

Chapter 5 Problem Based Learning (PBL)

PBL was developed by Dr. Howard Barrows, a physician and medical educator at McMaster University in Hamilton, Ontario, Canada. According to Dr. Barrows, learning involved three separate but related phases:

(1) an essential body of knowledge, (2) the ability to use . . . knowledge effectively in the evaluation and care of . . . patients' health problems, and (3) the ability to extend or improve that knowledge and to provide appropriate care for future problems which they must face (Barrows, 1985, p. 3).

Dr. Barrows intended that students become independent and self-directed learners who are critically thinking problem-solvers. Learners actively construct their own knowledge using pre-requisite enabling knowledge and skills within the context of a problem in an environment where the knowledge would be applied (Gallagher, 1997).

Learners mentally function at a meta-cognitive level (i.e., thinks critically and creatively, monitors own understanding, and manages their own learning) and have problem ownership. Presented in Figure 5.1 is a description of the PBL process building on Barrows and Tamblyn (1980, pp. 191-192).

I. Problem Based Learning

A. POI Formulation (Point A)

1. An academically relevant, realistic problem, opportunity, or issue (POI) is crafted by the instructor and/or others.
 - a. The POI must include associated content learning objectives and foster relevant self-directed and problem-solving skills.
 - b. The POI should be real as possible. A contrived POI is often too complicated to create. Real POI's have real outcomes, which motivate and encourage learning.
2. Critical, enabling, pre-requisite knowledge and skills are identified to solve a problem, capitalize on an opportunity, or resolve an issue.
3. Peterson (1997) argues that learners must learn to work together for PBL to be effective and successful. Successful cooperative learning principles are relevant here.

B. POI Presentation (Point B)

1. The POI is presented to the work team as it would emerge in its "natural" or "realistic" environment.
2. Present the case richly (much contextual information) or as a basic question. Curiosity is a powerful motivator.
3. It is critical that learners don't figure out the "desired" or "correct response" If that occurs, then motivation and learning vanish; many times, there is more than one "correct" answer.
4. When the POI is presented, work product, e.g., a case analysis report, evaluation criteria should be distributed and carefully reviewed.

- C. Self-Directed Learning→ Solution Testing→ Learning Self-Assessment→ Learning Goal Reformulation→ Self-Directed Learning (Points C, D, & E)
1. Given present learning and skills, the learners are permitted to wrestle with the POI so that creative thinking, inference-making, problem-solving, and conflict management skills are continually challenged and refined, as well as ability to apply, test, & refine learning.
 2. Learners need to reflect on both the content and on the learning process.
 3. Additional learning requirements are revealed, thereby, guiding individual study. The newly acquired knowledge and skill sets are applied to the problem so as to both reinforce learning and assess its effectiveness.
 4. The learner integrates the new learning and skills into his or her intellectual repertoire.
- D. Instructor Consultation (Point F)
1. During the first few sessions, students will be fairly dependent on the instructor who must deliberately wean learners from that dependence. The active inquiry model requires that learners are able to frame problems, gather data, engage in divergent thinking, generate ideas, create and evaluate alternatives, select alternatives and apply alternatives to solve a problem, capitalize upon an opportunity, or resolve an issue.
 - a. The instructor inventories the present knowledge and skills an individual learner or learner teams possess and compare the information to the knowledge and skills required by the learning outcomes. This is called a learning gap analysis.
 - b. The instructor must scaffold learning gaps; so, he or she constructs learning activities which foster learner mastery of the needed pre-requisite enabling knowledge and skills as well as enabling social skills (Collins, Brown, & Newman, 1987; Greening, 1998).
 - c. For example, basic research skills are essential. If learners lack basic research skills, then the instructor must either teach these or cause to have these skills taught and practiced.
 2. It is critical that learners don't figure out the "desired" or "correct response" If that occurs, then motivation and learning vanish; many times, there is more than one "correct" answer.
 3. When the POI is presented, work product, e.g., a case analysis report, evaluation criteria should be distributed and carefully reviewed.

