The Learning Process Methodology

Step	Explanation
Stage 1: Preparing to Learn	
1 Why	Identify and explain your reasons for learning.
2 Orientation	Develop a systematic overview of what is to be learned.
3 Prerequisites	Identify necessary skills and background knowledge needed to perform the learning.
4 Learning Objectives	Set appropriate goals and objectives for the learning activity.
5 Performance Criteria	Determine specific desired outcomes used to measure and gauge performance.
6 Vocabulary	Identify and learn key terminology.
7 Information	Collect, read, and study appropriate resources.
Stage 2: Performing a Learning Activity	
8 Plan	Develop a plan of action to meet the performance criteria.
9 Models	Study and review examples that assist in meeting the learning objectives and performance criteria.
10 Thinking Critically	Pose and answer questions that stimulate thought and promote understanding.
11 Transfer/Application	Transfer knowledge to different contexts; apply knowledge in new situations.
12 Problem Solving	Use knowledge in problem solving situations.
Stage 3: Assessing and Building New Knowledge	
13 Self-assessment	Assess use of the learning process and mastery of the material learned.
14 Research	Create and develop knowledge that is new and unique.

Notes

Designing the Active Learning Experience

Description of some possible components and their justification

Before Class:

1. **Purpose** (LPM Steps - Why and Orientation)

   A statement of what is to be learned where we

   - Indicate its relationship to the big picture (e.g. other learning)
   - Provide an example
   - Show relevancy in the learner's life

   Rationale: The student needs to see the importance of the topic in the content area and/or the real world. This motivates the student and helps them put the topic in proper context.

2. **Discovery Activity** (LPM steps - Why and Orientation)

   A discovery activity where the students are experiencing the content area through the topic in an interesting or relevant way

   Rationale: The student learns by doing and has something tangential to relate to the concepts for this experience.

3. **Objectives** (LPM Step - Learning Objectives)

   A list of the learning objectives that the student should meet by completing the experience

   Rationale: The student should know ahead of time what they will learn so that they can validate their learning later on.

4. **What do you already know?** (LPM - Step Prerequisites)

   Questions that draw on previous knowledge and the discovery activity and that will be used in the experience to follow.

   Rationale: The student realizes the connection of the performance to what they have already learned. They can then build off what they know. Often what you are learning can be significantly built on previous knowledge - such solving a linear inequality is built significantly on solving a linear equation.

5. **The Language of [Content Area]** (LPM - Step Vocabulary)

   A list of terminology and notation that will be used in the experience

   - Instructor can provide the definitions and explanations or
   - Student can be asked to provide them

   Rationale: In order to understand the content area the student must be able to communicate in the language of the content area. Knowing the correct vocabulary/symbolic notation and its precise meaning allows them to read resources and communicate with the class effectively in speech and writing.

6. **Information** (LPM Step - Information)

   Readings and resources that will support the learning experience.

   Rationale: Most knowledge is already stored in existing written or electronic materials. Instructional

designers sift through the flotsam and jetsam of the information world and provide the most effective sources for presenting knowledge.

7. **Addressing common errors** (LPM Step - Information)

   Common mistakes are listed with examples and reasoning

   Rationale: Students are bound to make mistakes and most of them are clustered around a few common mistakes. In order for students to learn validation of their work they should see the analysis of incorrect thinking and misconceptions done correctly. This also contributes to a deeper understanding of the correct process.

8. **Are you ready?** (LPM Step - Plan)

   The student inventories their readiness for the in-class activity.

   - A list of what they should be able to do is provided and they assess and check off if when they are ready.
   - If questions arise during the previous components they are documented and ready to be investigated.
   - The items can also be rated on a scale from not ready to ready

     Rationale: The student should know what is expected of them prior to class. If there are questions they should be recorded ahead of time and asked during class.

During Class:

1. **Summarize and Review above components** (LPM Steps 1-7)
2. **Performance Criteria** (LPM Step Performance Criteria)

   A description of the performance area and of the level at which students should be able to perform once the activity is complete. The learning objectives list what they should learn in this activity while the performance criterion sets the expectations on the quality of the performance.

   Rationale: The student needs to assume the identity of a professional to be successful. Performance criteria clarify this with simple to understand, realistic, and measurable characteristics of excellence.

3. **Plan** (LPM Step - Plan)

   Directions for how to complete the activity that usually include:

   - Set of the team and their roles
   - Sharing pre-activity learning including your worked out examples
   - Analysis of any additional information or models
   - Maybe an in-class discovery exercise
   - Critical Thinking questions
   - Testing your understanding

   Rationale: The student could benefit from a guide for the class meeting. A lesson plan ensures that everything is addressed in the precious class time available. If the students have a copy of this plan it encourages them to take responsibility for their learning.

