to solve real world problems." The emphasis in PBL is to provide a problem-solving process that students may use systematically to identify the nature of the problem, assign tasks to be completed, reason through problems as data and resources are gathered and consulted, arrive at a solution, and then assess the adequacy of the solution" (Duffy & Jonassen, 1992; Savery & Duffy 1996; Nelson, 1999).

# Characteristics

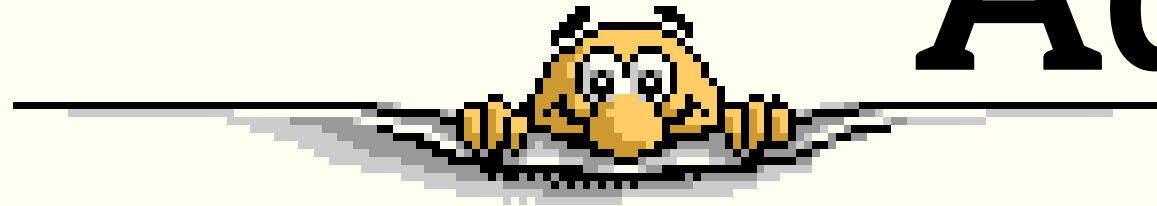


Nelson (2010) identified six key elements of successful PBL environments:

1. Student-centered
2. Ill-structured contextualized problems
3. A multi- disciplinary focus
4. Stressing self-regulation and collaboration
5. Reflection and evaluation
6. Closing analysis



# Advantages

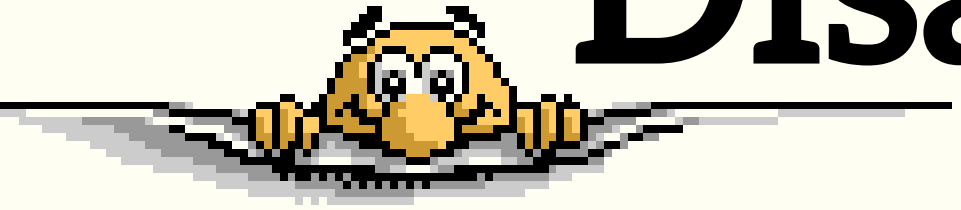


PBL curricula provide a learning environment (Dolmans & Schmidt, 1996):

- in which competence is fostered.
- in which Knowledge retention is increased.
- in which of self-directed learning skills are developed.
- in which students' intrinsic interest in the subject matter is enhanced.
- that is cost effective.



# Disadvantages



In PBL:

- learners are expected to learn from each other (Kirschner, Sweller, et al., 2006).
- open problem solving is frequently not only inefficient but often ineffective in teaching the desired skills (Kirschner, Sweller, et al., 2006).
- finding solutions can be time consuming.
- learners are expected to acquire the necessary skills by searching the resources and struggling with the problem solution (Kirschner, Sweller, et al., 2006).

# Summary



Problem based learning is an experiential learning process where students collaboratively work in small groups to investigate, explain, and resolve meaningful problems (Barrows, 2000).

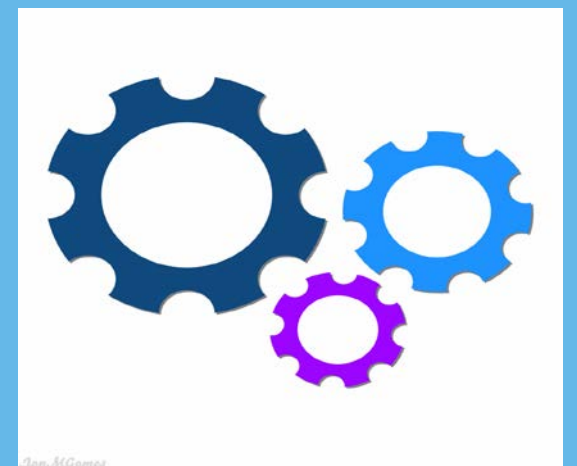
PBL teaches problem solving skills, develops life-long learning and facilitates self-directed learners but is disadvantaged by open problem solving which is frequently not only inefficient but ineffective in teaching the desired skills (Kirschner, Sweller, et al., 2006).



# GOAL BASED LEARNING

Goal Based Learning constitutes placing learners in scenarios to achieve a particular task. However in order to achieve this task/goal the learners must develop certain skill sets in order to complete a task or goal.

According to Schank (1992), “goal based scenario provides motivation, a sense of accomplishment, a support system, and a focus on skills rather than facts”.





# CHARACTERISTICS

Goal Based Learning (GBL) sets the environment where the task is to be executed, allowing learners to be fully engaged as they practice the target skills (Schank et al.,(1993/1994,1999).

- Learners are active participants in the attainment of the desired goal and engage in “a real-time simulation”. (Schank 1992)
- It is a system that provides a cognitive educational experience under the guidance of a "rule based expert training system".
- Task are realistic and holistic allowing learners to develop a broader and deeper knowledge on their preexisting skills to become specialists in their area of interest.
- Feedback is provided just in time by an expert in form of coaching, consequence of actions or stories about similar experiences.