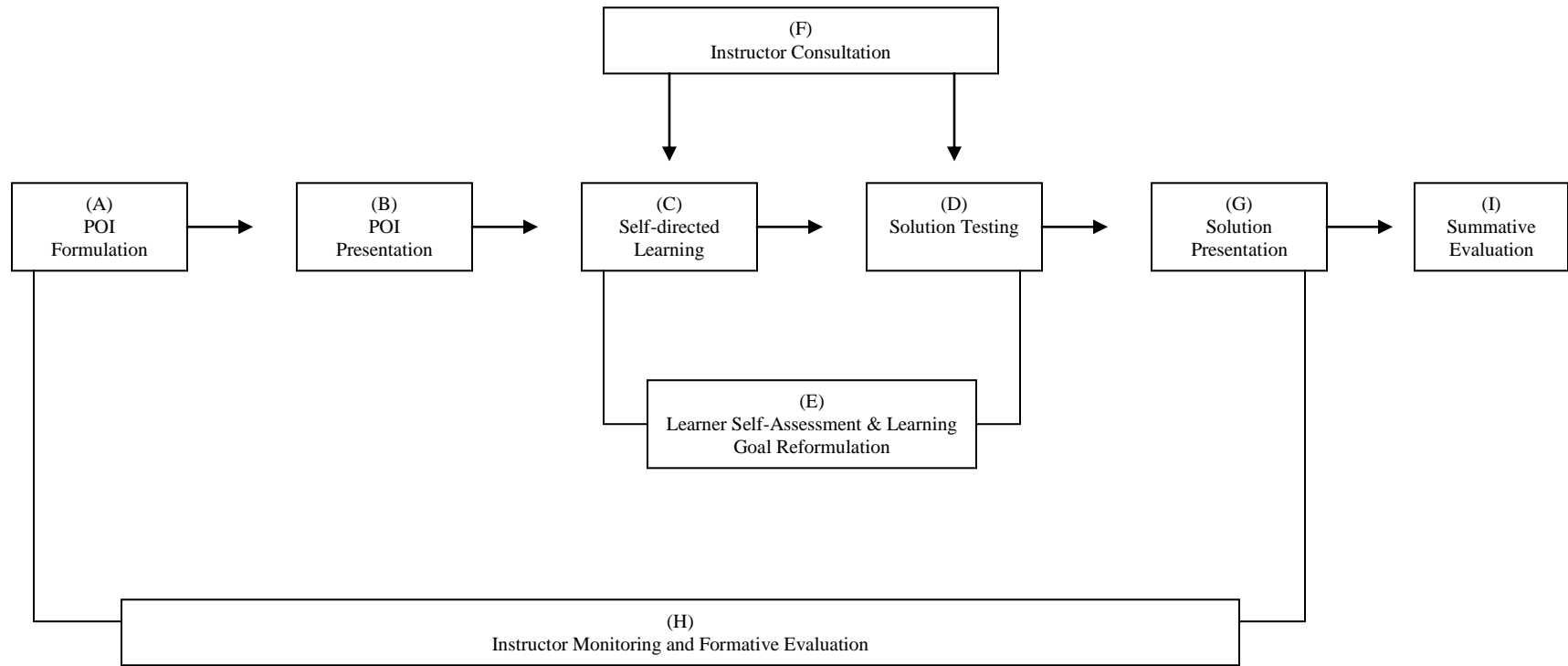


Figure 5.1 Problem Based Learning Process Model

E. Solution Presentation (Point G)

1. Once learners have completed negotiating Points C-F, the solution to the problem, opportunity, or issue is presented.
2. The instructor might provide a “free read” of the work-product, e.g., a case report, and offer recommendations for its improvement before the “official” submission. A consultation session should be held reasonably soon with each team after distribution of the “free read” comments.

F. Instructor Monitoring and Formative Evaluation (Point H)

1. Traditional tests are an efficient and effective strategy to assess individual and group learning for lower order intellectual skills which enable the higher order learning skills.
2. Brief surveys or immediate feedback techniques should be deployed to assess student attitudes and opinions at strategic points to inform the learning and revision processes.
3. The instructor should also record his or her observations and reflections about student experiences during the course of the learning exercise for instructional adjustment and revision use.

G. Summative Evaluation (Point I)

1. Performance assessment is recommended to evaluate team work-products.
2. When evaluation of the work product is completed, it along with the evaluation form should be distributed to students for their review.
3. Debrief students as to their understanding and reactions to the evaluation. Note concerns, complaints, and suggestions for possible use later. Prior to debriefing, assess student attitudes and opinions about the exercise, the learning, and the instructor’s consultation. Summative evaluation should include self- and peer-assessment.