4. **Models** (LPM Step - Models)

   Example(s) of more difficult problems are provided with analysis.

   Rationale: The student will know the basic methodology, however application to more difficult problems should be demonstrated as a resource for students to use to answer the critical thinking questions and demonstrate your understanding questions.

5. **Critical Thinking Questions** (LPM Step - Critical Thinking Questions)

   Six to ten questions written in a form that they can be asked about any of the models and the learning activity itself. Relevant, Growth-Oriented, Logical.

   - 2-3 directed – answer found in models, information, and resources.
   - 3-6 convergent – require students to analyze and synthesize.
   - 1 divergent – open ended.

   Rationale: The questions are essential to guide the student's inquiry through the models to produce understanding and meaning - address the misconceptions that might form, interplay between steps in the methodology, and reasoning issues. This makes the experience active and encourages them ask their own questions to each other.

After Class

1. **Demonstrate your understanding** (LPM Step - Transfer/Application)

   Students deal with more challenging problems in different contexts using the techniques and understanding developed from the methodology and the models.

   - Start with familiar context
   - Moves into less familiar and then unfamiliar contexts
   - Elevate the level of learning from level 1 to level 3.

   Rationale: Elevating the difficulty lets students apply their knowledge in new, abstract, or unfamiliar situations. This leads to a deeper understanding of the topic and the development of transferable learning skills preparing the foundation for generalization.

2. **The Hardest Problem** (LPM Step - Transfer/Application)

   Students come up with the hardest problem they can think of and then try and solve it or explain why it cannot be solved.

   Rationale: The student learns what aspects of this topic are difficult. They identify the ways in which you can vary the problems. By creating a problem the student analyzes the content area involved in more detail, lists the issues and boundary conditions they can generalize to be able to do any problem.

3. **Making It Matter** (LPM Step - Problem Solving)

   An academic and/or real life problem that deals with the topic at hand

   Rationale: Applying the techniques in real-life or academic life reveal the importance of the material and show them that they haven't wasted their time because now they can solve problems in their life. They can then deal with these situations with reasoning and critical thinking.

4. **Troubleshooting Solutions** (LPM Step - Assessment)

   "What Went Wrong and Why?" or "Identify and Correct the Errors"

A situation or scenario is provided where an error has been made and the students must find the mistake(s) and give a correction.

Rationale: The students should understand the topic well enough to validate someone else's work. Finding mistakes in this component prepares them to find mistakes in their own work later. Troubleshooting shows how the methodology may have to be adapted to deal with different situations.

5. **Learning to Learn [Content Area]** (LPM Step - Assessment)

   A few questions that address the impact the experience has had on their learning within the given content area.

   Rationale: The students reflect on their own learning process to understand it better. They can then appreciate the academic experience as a transformative one.

6. **Assessment** (LPM Step - Assessment)

   A brief self-assessment that may include the following

   - The greatest strength
   - Areas for improvement, plan for improvement
   - Most valuable insight

   Rationale: The assessment is used for improvement in the performance of academic learning, by reflecting on their performance the students realize what they need to change in their approach to learning. This is done in the form of positive reinforcement and avoids harsh self-judgment that can make students afraid to take risks.

Mapping of LPM to Components of Learning Activity

LPM	Component
Step 1	Title, Why/Purpose (Who Gives a Darn?)
Step 2	Concept Map, Table of Contents, Discovery
Step 3	Prerequisites
Step 4	Learning Objectives/Goals
Step 5	Performance and Criteria (Success Criteria)
Step 6	Developing Language in the Content Area (Vocabulary, Notation)
Step 7	Information, Resources, Methodologies, Common Errors, Models
Step 8	Plan
Step 9	Models/Examples, Your Turn
Step 10	Critical Thinking Questions, Exploratory Questions
Step 11	Skill Exercises (Demonstrate Your Understanding), Hardest Problem (Got It?)
Step 12	Making it Matter, Problem Solving
Step 13	Learning to Learn Mathematics (or other knowledge area), Self-Assessment, Identify and Correct Errors (Troubleshooting)
Step 14	Divergent CTQ, Undergraduate Research

Mapping of Components of Learning Activity to LPM

Component	LPM
Title	Step 1
Purpose, Why?	Step 1
Learning Goals	Step 4
Discovery	Step 2 (orientation)
Vocabulary, Learning the Language	Step 6
What do you already know?	Step 3
Readings, Information	Step 7
Resources, Reflection Tools	Support the process
Methodologies	Step 7
Identifying Common Errors	Step 7 (misconceptions)
Are you ready?	Step 8 (pre-planning)
Plan	Step 8
Models	Step 9
Critical Thinking Questions	Step 10
Performance & Criteria Challenge	Step 5
Demonstrate Your Understanding, Skill Exercises	Step 11
Hardest Problem	Step 11
Trouble Shooting	Step 11
Problem solving, Making it Matter	Step 12
Learning to Learn in Discipline	Step 13 (content)
Self-assessment	Step 13 (performance)