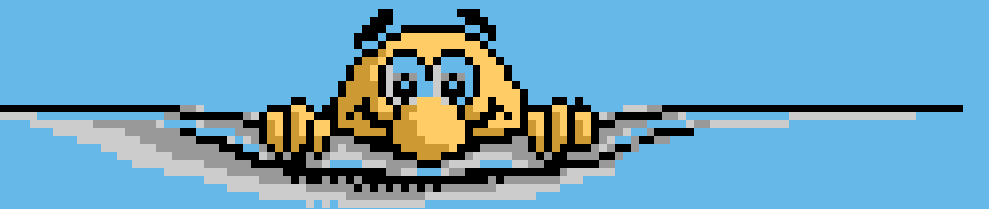
# ADVANTAGES



Goal-Based Scenario advantages include :

- developing a learning environment that motivates, and provides support to learners improve their knowledge and performance in their desired area of study.
- allowing for more authentic learning (Thomas, 2011). Authentic tasks allow learners to contextualise knowledge and skills that they are learning, rather than learning in a vacuum.
- scenarios where "learners can enter the environment with a wide variety of experiences and skills, be challenged by the goal set before them, and can pick and choose what they need to learn to accomplish this goal just in time from a variety of sources of information including print-based, multimedia computer-based information, and from live sources.(Montgomery et al 1994)

# DISADVANTAGES



Some drawbacks to using Goal-Based Learning may include:

- Some institutions will have to engage in continuous restructuring of their courses so that learners are able to pursue their learning goals (Thomas, 2011). Restructuring courses can result in multiple versions of a course though aligned to learners goals which will in turn cause low enrolment in courses and high course cost.
- GBS is a type of learn-by-doing task with very specific constraints on the selection of material to be taught, the goals the student will pursue, the environment in which the student will work, the task the student will perform, and the resources that are available to the student”. These constraints result in learners being “unprepared for the eventuality of other situations”.
- Educators have at times fail to design and fully incorporate principles of effective learning in goal based instruction. Critics of GBL argue that educators simply incorporated technology "for the sake of using it". According to Fischer (1989) the objective ought to be one where educators discern whether GBL is superior to or equivalent to other instructional media in attempt to achieve their objectives and learning outcomes.

# SUMMARY OF FINDINGS

Goal-Based Scenarios (GBS) is seen as an example of a computer based learning environments designed with specific goals for learners to achieve. As learners work in groups to complete various task they will develop various skill sets that they will need to achieve their goals. In Goal-Based Scenarios, learners assume various roles within the mission and essentially engage in a real-time simulation. According to Schank (1992), “goal based scenario is to provide motivation, a sense of accomplishment, a support system, and a focus on skills rather than facts”.



# MICROWORLDS



## Definition:

A subset of reality or a constructed reality (Papert, 1980a) in which students undertake tasks by constructing and exploring models (Gutierrez-Santos, Mavrikis and Magoulas, 2010).



# MICROWORLDS

## Characteristics:

- Involves computer-based, problem solving activities (Papert , 1980a)
- Allows for active engagement in exploration that would have otherwise been impossible without technology (Rieber, 2004)
- Use models to represent concepts in varied ways (Edwards, 1995)

# MICROWORLDS

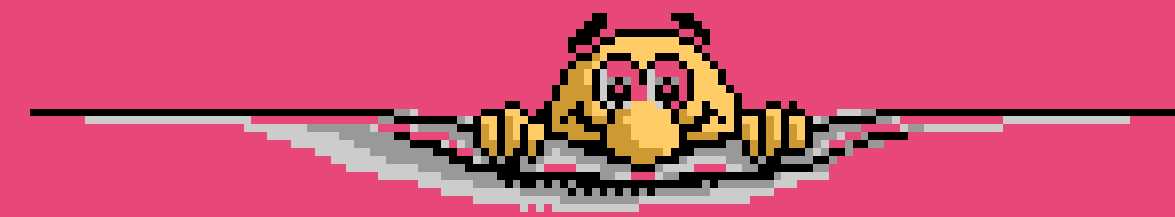
## Advantages:



- Provides authentic tasks; enhances learning by doing (Schank, 1996)
- Improves learning and cognitive development in children (Papert, 1994)
- Provides safe, inexpensive environment for 'learning by doing' (Harel and Papert, 1991)



# MICROWORLDS



## Disadvantages:

- Interactions with simulated tools may not translate to the effective and efficient use of the actual tool (Boring, et al, 2019)
- Development and implementation process can be expensive, lengthy and tedious (Boring, et al, 2019)
- Highly skilled experts are needed to oversee and manage its effective implementation (Rieber, 2004)

# MICROWORLDS



## Summary:

The design of microworlds follows the philosophy of constructionism - learning by building (Papert, 1991). They offer simplified version of the domain being explored so that it can be easily and immediately understood by the learner (Reiber, 2004). The end goal is for participants to either create new entities, solve specific problems or both (Edwards, 1995)



# Reference S

**THANK YOU!**  
for your time

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