II. Constructing the PBI Case: An Introduction**A. Definition and Instructional Value****1. Definition**

- a. A case is a description of a real-life situation or problem, often presented from the perspective of a particular person, e.g., a manager, which requires analysis, development of solution or response alternatives, testing of those alternatives, and selection of a solution and its implementation and evaluation.
- b. Cases engage students in active learning, while giving learners the opportunity to analyze, discuss, and solve real problems, capitalize upon opportunities, or resolve real issues by exposing learners to a variety of problems, opportunities, or issues encountered within his or her personal or professional environment.
- c. Cases are suitable in enabling higher order intellectual skills, e.g., analysis, synthesis, and evaluation, acquisition and development. These intellectual skills are pre-requisite for applying creative thinking, inference-making, problem-solving, and conflict management skills as alternative solutions

or responses must be devised, evaluated, discarded, and applied. Learners also apply values and judgments in framing solution alternatives, selecting solutions and reaching consensus.

- d. Cases promote knowledge and skill transfer as students learn how to apply what is learned to “real world” situations, but in a “safe” environment. Students learn more deeply because they apply the knowledge, tools, and skills that have been acquired through repeated practice.
2. Cases may be relatively simple or complex (Rotch, All, & Smith, 1995).
 - a. **Level 1:** Such cases are the simplest in complexity. The problem, opportunity, or issue is well-defined and solution or response techniques are clearly evident. The learner may need to correctly compute formula and perhaps interpret the results. See Appendix 5.1.
 - b. **Level 2:** While the case is well-defined, its analytical approach and solution are less clear. At this level of complexity, the mix of analytical strategies and techniques must be selected and perhaps even modified by the learner for the specific fact pattern presented in the case. Analytical results must be compared to other facts in the case in order for an interpretation to emerge. See Appendix 2.2, Course Design Model: Departmental Syllabus, Implementation Evaluation Task Description and Rubric.
 - c. **Level 3:** These most complex cases are intended to reflect “real life” problems, opportunities, or issues. The case’s fact pattern, while clear may, mask several relevant and irrelevant issues. Making critical assumptions, applying structure to an ill structured situation, and selecting the appropriate mix of analytical strategies and techniques, are integral to the intended learning outcomes. There are likely to be multiple defensible interpretations of the data, more than one “correct” answer, and several “workable” solutions. Significant judgment is required to select the most suitable solution, requiring a rationale which will sustain rigorous logical analysis. Level 3 cases are beyond the scope of this primer.
 3. There are two types of PBI cases used in active teaching and learning.
 - a. **The POI Case:** A specific situation (i.e., problem, opportunity, or issue) which requires decision-making is described. These are action oriented, which may require learners to assume roles, conduct analyses, and frame decision-making recommendations. These may be Level 1, 2, or 3 in complexity. Appendices 2.2 and 5.1 are examples.
 - b. **The Reference Case:** A specific situation is presented, including the selected solution and outcome. Learners discuss and reason through the decision-making process. Learners also analyze why the chosen solution succeeded or failed. These cases tend to be Level 3 in complexity; quite complex; and time consuming to construct. Writing a reference case is beyond the scope of this primer; however, a good source is the Harvard Business School.

- B. General Guidelines for Writing a Level 1, 2, or 3 POI Case
1. The guidelines listed below will be more or less applicable depending on the case complexity. Level 1 POI cases will involve fewer guidelines than Level 2 or 3 cases, etc.
 2. Determining the case's purpose entails identifying its learning objectives, instructional application, and its presentation. The specific intellectual skills to be fostered and applied are specified.
 - a. Learning Objectives or Outcomes: In planning the case, list intended learning outcomes learners are to meet or master. Include the concepts, rules, procedures, and/or principles learners are to apply in the case; these influence selection of the problem, opportunity, or issue to be embodied in the case.
 - b. Intellectual Skills. The specific intellectual skills to be acquired, developed, or fostered should be identified as well as their application in creative thinking, inference-making, problem-solving, or conflict management.
 - c. Instructional Application: Cases can be used to elicit learner's attention; stimulate learning; illustrate concepts, principles or ideas taught in class; enable learners to view a situation from multiple perspectives (e.g., stock holder, manager, employee, customer); or to assess student knowledge and skills.
 - d. Case Presentation: Cases may be read and analyzed before a class session; the ensuing discussion is about the concepts, rules, procedures, and/or principles in the case. Cases may be coordinated with lectures or other assignments or may be presented as a stand alone instructional device.
 3. Consider the learners when designing the PBL case.
 - a. Pre-requisite knowledge and skills must be identified in the case planning process. Learning gaps (the difference between pre-requisite knowledge and skills and those required to successfully meet the learning outcomes) must be scaffolded or bridged. It may be necessary to build scaffolds into the case or to construct supplemental instructional materials. The casewriter must know learner's academic characteristics.
 - b. Learner roles must be specified.
 - (1) A case written for role-playing will contain more detailed background information; dialogue; specific roles, with specified positions and detailed perceptions, thoughts, feelings, values, attitudes, and decision-making.
 - (2) Cases written to stimulate discussion will provide plentiful background information as to characters' positions, thinking, values, motives, emotions, and solution alternatives; the POI context; the selected solution; and its consequences. It may be necessary to provide learners additional (e.g., reports, library or Internet) information resources to meet intended learning outcomes.