Notes

Activity Design Template

Topic for Activity:	
Purpose Statement:	
Discovery Activity:	
Learning Objectives:	1. 2. 3.
What do you already know?	
The Language of the Content Area (Vocabulary):	
Information (Readings and Resources):	
Addressing Common Errors (or Misconceptions):	
Are you ready? (Readiness Check):	
Performance Criteria:	1. 2. 3.

Plan:	
Models:	
Critical Thinking Questions:	Directed Question – Convergent Question – Divergent Question –
Demonstrate your Understanding (Applications):	
Making It Matter (Real World Problem):	
Troubleshooting Solutions (Identify and Correct the Error):	
Learning to Learn in the Content Area:	
Assessment	

Activity Design as an Application of the Learning Process Methodology

Why?

Designing learning activities is an essential task for educators. Effective learning activities not only acknowledge the learning process but incorporate components that support the steps of the Learning Process Methodology, a procedure for optimizing learning. Understanding the link between the LPM and activity design allows for the development of a more effective strategy for activity design.

Overview

1. A brief 15 minute presentation on the dynamic interplay between the Learning Process Methodology and best practices for the design of active learning experiences.
2. A 25 minute team activity where participants will design learning experiences using the LPM as a framework.
3. A discussion amongst the attendees on the results of the activity and related issues for the remaining time.

What You Should Already Know

1. Learning Process Methodology (*Faculty Guidebook* Module 2.3.8)
2. Overview of Learning Activities (*Faculty Guidebook* Module 2.4.13)
3. Simple topics for learning in your field and related fields

Learning Objectives

1. Understand the complementary nature of the LPM and the design of active learning experiences.
2. Gain experience with the process of effective activity design.
3. Know some of the PE resources available to instructional designers.

Performance Criteria

1. Correlate the steps of the LPM with components of activity design and supporting theory.
2. Design an activity that supports the LPM within a discipline specific team.
3. Take away at least one insight about the instructional design process.

Vocabulary

Activity – The core unit of instructional design

Methodology – Multiple step models for complex processes

Information

LPM – The Learning Process Methodology (www.pcrest.com/LO/LPM/index.htm)

Active Learning Components Document (see handout)

Plan

1. Form teams based on content areas and assign roles of captain, recorder, spokesperson, and reflector.
2. Review the documents describing the components of an activity and the sample activity for a mathematics course.
3. Design an activity for a simple topic in an introductory course in your content area using the provided template.
4. Spokesperson - Prepare for a discussion with the facilitator and other groups.
5. Reflector - Complete an assessment of the team and speaker.

Models

Sample Activity – from *Quantitative Reasoning and Problem Solving* (see handout)

Critical Thinking Questions

1. Which components are the most difficult (easiest) to design?
2. What components do you use in your activities that you did not see in this approach? How do they fit in with the LPM?
3. What components included in the given template do you find are missing from many published textbooks?
4. How does the order differ between the steps of the LPM and the components of an activity?
5. Why is the LPM so similar in structure to a learning activity?
6. What corresponds to the research step of the LPM in an activity design?

Transfer/Application

Design completed learning activities for your classes using the LPM framework.

Problem Solving

Draft facilitation plans for the activities you designed.

Assess the activities and make revisions each time you use them.

Research

A research paper on this topic is expected to be in the *IJPE* next year.

Assessment

Reflectors should share assessments with other team members. Everyone should leave SII feedback for the facilitator.

Name _____

Team _____

Date _____

Activity _____

Reflector's Report

1 Team Performance

Our team's greatest strength and why: _____

_____

_____

_____

Our team's greatest area for improvement and how the improvement can be made: _____

_____

_____

_____

An insight gained about learning during this activity: _____

_____

_____

2 Individual Performance

Name: _____ Team Role: _____

Strength: _____

Area for Improvement: _____

Name: _____ Team Role: _____

Strength: _____

Area for Improvement: _____

Name: _____ Team Role: _____

Strength: _____

Area for Improvement: _____

Name: _____ Team Role: _____

Strength: _____

Area for Improvement: _____

Instructor Feedback

Strengths:

Areas for Improvement:

Insights:

Spokesperson's Report

Questions and Comments from your team:

Critical Thinking Questions:

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2. What components do you use in your activities that you did not see in this approach? How do they fit in with the LPM?

3. What components included in the given template do you find are missing from many published textbooks?

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