- (3) Cases written to apply learned knowledge and skills will require sufficient information to enable learners to achieve associated learning outcomes or targets. Often, this will require significant detailed information. See Appendix 2.2, Course Design Model: Departmental Syllabus, Implementation Evaluation Task Description and Rubric.
 - c. Once learning outcomes are identified and the case context is framed, the case writer or learner may need to locate needed information. Sources include databases, documents, personal/professional experience, interviews with people who experienced the source situation, library collections, professional literature, popular publications, electronic media, or subject matter experts. If learners are required to access any supplemental information, they should be told and prior instruction should enable them to access and use these information sources.
 - d. If the case is factual and the actual names of companies and/or people are used, then permission must be obtained, documented, and archived; the sponsoring organization or a key player may reserve the right to approve the case before release. If the case is based on a masked factual incident, permissions are not needed, but the casewriter must ensure that there exists no indication as to any identities in the case narrative or teaching note. If there is any chance of a reader identifying the organization or characters, the casewriter should obtain relevant permissions or revise the narrative to absolutely prevent identification.
4. POI Cases may include Teaching Notes which are written for the instructor to enable more effective use of the case and may accompany the case. Any teaching note for a Level 1 case will be quite brief; whereas, Level 3 notes tend to be quite lengthy.
 - a. The teaching note should be formatted to include: learning outcomes; the intellectual skills to be fostered and applied (e.g., critical thinking, problem solving, judgment); case summary; setting description (e.g., time, place, and other relevant contextual information); character descriptions (position, responsibilities, role in the case, personality, values, etc.); the problem, opportunity or issue to be acted upon; and case fact pattern (i.e., sequence of events).
 - b. Depending on the type of case, the actual solution or response may be presented including its consequences. Discussion questions may be included for the instructor and/or students. Questions should be simply stated so that the meaning of each is easily understood.
 - c. The case presented to students may include the case summary, context (setting and character descriptions), the problem, opportunity, or issue to be acted upon, case fact pattern, and possibly the effected solution and its consequences.

5. POI Cases typically include Case Narratives. A Level 1 narrative tends to be brief, while Level 3 narratives are quite detailed.
 - a. Cases should be written as a narrative, i.e., a story and must be “real” enough to engage learner interest and motivation to learn. Stories are easier to recall and transfer information from one application to another.
 - (1) Narratives tell the who, what, when, where, how, and why of an event through a progressive disclosure of the specific details, the character of the principal players, a presentation of the relevant fact pattern, and the problem(s), opportunity or opportunities, and/or issue(s) in the case.
 - (2) Devices to organize the narrative include presenting events in chronological order or by importance or using flashbacks if the presentation starts at the end or in the middle of the event sequence.
 - (3) There should be one central theme or event, i.e., POI, which dominates the case narrative, but no more than 5 logically related lesser themes or events.
 - b. Drafting the Case Narrative
 - (1) Before starting to draft the case narrative, the casewriter must know the case purpose (i.e., intended learning outcomes, intellectual skills, instructional application, and case presentation method) and salient learner characteristics.
 - (2) The casewriter next prepares the case outline and draft.
 - (a) There should be enough information so that learners can integrate themselves into the narrative, enabling them to learn what they must know and understand to discuss the case. The casewriter should not present an analysis.
 - (b) The casewriter should draft a plot which centers about the problem, opportunity or issue in the case.
 - [1] The plot should invoke uncertainty to be interesting to learners by progressively revealing facts, characters, and events.
 - [2] Plot disclosure must be sequenced to enable learner understanding. Sequencing can be done by constructing a series of logically ordered scenes as in a play.
 - [3] Scene one can introduce the case context, key characters, central problem, opportunity, or issue, and relevant lesser themes or events in a dramatic manner to “grab” the reader’s attention. Other characters and themes or events can be inserted into subsequent scenes as the plot unfolds. The final scene can “tie-up” the lesser themes or events, character perspectives, and solution alternatives with the central POI, thus inviting learner discussion.
 - [4] Each scene should enable the narrative to evolve; provide insight into each character’s personality, frustrations, values, and motives; and unify lesser themes or events with each other and the central POI.

- (3) The use of direct quotes and dialogue will enable learners to view cases themes from differing perspectives and will stimulate discussion of the case among learners especially if there is conflict over differing perspectives, causes, solutions, or anticipated consequences.
 - (4) The casewriter should anticipate and describe plausible solutions or response alternatives, including answers to case questions. When preparing the case narrative, the writer will then be cued to include relevant information. Some case writers include information about inappropriate solutions or responses to aid instructional effectiveness.
 - (5) Use transitions to connect scenes.
 - (6) Employ multiple media if practicable.
 - (7) Ensure that proper spelling, grammar and punctuation are used. Use simple direct sentences and headings.
 - (8) Provide only the numerical information necessary for learners to understand, discuss, and pose solutions to the case. Simple charts and graphs are effective in presenting numerical data.
- c. Drafting the case narrative is an iterative process; peer review and testing the case with learners are strongly recommended. Once the final draft is written, it is ready for evaluation.
6. Assessing and Evaluating the Final Case Draft, requires assessing the case narrative, teaching notes, and case purpose and learner fit, as applicable, given the complexity of the case.
- a. Assessing and Evaluating the Narrative
 - (1) Does the narrative tell the “who, what, when, where, and why” of the cases’ central event through a progressive disclosure?
 - (a) Is there sufficient detail about the context of the case for learners to understand its central problem, opportunity, or issue?
 - (b) Does the character development displayed in the case enable learners to assume roles and to understand associated attitudes, values, judgments, behavior, and decisions?
 - (c) Does the fact pattern presentation enable learners to understand the sequence of events, the evolving context, and influences of the key actors in the case?
 - (d) Does the ordering and linkage between narrative scenes promote intended learning?
 - (2) Writing Mechanics
 - (a) Are direct quotes and dialogue used to enable learners to understand differing perspectives in the case?
 - (b) Are transitions used to connect scenes?
 - (c) Do the organizing devices (e.g., chronological event ordering or use of flashbacks) enable learner understanding of case elements?
 - (d) If used, is multiple media application suitable to enable learning?
 - (e) Are proper spelling, grammar, and punctuation used?

- (3) Relationship with the Case Purpose & Learners
 - (a) Is the narrative very closely related to the learning outcomes?
 - (c) Does the narrative “fit” the instructional application of the case?
 - (d) Will the narrative keep learners interested and focused?
 - (e) Will the narrative stimulate discussion among learners?
 - (f) Is the case narrative suitable for the intended learner audience?

- b. Assessing and Evaluating The Case Purpose & Learner “Fit” requires answering these questions.
 - (1) Does the case achieve its purpose?
 - (2) Are the learning outcomes clearly stated?
 - (3) Are the learning outcomes appropriate to the intended application of the case?
 - (4) Are the learning outcomes suitable given learner academic characteristics?
 - (5) Does the case require learners to apply specified intellectual skills?
 - (6) Does the case require application of creative thinking, inference-making, problem-solving, or conflict management skills?
 - (7) Given the case, are learners likely to possess the pre-requisite knowledge and skills to meet the case purpose?
 - (8) Were learning gaps anticipated and sufficient scaffolding embedded in the case to enable intended learning?
 - (9) Is the case realistic?

- c. If provided, the effectiveness of the Teaching Notes (TN) must be assessed. Using these questions will prove helpful.
 - (1) Does the teaching note (TN) identify the courses or instructional applications for which the case is intended?
 - (2) Are case learning outcomes clearly stated?
 - (3) Are the specific pre-requisite knowledge and skills sufficiently described?
 - (4) Are specific higher-order intellectual skills specified?
 - (5) Are intended creative thinking, inference-making, problem-solving, or conflict management skills specified along with application examples?
 - (6) Are plausible learning gaps identified?
 - (7) Are suitable learning gap scaffold examples provided?
 - (8) Are helpful teaching strategies provided?
 - (9) If supplemental materials are provided, are they of sufficient quality?
 - (10) Are case associated learning activities/exercises challenging, if any?
 - (11) Are the answers to case questions clearly stated?
 - (12) Are case question answers accurate and understandable to learners?
 - (13) Are needed permission statements provided?

III. Strategies for Student Success in Case Learning

- A. The learner's role is to diagnose, analyze, and recommend a rational set of actions to solve a problem, capitalize on an opportunity, or resolve an issue. Case learning enables learners to
1. Increase their understanding of what does and does not guide organizational success;
 2. Foster skills to assess an organization's strengths, weaknesses, threats and opportunities in numerous situations;
 3. Acquire experience in identifying and framing organizational problems, opportunities, and issues as well as formulating, evaluating, selecting and implementing solution and/or response options;
 4. Enhance professional judgment and higher order intellectual skills; and
 5. Attain a rich, relevant experience base.
- B. Depending on case design and complexity (some of these suggestions may not apply), the instructor should advise learners to
1. Acquire a general understanding of the case, by quickly skimming it;
 2. Read the case slowly and very thoroughly to fully understand its facts and circumstances, once an overview has been established;
 3. Read all the tables, charts, graphs, inserts, and other exhibits;
 4. Determine the relevant points or issues;
 5. Perform what statistical analysis is necessary to interpret indices such as growth rates, financial ratios, etc.;
 6. Judge the validity and reliability of the data and information provided, including conflicting opinions and any recorded judgments;
 7. Fashion your own diagnosis and opinions about the data with evidence and reason based on logical analysis; and
 8. Develop a realistic, workable action plan with defensible recommendations, once a diagnosis has been made and supported.
- C. After the case discussion or while the case is being discussed, if it is substantial, each learner or learner team may prepare a case analysis report.
1. In preparing to write the case analysis report, learners should
 - a. Identify all pertinent issues, needing to be addressed.
 - b. Avoid unnecessary recounting of facts, numbers, history, etc.
 - c. Apply strategically, the knowledge, tools, and skills that have been acquired.
 - d. Interpret the evidence, logically with other supporting evidence.
 2. If a Case Analysis Report is written, it will likely be organized as follows.
 - a. The summary is composed of a few paragraphs which briefly report the central problem, opportunity, or issue and fact pattern.
 - b. The analysis is the longest section of the report document. Analyze and evaluate the fact pattern presented in the case. For example, for an organization

- (1) Provide a clearly focused diagnosis of the problems, issues, or opportunities, and demonstrate an understanding of relevant contexts (e.g., an organization's present circumstances, including its dominant business strategies).
 - (2) Determine the firm's financial health by examining its financial ratios, margins, rates of returns, and capital structure, etc.
 - (3) Decide whether or not the organization's strategies are producing satisfactory results, including why or why not.
 - (4) Assess the firm's marketing, production, regulatory and managerial competencies and performance.
 - (5) Assess the strength and character of competitors.
 - (6) Determine the firm's competitive position, including its trend.
 - (7) Offer evidence to support (logical analysis with evidence) the analysis and conclusions.
 - (8) Present supporting tables and charts which are may be cited in the text of the case report.
- c. If applicable, make appropriate recommendations
- (a) Recommendations should be comprehensive, addressing each problem, opportunity, and/or issue identified.
 - (b) Recommendations must follow logically from the analysis.
 - (c) Each recommendation should have a rationale, including a set of action steps that if implemented have a realistic prospect successful implementation. The action plan should be stated so that it is clear to a reasonably informed reader that what is recommended will solve the problem, capitalize upon an opportunity, or resolve the issue.
 - (d) If applicable, the organization or individual should be able to afford recommended courses of action. If there is a question as to affordability, strategies for raising the needed monies must be advanced.
 - (e) Recommendations should be culturally and legally acceptable.
 - (f) Do not make general, worthless statements, such as the organization must plan more; say specifically what it must do, no generalities.
- d. Implications: Here are written the expected or probable outcomes for the organization resulting from implementing the recommendations. Link logically the analysis, recommendations, and implications. The implications should be the logical conclusion to the analysis and recommendations.
3. If the case learning process is frustrating for some learners, advise them to be patient. The development of critical thinking, problem-solving and inference making skills as well as judgment takes time, experience, and discipline.
- a. If learners are new to the problem or case based learning, start with small situations such as one might frame for a brief or extended essay.
 - b. Next, start learners with a series Level 1 cases, carefully guiding them through the process.
 - c. Once learners are comfortable, gradually increase case complexity.

References

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Appendix 5.1 Program Evaluation Plan

Apply Kirkpatrick's Four Levels of Evaluation model to the evaluation of a selected training program (IBSTPI Standard: 5, 6, & 18). Using a different (from other individual students or student teams) program evaluation situation and evaluation research question (ERQ), the student will frame a program evaluation plan for any program he or she selects. Given your preference, you may work on this plan as a two-person team or individually. The process for completing this activity is below. Respond to each criterion (e.g., A1, A2, A3, B1, B2, etc.) in the order presented.

A. Program Evaluation Situation.

1. Describe the business or organizational unit experiencing the evaluation in terms of its mission, services or products, and general staffing and customer demographic characteristics.
2. Describe the reasons that the evaluation is necessary in concrete specific terms.
3. Describe whether or not this planned evaluation study is formative or summative; explain the rationale for your determination.

B. Evaluation Research Question

1. Identify and describe who will participate in the program being evaluated in some detail; include some demographic information.
2. State explicitly the intended outcomes for the program being evaluated as well as expected timeframe. Describe how the program is delivered (e.g., schedule, delivery platform, etc.) briefly.
3. Identify the independent variable and dependent variable involved in the planned evaluation study, stating specifically the expected impact of the independent variable on the dependent variable.
4. Identify 2 to 3 potential moderating variables; state clearly their expected impact on either the independent variable or the dependent variable (usually dependent variable); and describe how you will either reduce or eliminate their anticipated effects in the planned evaluation study.
5. Since the dependent variable must be measured, identify the specific name of the tool to measure the dependent variable used in the evaluation study.
6. This section should end with a specific evaluation research question (ERQ). The ERQ must include the independent variable, dependent variable, time-frame, name of any data collection tool or tools, and any moderating variables which are controlled by including them in the ERQ.

C. Evaluation Design

1. Identify and describe the specific evaluation design you intend to use; explain how the design “works,” including the rationale for selecting it. Identify the sampling plan and explain why it “fits” the selected design. Pick a design that will let you answer the evaluation research question. You may use a quantitative, qualitative, or mix method design; you only have to use one design.
2. Identify any controlled and uncontrolled internal design validity threats for quantitative designs (survey, pre-experimental, quasi-experimental, or experimental designs); describe intended control strategies, if there are any for the evaluation design selected; if the internal design validity threats are uncontrollable, say so. For qualitative designs, explain how you would establish the design’s validity.

D. Data Collection Tools

1. Construct a brief measure of knowledge, skill performance, and attitudes which should provide data to answer your evaluation research question. Data collection tools are required.
 - a. If you measure knowledge, you will need to construct an achievement test, Appendix A.
 - b. If you measure skill performance, you'll need to construct a direct performance assessment, Appendix A.
 - c. If you measure attitudes, you will need to construct an attitude scale, Appendix B.
2. Ensure that you explicitly align each measure (data collection tool) or a single instrument's items to Levels 1, 2, & 3, explaining the match.

Ensure each measure you construct conforms to generally accepted standards. The individual instruments must measure Levels 1-3; you must align or state which level every single item is intended to measure. Items which measure knowledge, skills, and attitudes are required.

If you identify, for example, five instruments or measurement tools, then you must design and include five measurement tools. Points are lost if five measurement tools are mentioned but only or two are included in your response to Criteria D.

E. Data Analysis Plan

1. Since most program evaluation tools used in instructional design and training are descriptive, be sure you specifically describe the measures of central tendency and variability, as well as what graphics, you intend to use.
2. Ensure that you explain the rationale for each of the descriptive statistics selected; if you plan to test for differences between groups, your instructor will help you prepare that portion. For example, if you use a pretest/posttest design, you can apply the dependent samples t-test. If you use control or comparison groups, you can apply the independent samples t-test.
3. Show explicitly how each measure provides data to answer the evaluation research question. You might construct a table (ensure you explain the table thoroughly) such as the one below.

Table Number

Table title

Statistical Indices	Rationale for Selection	How Answers ERQ
Central Tendency		
Mean		
Median		
Mode		
Variability	Rationale for Selection	How Answers ERQ
Range		
Standard Deviation		

F. Level 4 Evaluation Recommendations

1. Frame recommendations that if adopted would enable a Level 4 program evaluation; be specific in the metrics you recommend for a Level 4 evaluation. Describe them fully, explaining the rationale for each metric you selected.
2. Ensure that there is a logical connection between The Level 1, 2, and 3 evaluation described in Criteria D and the Level 4 recommendations presented in response to Criteria F.

Your program evaluation plan must meet all the criteria outlined above and in the scoring rubric. There is no waiver of criteria for any reason. The scoring rubric for the program evaluation plan is presented below. The plan is worth 150 points and is expected to be 8-9 pages, exclusive of the title page, reference list, and data collection tool(s).

The organization of the program evaluation plan is below. Please ensure compliance with the centered and left margin headings.

Cover Page

Program Evaluation Situation
Evaluation Research Question
Evaluation Design
Data Collection Tools
Data Analysis Plan
Level 4 Program Evaluation Recommendations

Reference List

Appendix A: Measure of Knowledge and Skills (Required)

Appendix B: Measure of Attitudes (Required)

(Appendices A and B may be combined)

(Ensure that instrument assesses levels 1, 2, & 3)

I will be happy to read any complete section for initial feedback prior to the middle of the 7th week. No papers will be accepted for free read after Wednesday (the 4th day) of Week 7. The free read is optional. If any documentation submitted for free read is incomplete or in rough draft form, I will return the document with no comments and no resubmission opportunity. The reference list is expected to be complete (for the sections submitted) and fully compliant with APA. To take advantage of the free read opportunity, it is likely that you will need to work ahead.

EDU 524 Program Evaluation Plan Scoring Rubric				
Criteria	Unsatisfactory	Basic	Competent	Proficient
A. Program Evaluation Situation. Described the business or organizational unit in terms of its mission, services or products, and general staffing and customer demographic characteristics; explained reasons for the program evaluation; & explained whether or not the evaluation is formative and summative.	0-13	14-15	16-18	19-20
B. Evaluation Research Question. Described program participants in detail; stated the program's intended outcomes; identified the independent variable and dependent variables; identified 2-3 potential moderating variables, their effect, and anticipated control strategies; identified or described the specific tool(s) to be used in measuring the dependent variable; & stated an explicit program evaluation question.	0-21	22-24	25-27	28-30
C. Evaluation Design. Described the evaluation design, how it "works," rationale for selection & any controlled or uncontrolled internal design validity threats for quantitative designs (described intended control strategies if any), or how validity would be established for	0-21	22-24	25-27	28-30

qualitative designs; and explained the rationale for the sampling strategy used.				
D. Data Collection Tools. Constructed a brief measure of knowledge and skill performance (e.g., test) and attitudes, which provides data to answer the research question suitable for a Level I, 2, & 3, evaluation. Each measure generally conforms to accepted professional standards.	0-21	22-24	25-27	28-30
E. Data Analysis Plan. Prepared a data analysis plan which includes measures of central tendency and variability as well as what graphics intend to be used in data analysis; explained the rationale for each of the descriptive statistics selected. Showed how each measure provides data to answer the ERQ.	0-13	14-15	16-18	19-20
F. Level 4 Recommendations. Framed recommendations that if adopted would enable a Level 4 program evaluation; ensured that there is a logical relationship between The Level 1, 2, and 3 evaluation described in Criteria D and the Level 4 recommendations presented in response to Criteria F.	0-13	14-15	16-18	19-20
Comments: Up to 12 points may be lost for failure to comply with APA referencing formats and style conventions.				
Total Score: _____ / 150 = _____ % or _____ (Grade)				
Proficient corresponds to an “A” grade (≥95%); Competent corresponds to a “B” to an “A-“grade (83%-94%); Basic corresponds to a “C” to a “B-“ grade (75%-82%); and Unsatisfactory corresponds to a “F” grade (≤74%).				